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ABSTRACTS OF THE ANNUAL MEETING 2024

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ORAL COMMUNICATIONS

OC 01

Artificial Intelligence in the diagnosis and management of appendicitis in pediatric departments: a systematic review

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Introduction: Artificial Intelligence is a growing field in medical research that could potentially help in the challenging diagnosis of acute appendicitis (AA) in children. However, usefulness of AI in clinical settings remains unclear. Our aim was to assess the accuracy of AIs in the diagnosis of AA in the pediatric population through a systematic literature review.

Methods: PubMed, Embase, and Web of Science were searched using the following keywords: "pediatric", "artificial intelligence", "standard practices", and "appendicitis", up to September 2023. The risk of bias was assessed using PROBAST.

Results: A total of 302 articles were identified and nine articles were included in the final review. Two studies had prospective validation, seven were retrospective, and no randomized control trials were found. All studies developed their own algorithms and had an accuracy greater than 90% or AUC >0.9. All studies were rated as a "high risk" concerning their overall risk of bias.

Conclusion: We analyzed the current status of artificial intelligence in the diagnosis of appendicitis in children. The application of AI shows promising potential, but the need for more rigor in study design, reporting, and transparency is urgent to facilitate its clinical implementation

OC 02

SWISSPANDEMIC&AMR-HEALTH ECONOMY AWARENESS DETECT, SPEARHEAD – Risk prediction for urinary tract infections using nationwide federated learning approach

Aerts L.K[1], Malpetti D[2], Azzimonti L[2], Bonesana C[2], Pham A[3], Kim H[3], Greub G[4], Delfino A[4], Huttner A[5], Lidén M.M[5], Sorolla E[1], Bielicki J.A[1]

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Introduction: Antimicrobial resistance (AMR) is considered a major threat to healthcare globally and without intervention it is expected to become one of the leading causes of death by 2050. One key response to AMR is to promote optimal use of antimicrobials through coordinated and data-driven stewardship. SPEARHEAD, a project funded by Innosuisse, aims to tackle AMR from multiple angles, ranging from evaluating its economic impact to promoting awareness via civic engagement. One of the project objectives is to develop a machine learning model that can help clinicians prescribe antimicrobials optimally to treat the commonly occurring urinary tract infections (UTIs) in the paediatric population.

Methods: To train machine learning models, this project uses a framework called federated learning (FL). This technique allows multiple institutions to collaboratively train a common model without sharing their data, but only sharing fully anonymous model parameters specific to the interest. The primary analytical output will be a risk prediction of the risk of any UTI episode being caused by a pathogen resistant to first choice empiric antibiotic treatment. The project will only reuse anonymized routine data and will not access any samples for additional laboratory analyses. There will be no sharing of patient-level data, but only meta-data (model parameters) aggregated centrally.

Results: The project started in 2022 and will last four years. The FL framework is under development at IDSIA, with a first test being successful. Currently, the project team is focused on locating existing relevant data within the databases of three different hospitals, UKBB, CHUV and HUG. These three data sources will be used to train machine learning models. The ultimate result of the model will be the creation of a user-friendly UTI specific platform that utilizes machine learning models to support clinicians in making data informed decisions for optimal antibiotic prescription.

Conclusion: The Swiss project SPEARHEAD uses federated learning to create a machine learning model that can predict antibiotic resistance in children. This model will serve as the backbone of a web-based platform accessible to clinicians, with the goal of supporting them in making responsible decisions regarding the use of antibiotics. Federated learning has the unique advantage of not requiring the transfer of data, allowing new partners, even those outside Switzerland, to join the framework.

OC 03

Glocal vaccination card manager: Using AI to help frontline healthcare workers to deliver appropriate healthcare to migrants and refugees

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Introduction: Globally around 67 million children missed immunization between 2019 and 2021. A 2015 report by WHO, UNHCR, and UNICEF on vaccination for refugees in the WHO European Region emphasizes equitable access to vaccination, irrespective of origin or political status. Migrants face challenges accessing health facilities, leading to missing or incomplete health records. Diverse national immunization programs, translation needs and a lack of digitalization contribute to difficulties, resulting in vaccine over-administration. This not only incurs additional costs but also strains medical resources. Solutions addressing these issues would promote equal vaccination access for migrating populations, as recommended in the 2015 report, and reduce outbreak risks for host countries.

Discussion: Healthcare professionals currently use a WHO website to assess a patient's immunization needs, comparing vaccination schedules across countries. This manual process, relying on paper vaccination cards and separate translation tools, is lengthy and error prone. Introducing a global digital card could streamline this process, but challenges such as data protection, storage, technological security, and compatibility must be carefully addressed.Proposing a digital vaccination

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card with offline capability, either as an application or web software, is our solution. This tool would store updated national vaccination schedules, interpret both paper and digital immunization records, and employ AI to recommend the best vaccination schedule for each patient. The aim is to efficiently compare schedules across origin, transit, and destination countries, providing personalized immunization advice. The user-friendly application would integrate with existing online tools, possess the ability to convert documents to PDF and comply with GDPR regulations by not storing personal health information.

Conclusion: The main aim of this new AI technology is to adjust recommendations to each individual patient according to their immunization status, granting access to vaccination and limiting duplicated or missing immunizations. In a world where conflicts, disasters and displacement are predicted to only increase, access to vaccination must become a global health priority not only to protect the individual but also to limit further outbreaks. In such an evolving world, advanced technology such as this digital card has the potential to serve as a powerful tool to continue ensuring access to quality.

OC 04

Make your data work – Ideas and actions to establish an analytics center for child health in Lucerne

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Todays EHR systems contain valuable data, that is underutilized for science purposes. To change this, we decided to establish a service unit tasked with translating ideas into data analysis, thereby improving data literacy and feeding back improvements in discrete documentation. Our main outcome will be data-enriched research projects, additionally we will automate data reporting and extraction, that is currently only possible with manual work.

Starting small this unit was established „embedded" within the Lucerne pediatric hospital with the double aim of supporting the usage of EHR data for science and improving structured documentation in the medical record. After five month we can share our structure, first projects, problems encountered and how we try to solve them. In addition we will provide an assessment of the state of data literacy in our institution.

OC 05

AI algorithms for the detection and confirmation of joint bleeds in children and adults using ultrasonography

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Background: Joint bleeds are a significant concern in patients with haemophilia, ultimately leading to arthropathy. Timely diagnosis and treatment of bleeds are essential but difficult on a clinical basis only. Artificial intelligence (AI) and handheld ultrasound technology can enable patients to detect joint bleeds with the use of point-of-care ultrasound. This study aimed to develop and assess the reliability of convolutional neural network deep learning algorithms in detecting and segmenting synovial recess distensions (a bleed indicator) in ultrasound images of the knee, elbow and ankle joints for both adults and children.

Methods: A total of 12,145 exams comprising 61,501 ultrasound images were collected from seven global healthcare centres. The dataset included normal controls, haemophilia controls and cases with recess distension for both adult and paediatric populations. Two experts manually labelled these images, which were then used to train binary convolutional neural network classifiers and segmentation models based on EfficientNet-B4 and DeepLab V3 architectures. Performance was evaluated using metrics such as accuracy, sensitivity, specificity and area under the curve (AUC).

Results: The algorithms exhibited high accuracy across all joints and both patient cohorts. Specifically, the knee model showed an accuracy of 97%, sensitivity of 96%, specificity of 97% and an AUC of 0.97 in synovial recess distension. The elbow and ankle models also performed well, especially when pre-trained on knee data, showing increases in accuracy of up to 4%. High Dice coefficients (80-85%) were achieved in segmentation tasks across all joints.

Conclusion: The developed AI algorithms demonstrated high efficacy in detecting and segmenting joint recess distensions in ultrasound images, offering a potentially cost-effective, scalable and accurate diagnostic tool. This technology has significant potential to enhance the early detection and management of joint bleeds in haemophilia care.

OC 06

Sensitivity for Clinical detection of DDH – does it still have a place in 2023?

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Background: Detecting developmental dysplasia of the hip (DDH) in infants is crucial, and various screening strategies have been proposed, including clinical examination and ultrasound. However, controversy exists regarding which screening method is optimal. There is no agreement on whether hip ultrasound should be performed on all newborns (universal screening) or only in those with risk factors or clinical instability of the hip during clinical examination (selective screening). We assessed the sensitivity of clinical screening for DDH conducted by experienced pediatric orthopedic surgeons in newborns.

Methods: In this retrospective study, we compared the records of the clinical exam to the hip ultrasound according to Graf in 122 newborns aged between 0–3 months treated at our tertiary care center for primary DDH. Statistical analysis was applied to calculate the sensitivity of the clinical examination.

Results: Clinical screening showed a sensitivity of 66%. This indicates that 34% of DDH cases would have not been diagnosed through clinical examination alone. Furthermore the sensitivity of the exam for unstable patients (Graf D, III and IV) was 91% and as low as 50% for stable patients (Graf IIA, IIB and IIC). This difference in sensitivity was statistically significant ($P < 0.05$).

Conclusion: Clinical screening, even when conducted by experienced pediatric orthopedic surgeons, exhibited limited sensitivity. Universal ultrasound screening at birth provides a more

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comprehensive evaluation and has the potential to reduce delayed diagnoses and their associated complications.

OC 07

Congenital syphilis in Switzerland: a retrospective cohort study, 2010 to 2019

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Aims of the study: We previously reported a re-emergence of syphilis from 2006 to 2009 with detection of congenital syphilis in Switzerland. This study aimed to reassess the incidence of children exposed to maternal syphilis during pregnancy and congenital syphilis in a following 10-year period in the canton of Zurich, the most populous canton in Switzerland with the highest incidences of syphilis.

Methods: Children were identified both by reviewing medical records at the four major neonatal and paediatric hospitals providing acute care in the canton of Zurich and by the serological database of the syphilis reference laboratory. Inclusion criteria for children were (a) date of birth in the period 2010–2019, (b) place of birth in the canton of Zurich, (c) evaluation for syphilis due to positive syphilis pregnancy screening and (d) age <1 year at diagnosis. Results were compared with epidemiological data provided by the Federal Office of Public Health (FOPH).

Results: We identified and evaluated 17 children after potential exposure to maternal syphilis. Residual antibodies of a past infection were found in 11 mothers. Six children were identified as having had real exposure to asymptomatic maternal syphilis. From an epidemiological perspective, the distribution of the cases followed a similar pattern as confirmed syphilis cases in women of childbearing age reported to the FOPH. No cases of congenital syphilis were observed.

Conclusions: In contrast to the rise in syphilis infections, this study identified no cases of congenital syphilis in the canton of Zurich, Switzerland, in the period 2010–2019. Syphilis pregnancy screening may have prevented congenital syphilis by diagnosing and allowing adequate treatment of asymptomatic maternal syphilis.

OC 08

Metagenomics analysis of the neonatal intestinal resistome

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Introduction: The intestinal microbiome forms a major reservoir for antibiotic resistance genes (ARGs). Little is known about the neonatal intestinal resistome.

Objective: The objective of this study was to investigate the intestinal resistome and factors that influence the abundance of ARGs in a large cohort of neonates.

Methods: Shotgun metagenomics was used to analyse the resistome in stool samples collected at one week of age from 390 healthy, term-born neonates who did not receive antibiotics.

Results: Overall, 913 ARGs belonging to 27 classes were identified. The most abundant ARGs were those conferring resistance to tetracyclines, quaternary ammonium compounds, and macrolide-lincosamide-streptogramin-B. Phylogenetic composition was strongly associated with the resistome composition. Other factors that were associated with the abundance of ARGs were delivery mode, gestational age, birth weight, feeding method and antibiotics in the last trimester of pregnancy. Sex, ethnicity, probiotic use during pregnancy, and intrapartum antibiotics had little effect on the abundance of ARGs.

Conclusion: Even in the absence of direct antibiotic exposure, the neonatal intestine harbours a high abundance and a variety of ARGs.

OC 09

Parental knowledge and attitudes to infant immunization in the context of RSV: all about confidence?

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Background: Recently, the first RSV vaccines have been approved, but vaccine hesitancy still poses great challenges to immunization programs.

Objective: To investigate this phenomenon in the context of the new RSV vaccines and an increased virus activity in 2022/23, we assessed parental knowledge and attitudes towards general childhood and RSV vaccines.

Methods: Parents of infants from 0-36 months completed an online questionnaire on demographics, socio-economic status, mental well-being, knowledge on RSV and perceptions of disease, attitudes to general childhood and RSV vaccines. The survey was conducted from February-June 2023 in the region of Regensburg, Germany. We compared continuous or categor-

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ical data with two-sided t-tests or Chi-square tests, respectively. Linear and logistic regression models were used to adjust for confounders.

Results: From 191 survey participants, 84% had never refused any recommended vaccination and 90% trusted their paediatrician's information. 11% felt that children should have fewer vaccinations or rather get over the illness. Parents who were supportive or undecided about RSV vaccination were less likely to be vaccine hesitant in general (OR 0.037, p <0.001; OR 0.144, p = 0.003). 58% reported to have basic or good knowledge on RSV, correlating with a higher socioeconomic index (p <0.001). 24% were undecided about RSV immunization, while all parents rated its benefit high in the child's first year of life. Parents who refused RSV vaccination were less concerned about the infection compared to vaccine supporters (OR 0.45, p = 0.005). Parents with previously hospitalized (OR 3.2, p = 0.026) or preterm born children (OR 4.3, p = 0.036) were generally more concerned.

Conclusion: Many factors influence parental decision-making leading to three main groups of attitudes: vaccine acceptors, refusers and hesitant but accessible parents. They (24%) represent the "target group" to increase vaccine uptake. Information on the vaccine-preventable disease reduces vaccine hesitancy, underlining the importance of healthcare professionals who remain an important source of trust.

OC 10

Phase 1 Safety and Immunogenicity Results of Two Investigational mRNA Vaccines, mRNA-1345, a Respiratory Syncytial Virus Vaccine, and mRNA-1653, a Human Metapneumovirus and Parainfluenza Virus Type 3 Combination Vaccine in Seropositive Young Children

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Background: Respiratory syncytial virus (RSV), human metapneumovirus (hMPV), and parainfluenza virus type 3 (PIV3) are common respiratory illnesses in children. Two investigational vaccines, mRNA-1345, encoding the RSV prefusion stabilized F (preF) glycoprotein, and mRNA-1653, encoding the hMPV and PIV3 F glycoproteins, are in clinical trials.

Methods: Two phase 1, randomized, observer-blind, placebo-controlled trials in children aged 12-59 months assessed safety and immunogenicity of mRNA-1345 (NCT04528719) and mRNA-1653 (NCT04144348). In the mRNA-1345 trial, RSV-seropositive children (N = 46) were randomized to receive 3 doses of mRNA-1345 (15 µg or 30 µg) or placebo 2 months apart. In the mRNA-1653 trial, hMPV- and PIV3-seropositive children (N = 27) were randomized to receive 2 doses of mRNA-1653 (10 µg or 30 µg) or placebo 2 months apart. Interim data through Month (M) 5 for mRNA-1345 and M3 for mRNA-1653 are reported.

Results: mRNA-1345 and mRNA-1653 were well-tolerated. The most frequently reported solicited local adverse reaction (AR) was tenderness at injection site (mRNA-1345, 35.7%-71.4%; placebo, 26.7%-42.9% and mRNA-1653, 44.4%-60.0%; placebo, 12.5%-30.0%); solicited systemic ARs (mRNA-1345, 12.5%-53.3%; placebo, 33.3%-50.0% and mRNA-1653, 33.3%-55.6%; placebo, 12.5%-60.0%) were mostly grade 1/2. One mRNA-1345 injection boosted RSV neutralizing antibody (nAb) titers (geometric mean fold rise [GMFR] over baseline: RSV-A = 18.9-34.9; RSV-B = 7.2-14.3) and RSV preF and postF binding antibody (bAb) concentrations (GMFR: preF = 13.9-26.5; postF = 9.3-16.0); additional injections did not further elevate antibody levels. One mRNA-1653 injection boosted hMPV and PIV3 nAb titers (GMFR over baseline: hMPV-A = 2.9-6.1; hMPV-B = 6.2-13.2; PIV3 = 2.8-3.0) and preF and postF bAb concentrations (GMFR: hMPV preF = 5.3-6.1; postF = 4.6-6.5 and PIV3 preF = 13.9-14.2; postF = 11.0-12.1); a second injection did not further increase antibody levels. In both trials, bAb responses were generally preF biased.

Conclusions: In seropositive children aged 12-59 months, mRNA-1345 and mRNA-1653 were well-tolerated and boosted RSV and hMPV plus PIV3 antibodies, respectively, supporting their continued development and that of a combination RSV and hMPV vaccine.

OC 11

The fit of WHO growth reference curves to school children from Zurich: The LuftiBus in the school study (LUIS)

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Introduction: Within Switzerland different growth references are available: The World Health Organization (WHO) references, recommended by the pediatric society, and the Center for Pediatric Endocrinology Zurich (PEZZ) references. We investigated the fit of the two growth references to anthropometric measurements from school children in the canton of Zurich and assessed the prevalence of overweight, obesity, thinness, and short stature.

Methods: We analyzed data from 3755 children aged 6-17 years of the LuftiBus in the school (LUIS) study, collected between 2013-2016. We calculated z-scores of height, weight, and body mass index (BMI) based on the WHO and PEZZ growth references. We compared the mean and distribution of z-scores to the expected standard normal distribution with the Anderson-Darling test. We classified overweight and obesity based on cut off values provided by the respective BMI references: WHO: obesity >97.0th percentile, overweight >90.0, thinness <10.0; PEZZ girls: obesity >96.8, overweight >82.9, thinness <10.0; PEZZ boys: obesity >95.5, overweight >78.9, thinness <8.5. We defined short stature below the 3rd percentile of height-for-age.

Results: Children in LUIS were taller (mean height z-score: 0.56), heavier (mean weight z-score: 0.28), and had a slightly higher BMI (mean BMI z-score: 0.06) than the WHO reference population. LUIS children were also slightly taller (mean height z-score: 0.15) and heavier (mean weight z-score: 0.06) than the PEZZ population but had a similar BMI (mean BMI z-score: -0.01). The WHO references provided a worse fit to the LUIS children than the PEZZ references, Anderson-Darling goodness of fit A2 (lower value indicates better fit): height (WHO: 578.1 vs. PEZZ: 48.1), weight (124.0 vs. 10.0), and BMI (24.3 vs. 0.8). The WHO classified fewer children as overweight than the PEZZ (9% vs. 15%) but more children as obese (6% vs. 4%). The WHO defined fewer children as short stature than the PEZZ (1% vs. 3%).

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Conclusions: Our findings suggest that the growth of school children in Zurich differs clearly from the WHO growth references. The PEZZ references, also based on children living in Zurich and Luzern, fitted better. However, the validity of growth references should be evaluated on a national level as there might be regional differences.

Funding: Funded by the Swiss Personalized Health Network (NDS-2021-911) and Lunge Zürich.

OC 12

Access to Pediatric Primary Care in Switzerland: Current Geographic Differences and Modeled Future Needs

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Background: The distribution of pediatricians in private practice is quite unbalanced in Switzerland. However, even in regions, with a high density of primary care providers, retirements soon will lead to a high demand of successors. Spatial disparities in health care access have already been assessed for family doctors in Switzerland, but this has not been done for pediatricians, so far. Furthermore, there is no data available, which models the distribution of active pediatricians in private practice over the next years. We therefore aimed to determine the number of pediatricians actively working in pediatric private practices in Switzerland in 2019, to explore the geographic distribution and density of pediatric practices, and to model the situation 10 years after baseline, based on the demographic characteristics of active pediatricians.

Methods: We applied the Modified Huff-model-based Variable 3 Step Floating Catchment Area (MHV3SFCA) method to calculate and map a Supply Density Index (SDI) across Switzerland, based on structural data on medical practices and outpatient centers of the Swiss Federal Statistical Office (FSO), and the geodata set of the statistics on population and households (STATPOP) of the FSO.

Results: In 2019, 1,332 doctors were working in pediatric outpatient practices in Switzerland, with an average workload of 70.4%. This total workforce was available to a demand population of 1,335,177 children and adolescents under the age of 14. Thus, an average of 1,423 children and adolescents were cared for by one practitioner, with significant differences between regions. We found that in 2019, more than one third of all pediatricians in private practices were aged 55 years or older, thus arriving at the usual age of retirement within ten years, leading to a marked loss of available pediatricians in private practice until 2029, particularly in the north-western part of the country.

Discussion: Our findings illustrate an unbalanced spatial distribution of active primary care pediatricians in Switzerland, and the imminent challenges to maintain the current level of service. It will be necessary to compensate the expected loss of workforce some regions facing to be clearly underserved, if no compensatory measures are installed, or adaptations of pediatric healthcare models are considered. Our methodology could also be applied in other types of health care in Switzerland and comparable settings worldwide.

OC 13

Growth response to medical intervention in a cohort of children with growth delay

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Context: Growth delay has various etiologies and treatment aims to get the child as close to his genetic height as possible and depends on the underlying cause. Growth response to growth hormone (GH) therapy is highly variable and data regarding catch-up growth is lacking for children who do not meet criteria for medical treatment.

Objectives: We aimed to assess the effect of a medical intervention (including GH therapy) on catch-up growth (primary outcome). We also looked at factors associated with good catch-up growth (secondary outcome).

Design: This was a retrospective cohort study on children referred for growth delay to the pediatric endocrinology clinic at Lausanne University Hospital between 2000 and 2019.

Patients: We included 536 children who answered one of the following inclusion criteria at time of referral: height <-2 SD, height <-2SD from target height or growth velocity <0 SD.

Intervention: Patients were divided into two groups; those who received a medical intervention (growth hormone, thyroid hormone etc) and those who benefitted from a wait-and-see approach.

Outcome measures: Good catch-up growth was defined as a difference in height of >0.5 SD and a difference in height velocity of >1 SD after 1 year.

Methods: The primary outcome was analyzed by means of propensity scores and inverse probability of treatment weighting. To determine factors associated with good catch-up growth (secondary outcome) we created a model considering the interactions between the intervention and the covariates.The final model was applied to 50 imputed datasets and pooled using Rubin's rule. The model considered a Poisson regression with robust variance with a log link function.

Results: The probability of showing good catch-up growth was 8.3 times higher with a medical intervention ([95% CI] 3.7-18.6, p <0.001) than a wait-and-see approach. Age, growth velocity and IGF-1 were inversely associated with good catch-up growth independently of the medical intervention. Peak of GH secretion and difference in bone age to chronological age were positively associated with good catch-up growth with a higher probability in the wait-and-see arm.

Conclusion: Appropriate medical intervention is key to ensure good catch-up growth in children with growth delay. Children with lower growth velocity, IGF-1 levels and younger in age should be referred early to specialized clinic as these factors are associated with a more favorable catch-up growth.

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OC 15

Distinguishing idiopathic autism from syndromic autism during an initial autism diagnostic evaluation.

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Introduction: Autism Spectrum Disorders (ASD) are neurodevelopmental disorders that occurs in approximately 1 in 100 live births. Autism is characterized by anomalies in social communication, repetitive behavior and restrictive interests. Currently, ASD refers to both idiopathic and syndromic autism. There are various causes of syndromic autism, including specific genetic mutations responsible for more severe behavioral phenotypes. Early methods for differentiating idiopathic and syndromic autism would be a useful indicator for genetic testing recommendations and building treatment plans based on a child's specific phenotype. The aim of our study is to understand whether standardized tests used for autism diagnosis reflect when ASD is syndromic.

Method: We retrospectively analyzed data recorded from 62 children diagnosed with an ASD between 2013 and 2021. Children with idiopathic autism (n = 43) were differentiated from children with syndromic autism (n = 19) based on conclusive genetic analyses indicating a genetic syndrome. Bivariate analyses were used to describe the sample. A logistic regression model included seven variables (gender, year of birth, age at diagnosis, M-CHAT, ADOS-2, ADI-R and IQ). The relationships between the two groups were explored using non-parametric statistical tests (chi-squared tests, Mann-Whitney tests).

Results: Bivariate analyses demonstrated significant differences between the two groups of children on the following variables: gender, age at diagnosis, M-CHAT screening test scores, ADOS-2 test scores and IQ. When compared to idiopathic ASD, children with syndromic autism were more likely to be female (p-value = 0.011), and be younger at diagnosis (p-value = 0.0009). Moreover, children with syndromic autism reported higher M-CHAT scores (p-value = 0.002) and ADOS-2 Total (p-value = 0.038) scores indicating more significant ASD symptoms. Finally, nearly all children suffering from syndromic autism showed moderate to severe delays on an IQ test, while average non-verbal IQ in the group was normal.

Discussion and conclusion: Children with syndromic autism had higher symptom scores at diagnosis on the M-CHAT and ADOS-2, and lower scores on cognitive tests, compared to children with idiopathic autism. Children, and particularly females, with a severe autistic profile demonstrated through elevated M-CHAT and ADOS-2 total scores and low cognitive test scores, should alert clinicians to the need for genetic testing.

OC 16

Associations of validated e-cigarettes and tobacco cigarettes exposure and subjective and objective lung health measures including multiple breath washout in adolescents. A cross-sectional study.

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Background: A growing number of adolescents are using e-cigarettes. Data on possible harms of e-cigarettes to adolescents is lacking. We compared indicators of lung health, including objective measures of exposure, in adolescents who vape, smoke, or do not vape nor smoke.

Methods: We included adolescents from a birth cohort in Bern, Switzerland, and enriched the dataset with adolescents who vape recruited through social media. We assessed demographic, substance use, respiratory symptoms (longest episode without coughing in past year), and lung function measures: conventional lung function, lung clearance Index (LCI) via multiple breath washout and fraction of exhaled nitric oxide (FeNO). We validated exposure to inhaled toxins through urinary analyses of polycyclic aromatic hydrocarbons (PAH), volatile organic compounds (VOC), tobacco-specific nitrosamines (NNAL), and salivary analyses of cotinine. Categories of exposure were: daily smoking; daily vaping without daily smoking (daily vapers); vaping or smoking weekly or monthly (occasional users); and no vaping nor smoking in the past year (abstainers). We adjusted results by gender, age, education level, secondhand smoke and ambient air pollution exposure, and self-reported atopic disease.

Results: We included 89 participants. Median age was 17.0 (range 15 to 22) years, 52% were women. Daily smokers (n = 11) and daily vapers (n = 22) reported not coughing for the same number of days (94 versus 95 days, difference: 1 day, 95% CI -75 to 77), but abstainers (n = 35) reported more cough-free days (194 days, 95% CI 153 to 236 days / year). Lung function results, including LCI and FeNO, were similar in all groups. Urinary NNAL concentrations were elevated in daily smokers (p = 0.02) and salivary cotinine levels were elevated in daily vapers and daily smokers (p <0.001), indicating that self-reporting was adequate. Levels of inhaled toxins (PAH and VOCs) were higher in daily smokers than in other groups (e.g. PAH 2.7 (1.7 to 3.6) vs 0.3 (0.0 to 1.0) in daily vapers). Results for occasional users (n = 21) resembled abstainers in all measures.

Conclusion: Lung function results were comparable in adolescents who vaped, smoked or did none. Adolescents vaping or smoking reported more respiratory symptoms than abstainers, indicating that both impaired lung health. Adolescents vaping were less exposed to toxins than smoking adolescents, suggesting vaping could be substituted for smoking to reduce harm in adolescents.

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OC 17

Acute aseptic meningitis temporally associated with intravenous polyclonal immunoglobulin therapy: systematic review and meta-analysis

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Background: An acute aseptic meningitis, characterized by symptoms and signs consistent with meningitis and by an elevated cerebrospinal fluid white cell count, has been occasionally observed on intravenous polyclonal human immunoglobulin therapy. Since case reports cannot be employed to draw inferences about the relationships between immunoglobulin therapy and meningitis, we conducted a systematic review and meta-analysis of the literature.

Methods: Eligible were cases, case series, and pharmacovigilance studies. The data sources utilized were Excerpta Medica, the United States National Library of Medicine, and Web of Sciences, without any limitation. The search strategy employed the following terms entered in separate pairs: (Intravenous immunoglobulin OR IVIG OR gamma globulin) AND (meningitis OR cerebrospinal inflammation). Relevant articles cited in the retrieved records, reports available in Google Scholar, and reports previously known to the authors were also considered for inclusion.

Results: We found 71 individually documented cases (36 individuals ≤18 years of age) of meningitis, predominantly affecting individuals with autoimmune disorders (N = 65; 92%). Ninety percent of cases presented ≤3 days after initiating immunoglobulin therapy and recovered within ≤7 days (with a shorter disease duration in children: ≤3 days in 29 (94%) cases). In 22 (31%) instances, the authors noted a link between the onset of meningitis and a rapid intravenous infusion of immunoglobulins. Cerebrospinal fluid analysis revealed a predominantly neutrophilic (N = 46, 66%) pleocytosis. Features consistent with an anaphylactic reaction or a serum sickness were never reported. Recurrences after re-exposure were observed in eight (N = 11%) patients. Eight case series addressed the prevalence of meningitis in 4089 patients treated with immunoglobulins. A pooled prevalence of 0.6% was noted.

Conclusion: Finally, pharmacovigilance data revealed that meningitis temporally associated with intravenous immunoglobulin therapy occurred with at least five different products. In conclusion, the present review and meta-analysis indicates that intravenous immunoglobulin may cause an acute aseptic meningitis. The clinical features remit rapidly after discontinuing the medication. The underlying mechanisms are still elusive.

OC 18

Nontyphoidal Salmonella Outbreaks Associated With Chocolate Consumption: A Systematic Review

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Background: A large, cross-border outbreak of nontyphoidal salmonellosis connected to chocolate product consumption was recently reported. This occurrence motivated us to conduct a comprehensive review of existing literature concerning outbreaks of nontyphoidal salmonellosis associated with chocolate consumption.

Methods: We performed a systematic review following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (PROSPERO CRD42022369023) in 3 databases: U.S. National Library of Medicine, Web of Science and Excerpta Medica. Google Scholar and the bibliography of each identified report were also screened. Eligible were articles published after 1970, describing outbreaks of more than 10 patients with a nontyphoidal salmonellosis associated with chocolate consumption.

Results: Twenty-three articles were included, which described 12 outbreaks involving a total of 3266 patients. All outbreaks occurred in high-income countries: 1 was limited to 1 city, 6 involved 1 country and the remaining 5 involved 2 or more countries. Six outbreaks peaked in winter, 3 in autumn, 2 in spring and 1 in summer. Children were mainly affected. No predominant serotype was identified.

Conclusions: Our data documents that chocolate is an optimal medium for the transmission of nontyphoidal salmonellosis. A connected worldwide reporting system including high-income, middle-income and low-income countries is crucial to detect infectious diseases outbreaks in an early phase and avoid their spread.

OC 19

Vaccine Immunity and immune reconstitution in Children After Hematopoietic stem cell transplantation: A Retrospective Single-center Study

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After undergoing hematopoietic stem cell transplantation (HSCT), pediatric patients face an elevated risk of contracting vaccine-preventable diseases. A retrospective study was conducted on 28 children who underwent HSCT between 2015 and 2019 at the Geneva University Children's Hospital. The primary

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objective of this study was to assess the restoration of the immune system and the maintenance of vaccine-induced protection following HSCT. Regarding immune reconstitution, it was observed that all children achieved normal levels of B and T cells within 12 months after the transplantation procedure. During the first year post-HSCT, vaccine-induced protection remained robust for tetanus and Haemophilus influenzae type b. However, the level of protection against pneumococcus was insufficient, with rates ranging from 54% at 3 months post-HSCT to 70% at 12 months post-HSCT. Furthermore, the study revealed a decline in seroprotection against varicella and measles at 12 months post-HSCT, with rates dropping to 73% and 44%, respectively. These findings emphasize the necessity of optimizing current vaccination guidelines for individuals who have undergone HSCT, with particular attention to improve pneumococcal vaccine strategies and addressing the challenges associated with live-attenuated vaccines.

OC 20

Rituximab-to-vaccine interval on SARS-CoV-2 immunogenicity in children: the potential role of prior natural infection

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Background: Treatment with anti-CD20 antibodies (Rituximab) is used in both adults and children to treat various autoimmune and oncological diseases. Rituximab depletes B cells and thereby antibody response to vaccines. This study aimed to examine the antibody response to mRNA-based COVID-19 vaccines in children aged 5 to 18 years undergoing rituximab treatment compared to healthy matched children.

Methods: Between January 31st and July 18th, 2022, we conducted a prospective observational study at the Geneva University Hospitals enrolling children aged 5-18 years under rituximab treatment who had received two mRNA-based SARS-CoV-2 vaccine doses. Controls were healthy, age matched, volunteers with no significant medical conditions. Exclusion criteria included a recent SARS-CoV-2 infection. Blood samples were collected at day 60 (±30) and day 270 (±90) after the second vaccination.

Results: Twenty participants were enrolled in the study, comprising 9 patients under rituximab treatment and 11 healthy controls. Rituximab-treated children elicited significantly lower SARS-CoV-2 spike protein (anti-S) antibody responses than healthy controls at 60 (±30) days after the second vaccine dose (geometric mean concentration: 868.3 IU/ml in patients and 11393 IU/ml in controls; p = .008). However, at this timepoint, patients with a rituximab-to-vaccine interval shorter than 6 months and with evidence of a past infection (based on positive anti-N antibody levels) had high levels of anti-S antibodies (geometric mean concentration: 2403 IU/ml). Further data collected at 270 (±90) days post-vaccination showed that the GMC for anti-S antibodies in patients was 667 IU/ml (95% CI 42-10610) and 1.56 (95% CI 0.22-11.12) for anti-N antibodies (Supplementary Table 1). There was no significant difference in anti-S antibody levels in the patient group between days 60 (±30) and 270 (±90).

Conclusion: A past infection with SARS-CoV-2 may induce anti-S-specific memory B cells that can be re-activated by SARS-CoV-2 vaccination, even after rituximab-induced B cell-depletion. This suggests that it is possible to vaccinate earlier than 6 months after rituximab to develop a good antibody response, especially in the case of past SARS-CoV-2 infection.

OC 21

Increased breadth and neutralization of antibodies against SARS-CoV-2 variants after infection and vaccination: A serosurveillance study in pediatric patients of Southern Switzerland

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Introduction: Limited data exists regarding the immune response in children following infection with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) or vaccination. The aim of this study is to evaluate the seroprevalence and the characteristics of the antibody response among children in Southern Switzerland across different phases of the Coronavirus Disease 2019 (COVID-19) pandemic.

Materials and methods: By analysing 756 sera derived from patients aged 0 to 16 years, admitted to the Institute of Pediatrics in Southern Switzerland during the pre-pandemic era and the four pandemic waves, our study examined the binding titers, cross-reactivity, and neutralizing capacities of serum antibodies specifically targeting SARS-CoV-2 variants. Seroprevalence demonstrated variability, as low as at 6% during the first wave and up to 14% and 17% in the subsequent two waves, peaking at 39% during the fourth wave. Among the 96 seropositive cases, the majority were asymptomatic (42.7%) or exhibited mild (20.8%) to moderate (32.3%) symptoms. A heightened risk of infection was significantly associated with moderate symptoms and close contact with COVID-19-positive subjects (P <0.001). The predominant driver of the antibody response was IgG specifically targeted at the receptor-binding domain (RBD) of the Wuhan-1 SARS-CoV-2 Spike (S). Children contracting the virus in the first three waves manifested a considerable decline in antibody titers, experiencing reductions of up to 11-fold in binding titers and 5.5-fold in neutralizing titers against diverse SARS-CoV-2 variants, such as Beta, Delta, and Omicron BA.1, BA.2, and BA.5. The decline in titers was less prominent among children infected in the fourth wave, displaying the highest frequency and titers of neutralizing antibodies against the same variants. In contrast to infection, immunization with a Wuhan-1-derived messenger RNA (mRNA) vaccine elicited elevated and diverse levels of cross-reacting antibodies against SARS-CoV-2 variants.

Conclusions: Despite the prevalent COVID-19 impact in Southern Switzerland, we initially noted a low seroprevalence of

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SARS-CoV-2 in children, which later increased during subsequent waves. The antibody response, initially modest in the first three waves, exhibited enhancement in the fourth wave. During this phase, children demonstrated elevated production of neutralizing antibodies following vaccination or infection with Delta and/or Omicron variants.

OC 22

Management of pediatric tularemia in Switzerland and Finland – 2004-2021

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Background: Comprehensive data on paediatric tularemia, an emerging zoonosis, are rarely described. The aim of this study was to analyse a large European cohort from Finland (FI) and Switzerland (CH) and describe differences in clinical presentation and management of tularemia (Subspecies: F. tularensis holarctica) transmitted by different vectors.

Methods: Review of patient records of two paediatric populations during 2004-2021 at Oulu University Hospital (FI) and 2012-21 from 11 large Swiss children's hospitals.

Results: 371 (FI: 268; CH: 103) tularemia cases were analysed: Mean age 7 years. 44% female. Main vectors in CH were ticks (88%), in FI 100% mosquitoes. Fever was present in 81% CH children and their median CRP was 15 mg/l (range 1-175). In both countries regional tularemia manifestations were present in 85%. Cervical and inguinal lymphadenopathy were the most common anatomic locations in CH and FI respectively. Serology was the main diagnostic tool. PCR was used in CH and FI in 33% and 6% of cases respectively. In CH 11% and in FI 55% of physicians used a targeted antimicrobial at the first presentation. Median delay of a first targeted antibiotic was 9 and 21 days in FI and CH respectively. Abscess formation (58% vs. 11%) occurred and surgery (42% vs 5%) was necessary in CH and FI children respectively. In both countries 55-59% children were hospitalised.

Conclusion: To our knowledge this is the largest European paediatric tularemia cohort. Tularemia, even as regional manifestation, causes substantial morbidity in children. It seems to be a more well-known differential diagnosis to FI physicians, as targeted antibiotics are used more often and with less time delay at the first instance. We postulate that early targeted treatment reduces suppurative complications, need for surgery and hospitalisation.

OC 23

Clinical characteristics and serological profiles of Lyme disease in children: a retrospective cohort study in Switzerland, 2006–2020

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Background: Lyme disease (LD) is the most common tickborne disease in the northern hemisphere and caused by the bacteria Borrelia burgdorferi. Although classical characteristics of LD are well-known, the diagnosis and treatment are often delayed, particularly in children. The aim of this study was to better describe clinical characteristics and serological profiles which allow for early and reliable diagnosis of LD in children.

Methods: This is a retrospective cohort study of children, 0–17 years of age, diagnosed with LD according to current guidelines at University Children's Hospital Zurich from January 1, 2006–December 31, 2020.

Results: In total, 469 children diagnosed with LD were included. LD presented in 171 (36.5%) patients with skin manifestations (including erythema migrans and borrelial lymphocytoma), in 190 patients (40.5%) with Lyme neuroborreliosis (LNB), and in 108 (23.0%) patients with Lyme arthritis. Seasonal variations were observed in patients with skin manifestations and LNB (high prevalence in May–October), but not in patients with Lyme arthritis. The median age was 8.0 years (IQR 5.5–10.5), but there were significant age differences observed between patients with different manifestations. Patients with Lyme arthritis showed more pronounced systemic inflammation compared to other manifestations. Significant differences were observed in specificity and magnitude of B. burgdorferi-specific serum antibody responses among LD manifestation groups.

Conclusion: This is one of the largest and most detailed studies for LD in Europe. It presents new observations regarding the differences in epidemiology and immune responses between various manifestations of LD in children, which we are investigating in more detail in a prospective LD study (BRILLIANT Study).

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OC 24

Long-term follow-up of seroprotection against measles after post-transplantation vaccination in children: a 9-year national prospective study

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Background: Live-attenuated vaccines, such as the measles-mumps-rubella vaccine (MMR), can be safety given to solid organ transplant recipients fulfilling specific safety criteria. However, there is no data on the long-term persistence of seroprotection.

Method: In this interventional, prospective, national cohort study, children were included at least one year after liver transplantation (LT). Eligible participants received MMR immunization. Measles-specific IgG antibodies were reassessed 2 months after vaccination and annually. Maximum three MMR doses were administered in total during the study to those who lost seroprotection (<150 IU/L).

Results: Of 119 participants enrolled, 60 (50%) were seroprotected against measles. Among the 59 non-seroprotected participants, safety criteria were fulfilled by 56 who subsequently received MMR vaccination at a median of 5.9 years (IQR 3.1-9.6) after LT. Seroprotection rate was 87% (95%CI 75-95%) after the first dose, 95% (95%CI 85-99%) after 1 to 3 doses. Half of the vaccinees (26/53, 49%) subsequently lost seroprotection. Among them, 23 received additional doses of MMR, with a seroconversion rate of 91% (95%CI 72-99%) after the first booster and 100% (97.5%CI 74-100%) after the second booster. At their last follow up (median 6.1 years, IQR 3.0-8.1 after inclusion), 63% (95%CI 49-75%) of all participants vaccinated by the study were seroprotected against measles. All were closely monitored after each immunization and no serious adverse event attributable to MMR was reported. There was no measles breakthrough infection.

Conclusions: When feasible, MMR vaccination should be administered before transplantation, as 50% of vaccinees remains seroprotected after transplantation. Non-seroprotected patients fulfilling specific safety criteria can safely benefit from MMR vaccination after LT. Regular serological monitoring is recommended to promptly identify the need for booster doses, that may be required in half of those vaccinated after LT.

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SWISSPEDNET

SPN 01

Clinical and laboratory biomarkers as predictors of severity in paediatric inflammatory multisystem syndrome-temporally associated with SARS-CoV-2 (PIMS-TS) – data from a prospective nationwide surveillance study in Switzerland

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Background: PIMS-TS (paediatric inflammatory multisystem syndrome-temporally associated with SARS-CoV-2) is a rare but serious condition in children following SARS-CoV-2 infection, characterised by a range of clinical symptoms with varying severity. Understanding risk factors for severe PIMS-TS is crucial for appropriate and timely intervention.

Objective: To identify factors associated with increased PIMS-TS severity in children.

Methods: In this nationwide prospective observational study, epidemiological and clinical data was collected from children <18 years of age with suspected or confirmed PIMS-TS from all 29 paediatric hospitals in Switzerland. Children were categorised into three groups according to admission to intensive care unit (ICU): non-ICU, ICU-moderate and ICU-severe, defined as requirement of invasive ventilation and/or inotropic support.

Results: Our analysis included a total of 204 children; 99 (49%) categorised as non-ICU, 50 (25%) as ICU-moderate, and 55 (27%) as ICU-severe. In ICU-severe cases, respiratory and neurological symptoms were more frequent compared with non-ICU cases: 72% vs. 47%, p <0.001 and 66% vs. 41%, p = 0.001, respectively. Compared with the non-ICU group, children in the ICU-severe group had lower lymphocyte counts, higher neutrophil-lymphocyte ratios, lower platelet counts, as well as higher C-reactive protein, N-terminal pro b-type natriuretic peptide, troponin T, and creatinine levels at admission. Lymphopenia and elevated troponin T levels at admission were associated with an increased risk of being in the ICU-severe group.

Conclusion: Severity of PIMS-TS may be predicted using laboratory biomarkers, which supports clinicians in decision making and management of patients.

SPN 02

A randomized controlled non-inferiority trial of placebo versus macrolide antibiotics for Mycoplasma pneumoniae infection in children with community-acquired pneumonia: trial protocol for the MYTHIC Study

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Background: The delayed re-emergence of Mycoplasma pneumoniae since late 2023 has led to outbreaks of community-acquired pneumonia (CAP) among children worldwide. Macrolides are the first-line treatment for this infection. However, it is unclear if macrolides are effective in treating M. pneumoniae CAP, mainly due to limitations in microbiological diagnosis of previous studies. The extensive global use of macrolides has led to increasing antimicrobial resistance. The overall objective of this trial is to produce efficacy data for macrolide treatment in children with M. pneumoniae CAP.

Methods: The MYTHIC Study is a randomized, double-blind, placebo-controlled, multicenter, non-inferiority trial in 13 Swiss pediatric centers. Previously healthy ambulatory and hospitalized children aged 3–17 years with clinically diagnosed CAP will be screened with a sensitive and commercially available M. pneumoniae-specific IgM lateral flow assay using a capillary blood sample where the results will be available within 10min. The diagnosis of M. pneumoniae infection in screened patients will be retrospectively verified by respiratory PCR (as reference test) and specific IgM antibody-secreting cell (ASC) enzyme-linked immunospot (ELISpot) assay (as confirmatory test for distinguishing between carriage and infection). Patients will be randomized 1:1 to receive a 5-day-treatment of macrolides (azithromycin) or placebo. The co-primary endpoints are (1) time to normalization of all vital signs for at least 24h (efficacy), and (2) CAP-related change in patient care status within 28 days (safety), such as (re-)admission or intensive care unit transfer. Secondary outcomes include side effects, as well as antimicrobial and anti-inflammatory effects. For both co-primary endpoints we aim to show non-inferiority of placebo to macrolide treatment. We expect no macrolide effect (hazard ratio of 1, absolute risk difference of 0) and set the corresponding

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non-inferiority margins to 0.7 and -7.5%. The “at least one” success criterion is used to handle multiplicity with the two co-primary endpoints. With a power of 80% to reject at least one null hypothesis at a one-sided significance level of 1.25%, 376 patients will be required.

Discussion: This trial will produce efficacy data for macrolide treatment in children with M. pneumoniae CAP that might help to reduce the prescription of antibiotics and therefore contribute to the global efforts toward reducing antimicrobial resistance.

SPN 03

12-Month Campaign – 12 Actions: A Manifesto for Individual and Planetary Health

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The environmental crisis poses a threat to our health in multiple ways: pandemics, global environmental pollution, climate change, and the collapse of biodiversity. Scientific evidence is clear; human-induced environmental disruptions are the cause of these health disasters: emerging infectious diseases, chronic illnesses, cancers, mental health disorders, excess mortality due to heatwaves, food insecurity, and threats to clean water resources. Healthcare systems aim to improve health but contribute to environmental degradation, accounting for 4 to 5% of global carbon emissions (6.7% in Switzerland). The Swiss Medical Association encourages primary care physicians to address the environmental dimension of healthcare. As pediatricians, our responsibility is crucial, especially considering that we care for the generation of tomorrow. Thus, we have the opportunity to influence their behavior. According to the latest study from the Swiss Federal Institute of Technology (EPFZ) on greenhouse gas emissions in Switzerland, only the awareness of environmental issues has an impact on individual carbon footprint.

In light of these findings, we have developed the 12-Month Campaign – 12 Actions. The goal of this campaign is to raise awareness among patients and their families about the concept of health and environmental co-benefits. Every month for one year, pediatricians can download material to promote a simple action that sensitizes their patients to healthy behaviors while reducing polluting impacts on the planet. The monthly sheet contains information and support material to enable doctors to inform patients: infographics, short evidence-based texts describing the scientific foundations, and concrete actions for maintaining health while benefiting the planet. It also includes the appropriate times to discuss these topics during consultations and references. To assess the campaign's impact on patients and pediatricians, as well as its feasibility, three studies conducted by master's students are currently underway.

We aim to present the scientific foundations on which the sheets are developed, along with all the logistical requirements for implementing such a campaign. Simultaneously, we are establishing a rigorous scientific evaluation system to measure its impact.

SPN 04

Music impacts brain cortical microstructural maturation in very preterm infants

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Background: Preterm birth disrupts important micro and macrostructural neurodevelopmental processes taking place from mid-fetal stage to birth. Early music interventions, by enriching the sensory input of premature newborns during neonatal intensive care unit (NICU) stay, could enhance brain maturation during this critical period of activity-dependent brain plasticity. However, literature is still scarce in this regard, namely its impact on brain structure.

Objectives: We aimed to study the impact of a longitudinal early music intervention on very preterm infants’ brain microstructural development.

Methods: We recruited 54 very preterm infants, born before 32 weeks’ gestational age (GA), who were randomized to receive a daily music intervention, controlled by a "sham" intervention. These children underwent longitudinal magnetic resonance imaging (MRI) acquisition, including a first MRI before the intervention (at 33 weeks GA) and a second MRI after the intervention (at term-equivalent age). We used the latest technological advances in diffusion MRI acquisition and analysis to assess microstructural changes in the preterm brain, namely applying whole-brain fixel-based analysis (FBA) complemented by NODDI.

Results: Between the 33th week GA and TEA (n = 40), preterm infants showed a significant longitudinal increase of fiber density (FD) and fiber cross-section (FC) in all major cerebral white matter (WM) fibers, reflecting fiber myelination and maturation. In cortical grey matter (GM), on the other hand, FD decreases, while FC and orientation dispersion index (ODI) increase longitudinally, reflecting cortical multidirectional complexification and intracortical myelination. The early music intervention resulted in a significantly higher longitudinal increase in FC and ODI in paralimbic cortical regions, namely the insula-orbito-temporopolar complex, precuneus, posterior cingulate gyrus, as well as auditory association cortex.

Conclusion: Our results show that important microstructural maturational changes are taking place in preterm infants WM and GM between 33 weeks GA and term-equivalent age. An early musical intervention increased these infants’ brain cortical complexity in regions important namely for social-emotional development, which is known to be impaired in preterm infants.

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SPN 05

Artificial Intelligence for Central Nervous System Tumor Segmentation in children —An Emerging Paradigm

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Background: Central nervous system (CNS) tumors represent the most prevalent solid tumors and are the leading cause of cancer-related mortality in children. Accurate tumor delineation on MRI is critical for surgical and medical treatment planning, as well as for response assessment and monitoring. However, manual segmentation is time-consuming and prone to high interoperator variability. These challenges could be mitigated using Artificial Intelligence (AI). In this study, we develop an AI-based approach for automated brain delineation and segmentation in a diverse dataset of pediatric CNS tumors.

Methods: We built a clinically annotated dataset of baseline MRI images of 210 pediatric patients diagnosed with CNS tumors at the University Children's Hospital of Zurich from 2014 to 2022. Multi-parametric MRI sequences (T1w, T1w-CE, T2, and T2-FLAIR) were pre-processed and manually segmented to delineate brain tissue and tumor subregions, including enhancing/non-enhancing tumor, cystic component, and peritumoral edema. A deep learning approach based on a 3D U-Net network will be trained on 154 patients and tested on a separate cohort of 56 patients.

Results: The patient cohort consisted of 210 patients with a median of 6 years (SD of 4.7). Low/high grade/diffuse midline gliomas, ependymomas, medulloblastomas, germ cell tumors located in different anatomical locations (brain lobes, brainstem, optic pathway, cerebellum, posterior fossa) were included. As proof of principle, we performed a whole tumor segmentation analysis on the most common pediatric CNS tumors, analyzing posterior fossa tumors and a subset of low-grade gliomas. The accuracy of the automated delineation method was given as volumetric overlap, expressed as Dice scores. The Dice score (median ± SD) for the whole tumor was 0.83 ± 0.2. Analyses for the remaining tumor locations and entities are ongoing.

Conclusion: Automated tumor segmentation contributes to pediatric CNS tumors' grading, treatment response prediction and prognosis; and has a major impact on surgical or radiotherapy planning and follow-up. Implementation of these methods may streamline clinical workflow. Our brain delineation and tumor segmentation model provide accurate and reproducible volumetric measurements. This network will be trained and validated in all subtypes of pediatric CNS tumors, for different tumor subregions, representing the first of its kind to be performed on such a comprehensive pediatric database.

SPN 06

Simplified meal announcement study (SMASH) using hybrid closed-loop insulin delivery in youth and young adults with type 1 diabetes – a randomised controlled two-centre crossover trial

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Background and aims: In recent years, the development of hybrid closed-loop systems, which link insulin delivery to sensor glucose levels, have started to transform the management of type 1 diabetes. At the core of the technology is an algorithm that automatically adjusts insulin delivery via an insulin pump in response to real-time sensor glucose levels. These systems, characterized by automated algorithm-based insulin delivery in combination with user-initiated meal bolusing, have become standard of care for people with of type 1 diabetes (T1D). Although the majority of hybrid closed-loop (HCL) systems still require exact carbohydrate counting (ECC), there is little evidence on its glycaemic relevance. We aimed to compare glucose control with simplified meal announcement (SMA) vs ECC in youth and young adults with type 1 diabetes (T1D) using the mylife CamAPS FX system.

Methods: This two-centre, randomized crossover non-inferiority trial recruited 46 participants (aged 12-20 years) with T1D on multiple injections (n = 35), sensor-augmented pump (n = 4) or HCL (n = 7) before enrolment. Study treatment was use of HCL (CamAPS FX algorithm, YpsoPump, Dexcom G6) with SMA or ECC in random order, each for 3 months. The primary endpoint was the percentage time with sensor glucose in target range (3.9–10.0 mmol/l) with a non-inferiority margin of 5%. Secondary endpoints were other glucose endpoints, insulin metrics, and usability and safety outcomes. The primary analysis was done as per intention to treat. ClinicalTrials.gov, NCT05481034.

Findings: Forty-three participants (18 females) completed the trial. Percentage time with sensor glucose 3.9–10.0 mmol/l (mean±SD) was 69.9±12.4% with SMA and 70.7±13.0% with ECC (estimated mean difference -0.6 percentage points (95%CI -2.4;1.1), demonstrating non-inferiority). Percentage time <3.9 mmol/l (1.9±1.0% vs 2.1±1.2%) and >10.0 mmol/l (28.2±12.6% vs 27.2±13.4%) was similar between periods. Total daily insulin dose was higher in SMA (54.1±14.7U vs 51.7±12.1U, p = 0.037). One serious adverse event occurred with SMA and two with ECC, none of which were intervention-related.

Interpretation: Glucose control using the CamAPS FX algorithm with SMA was non-inferior to its use with ECC in youth and young adults with T1D, challenging the justification for exact CHO quantification in this population.

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SPN 07

Varicella associated hospitalizations and complications in Switzerland from 2021 to 2023 prior to the introduction of universal varicella vaccination recommendations

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Aim: To prospectively assess varicella zoster virus (VZV) associated disease burden in hospitalized children 0-16 years of age prior to the introduction of universal varicella vaccination (UVV) in Switzerland.

Methods: Anonymized data (clinical characteristics, diagnostics, treatment, and outcome) of hospitalized children was available from monthly active case reporting by 29 pediatric clinics and hospitals to the Swiss Pediatric Surveillance Unit (SPSU) from July 2021 to June 2023.

Results: During the two-year study period 239 children and adolescents were hospitalized with varicella (N = 224; 94%) or herpes zoster (N = 15; 6%). Mean age was 5 years, median 4.7 years (range 0 – 16 years). In 13 patients varicella was concomitant and not the primary reason for hospitalization. 199 patients (83%) were primarily healthy, 138 were male (58%). Mean duration of hospitalization was 5.8 days. Of the 224 children with varicella, 120 (61%) had acute skin complications (including 52 Streptococcus pyogenes infections, 29 (15%) musculoskeletal and 25 (13%) neurological complications. Two patients (1%) had ischemic strokes. 33 patients (14%), 32 with varicella and 1 with herpes zoster, required intensive care treatment (mean duration 3.5 days) and 2 (1%) died. Forty patients with varicella (18%) required surgical interventions. The calculated hospitalization incidence rate was 7.8 per 100'000 for children aged 0-16 years and the calculated hospitalization rate was 14 per 10'000 cases.

Conclusions: Varicella is associated with considerable morbidity, particularly in primarily healthy children. Skin complications (mainly secondary bacterial infections), musculoskeletal and neurological complications are main reasons for hospitalization and may cause death in previously healthy, immunocompetent children. These baseline burden of disease findings will allow to evaluate the impact of the UVV introduced in Switzerland in January 2023.

SPN 08

Differences in autophagy marker levels at birth in preterm vs. term infants

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Introduction: Preterm infants are susceptible to oxidative stress and prone to respiratory diseases. Autophagy is an important defense mechanism against oxidative-stress-induced cell damage and involved in lung development and respiratory morbidity. We hypothesized that autophagy marker levels differ between preterm and term infants.

Methods: In the prospective Basel-Bern Infant Lung Development (BILD) birth cohort we compared cord blood levels of macroautophagy (Beclin-1, LC3B), selective autophagy (p62) and regulation of autophagy (SIRT1) in 64 preterm and 453 term infants.

Results: Beclin-1 and LC3B did not differ between preterm and term infants. However, p62 was higher (0.37, 95% confidence interval (CI) 0.05;0.69 in log2-transformed level, p = 0.025, padj = 0.050) and SIRT1 lower in preterm infants (-0.55, 95% CI -0.78;-0.31 in log2-transformed level, padj<0.001). Furthermore, p62 decreased (padj-value for smoothing function was 0.018) and SIRT1 increased (0.10, 95% CI 0.07;0.13 in log2-transformed level, padj<0.001) with increasing gestational age.

Conclusion: Our findings suggest differential levels of key autophagy markers between preterm and term infants. This adds to the knowledge of the sparsely studied field of autophagy mechanisms in preterm infants and might be linked to impaired oxidative stress response, preterm birth, impaired lung development and higher susceptibility to respiratory morbidity in preterm infants.

SPN 09

Survival without neurodevelopmental impairments at school age in children with congenital heart disease

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Introduction: The prevalence of neurodevelopmental comorbidities in children with congenital heart disease (CHD) is high. They often affect several neurodevelopmental domains (ND) and can lead to significant burden. However, there is little information about how many children with CHD develop without impairments at school age and the underlying factors.

Methods: Retrospective analysis of neurodevelopmental outcome data (WISC IV, Zurich Neuromotor Assessment, BRIEF, SRS, Conners 3 short version) at age 10 in 135 prospectively recruited and longitudinally followed children with CHD who underwent open-heart surgery between 2004 and 2009. Based on the clinically relevant definition of impairment as IQ <85 or total motor score <10th percentile or BRIEF global score T ≥65, SRS global score T >60 or T ≥65 in at least two Conners subscales, three impairment groups were formed. Ordinal logistic regression was performed to identify protective factors.

Results: In a complete case analysis including 98 patients, 35.7% showed no impairments, 35.7% showed impairments in one, and 28.6% in >2 ND. Higher socioeconomic status (SES) (p = 0.03), higher IQ at 6 year follow up (FU) (p = 0.04) and higher Movement ABC-2 score at 4 year FU (p = 0.007) increased the probability to have no impairments at 10 year FU, whereas gestational age, birth weight, length of hospitalization, duration of extracorporeal circulation, IQ at 4 year FU, Bayley scores at 1 year FU did not.

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Conclusion: 36% of children with CHD at age 10 demonstrate no ND impairments. As higher SES seems to be protective, families with low SES need our special attention.

SPN 10

Executive function profiles in children born very preterm or with complex congenital heart disease at school age

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Introduction: Children born with complex congenital heart disease (CHD) or very preterm (VPT) share a general risk for neurodevelopmental impairments, however, the variability between different neurodevelopmental outcomes and across individuals is large. This study investigates whether distinct profiles of executive function (EF) outcomes are apparent in the two groups.

Methods: In total, 529 children (CHD: 95; VPT: 181; typically developing: 253) were assessed with a comprehensive neuropsychological test battery at a mean age of 11.3 years (SD = 2.0, range: 6.9-16.4). Scores of eight EF tests assessing working memory, inhibition, cognitive flexibility, switching, and planning were standardized for age and a latent profile analysis was conducted to identify distinct profiles. Risk and protective factors for profile membership were identified by an ordinal regression analysis.

Results: Three distinct EF profiles were found. Whereas 66.4% of typically developing children did not show any EF impairments, only 28.4% of CHD and 37.6% of VPT children fell within the respective profile ($p < 0.001$). In contrast, 58.9% of children with CHD and 53% of children born VPT showed a mildly and 12.6% and 9.4% a severely impaired profile, while 33.2%, respectively 0% of typically developing children did ($p < 0.001$). Higher parental education, faster processing-speed, and better fine-motor skills were significant protective factors for experiencing less EF impairments.

Conclusion: School-aged children born with complex CHD or VPT show a similar profile of EF difficulties. EF should be monitored in both clinical groups, particularly in children with lower parental education or known fine motor and/or processing speed problems.

SPN 11

The Swiss Pediatric Inflammatory Brain Disease Cohort Study: First Insights

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Background: Pediatric-onset inflammatory brain diseases (P-IBDs), such as pediatric-onset multiple sclerosis (POMS), are rare and often severe diseases that affect children during crucial periods of brain development. They therefore have the potential to cause permanent cognitive and/or physical impairment. Until now, no data on the epidemiology, clinical presentation, diagnoses, and treatment of P-IBDs were available in the Swiss population. In this abstract, we report the first results from our recently established national P-IBD registry.

Methods: The registry includes all patients with a P-IBD living and/or treated in Switzerland. Data are available from 2005 onwards, with prospective data collection starting in 2020. Patients with infectious/metabolic etiologies or Guillain-Barré syndrome are excluded. Continuous variables are summarized as median (IQR), categorical variables are given as proportions (%). The incidence rate of P-IBDs was calculated using the population data from the Swiss Federal Office of Statistics.

Results: So far, 229 patients (142 females, 62%) with a minimal and 116 patients (72 females, 62%) with a full data set have been enrolled. POMS (108, 47%), acute disseminated encephalomyelitis (26, 11%), and MOG antibody disease (22, 10%) are the most frequent diagnoses. The incidence rate of P-IBDs is 1.47 per 100'000 children and year and the incidence rate of POMS is 0.56 per 100'000 children and year. Median age at symptom onset and diagnosis is 11.4 y (IQR: 7.4 y) and 11.9 y (IQR: 7.5 y) respectively. The most frequent initial symptoms are visual impairment (41, 35%), nausea/vomiting (40, 34%), and headaches (37, 32%) with over two thirds of patients being polysymptomatic. Among the 41 POMS patients with a full data set, visual deficits (17, 41%), hemisyndrome (10, 24%), and vertigo (8, 20%) were most frequently reported. Of the patients with POMS, 38 (93%) received immunotherapy 62 d (IQR: 51 d) after diagnosis. Fingolimod and Interferon beta were used equally often as the initial immunotherapy (11, 27% for both substances).

Conclusion: Demyelinating diseases and particularly POMS are the most frequent P-IBD in Switzerland with incidence rates comparable to the international literature. The registry allows for a structured and systematic analysis of Swiss P-IBD patients and provides a platform for future collaborative studies.

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SPN 12

Parental quality of life as an outcome of specialised paediatric palliative care: results of the SPhAERA study

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Background: The number of children suffering from a life-limiting condition is rising worldwide. Specialised paediatric palliative care (SPPC) is considered the gold standard to address the complex care needs of this patient population and their families. It is described as a multiprofessional team approach of specialists working in a dedicated PPC setting. However, the field's progress is challenged by conceptual, educational and especially financial shortcomings. Additionally, the effectiveness of SPPC as a complex intervention has not been scientifically demonstrated so far. Quality of life (QOL) seems to be the central outcome when assessing the impact of SPPC, as improving and maintaining QOL is the main goal of palliative care in general. Several studies have shown that SPPC can impact caregiver's QOL positively, however, these results are limited by the cross-sectional and uncontrolled study designs they originate from. We report on the assessment of parental QOL within the Specialised Paediatric PAlliativE CaRe: Assessing family, healthcare professionals and health system outcomes in a multi-site context of various care settings: SPhAERA study (2019-2023).

Methods: The SPhAERA study is a longitudinal non-randomised comparative effectiveness study, involving families of children with a life-limiting condition of various origins. The intervention group consisted of patients and their families enrolled in the SPPC programme at the University Children's Hospital in Zürich. The comparison group consisted of patients and their families potentially needing SPPC and receiving generalised PPC at the University Children's Hospitals Basel and Bern. QOL data was collected longitudinally at nine timepoints during the palliative phase, and for the case the index patient deceased, at four time points in the bereavement phase. Sophisticated statistical approaches were applied to account for missing data, group differences and confounders.

Results: Seventy patients from 69 families could be enrolled. This corresponds with 66 mothers and 61 fathers providing longitudinal and individual QOL reports (N = 127). Analyses are ongoing and detailed results concerning the effectiveness of SPPC versus generalised PPC and the trajectories of parental QOL will be provided.

Discussion: The SPhAERA study contributes to current knowledge by providing relevant outcome data based on the assessment of SPPC services within a comparative effectiveness research framework.

SPN 13

Reduced lower body muscular strength and endurance among childhood cancer survivors measured by 1-minute sit-to-stand test

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Background: Impaired lower body muscular strength and endurance is a possible late effect among childhood cancer survivors (CCS). Evaluating lower body strength and endurance is crucial for assessing mobility and exercise capacity, which then serves as a foundation for advising effective training and rehabilitation strategies to promote muscular strength and endurance. The sit-to-stand test (STS) has been used extensively and reliably to assess lower body muscular strength and endurance in different clinical settings. We aimed to 1) describe body strength and endurance in a large cohort of adult CCS with various childhood cancer diagnoses compared with the general population using the 1-min STS; 2) identify lifestyle and treatment-related risk factors for a diminished 1-min STS performance; and 3) describe the development of 1-min STS performance in CCS over time.

Methods: In a prospective multicenter cohort study, we invited CCS ≥18 years of age, diagnosed between ages 0–20 treated in five pediatric oncology centers across Switzerland from 1976–2017 who survived ≥5 years for a 1-min STS. We collected information about lifestyle, medical history, and previous cancer treatment. Using population-based Swiss reference values, we calculated age- and sex-adjusted z-scores for 1-min STS performance and assessed the association between risk factors and 1-min STS using multivariable linear regression. We fitted a multilevel linear model to describe the longitudinal course of 1-min STS performance.

Results: We included 338 CCS of 1048 invited CCS (participation rate 32%) with median age at study of 34 years (interquartile range 26–41). Compared with the general population, mean 1-min STS z-score was half a standard deviation lower (-0.52; 95% CI -0.64– -0.40). Obesity (B = -0.56; 95% CI -0.97– -0.16), cumulative cisplatin dose (B = -0.12; 95% CI -0.21– -0.02), and cumulative cranial radiotherapy dose (B = -0.10; 95% CI -0.19– -0.01) were associated with reduced 1-min STS performance. There was no change in 1-min STS z-scores over time (B = 0.02; 95% CI -0.05–0.09).

Conclusion: Using a simple screening tool, we found evidence of reduced lower body muscular strength and endurance after treatment for childhood cancer, especially among survivors with obesity or treated with cisplatin or cranial radiation. Our findings suggest a need for effective training and rehabilitation programs for maintaining daily functioning and improving survivor's cardiovascular health.

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SPN 14

Assessing vaccine-induced immunity against pneumococcus, hepatitis A and B over a 9-year follow-up in pediatric liver transplant recipients: a nationwide retrospective study

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Background and aims: Pediatric liver transplant recipients are particularly at risk of infections due to their preexisting health condition and lifelong immunosuppression to prevent graft rejection. The most cost-effective way to prevent infectious complications is through vaccination. Diseases that can potentially be prevented through vaccination include invasive pneumococcal diseases (IPD) and hepatitis A and B virus (HAV and HBV, respectively).

Methods: Retrospective analysis of HBV, HAV and pneumococcal immunity in pediatric patients, transplanted of liver between 2009 and 2020 at the Children's Hospital of Geneva, Switzerland. All patient's files were analyzed to collect immunization data, and vaccine serology.

Results: Among the 62 liver transplant recipients, 58 (94%) had vaccination records. At transplant, 19/30 (63%) were seroprotected against HAV; 45/50 (90%) against HBV and 18/23 (78%) had pneumococcal immunity. Immunity against these three pathogens remained suboptimal during the follow-up years post-liver transplant. When a booster vaccine was necessary, it was only administered to a small proportion of patients, ranging between 20 and 40%. Patients who had received more than 4 doses of HBV vaccine and more than 2 doses of HAV vaccines before transplant, had a higher overall seroprotection during the follow-up period.

Conclusion: Our study shows that long-term seroprotection against pneumococcus, HBV and HAV is significantly reduced in this population over the years following transplant and strengthens the idea that a serology-based approach should be accompanied by a more systematic follow-up of the vaccination. Special attention should be given to patients who exhibit an incomplete vaccination schedule at transplant.

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POSTERS

P 01

Plasmapheresis in a Pediatric Case of Multiorgan failure with Suspected DRESS or TSS

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Case report: A 7-year-old female with a history of Jeavons syndrome treated with valproic acid, developed acute liver failure (ALF) two weeks after starting lamotrigine. Symptoms included a three-day fever, trunk-centric maculopapular rash, facial swelling, abdominal pain, diarrhea, and confusion. Initial evaluations indicated ALF characterized by dyscrasia and cytolysis, without cholestasis or hyperammonemia, accompanied by significant inflammatory syndrome and thrombocytopenia. In response to the differential diagnosis of a drug reaction versus infectious causes including toxic shock syndrome (TSS), broad-spectrum antibiotics and ganciclovir were administered, and her antiepileptic medication was switched to levetiracetam. Her condition deteriorated, necessitating vasopressor support and intubation due to evolving encephalopathy. Further investigations revealed new-onset eosinophilia, elevated ammonium levels, acute renal failure with interstitial nephritis, high LDH, HHV-7 positivity and persistent inflammation. A exhaustive infectious disease workup returned normal. Plasmapheresis was employed as a novel strategy in the treatment of ALF, leading to a marked improvement in liver function following a single treatment. Concurrently, intravenous immunoglobulins were provided due to the potential diagnosis of Kawasaki-like disease and TSS. The administration of corticosteroids was guided by a RegiSCAR score of 3-4, suggesting a likely case of DRESS, a diagnosis further corroborated by the recent introduction of lamotrigine and the associated timeline of events.

Her recovery involved resolving organ failures and cognitive improvement. Follow-up care included conducting HLA genetic testing to evaluate her predisposition to DRESS, tapering corticosteroids, and performing delayed allergologic testing.

Discussion: Distinguishing DRESS from TSS posed a challenge due to their similar life-threatening features and the lack of exclusionary tests. The remarkable recovery post-plasmapheresis raises questions about the plasmapheresis's role, which might have helped by removing circulating toxins or immune complexes implicated in both conditions, though its exact contribution remains uncertain.

Conclusion: Future studies are warranted to clarify the role of plasmapheresis in the management of DRESS and TSS, given its potential benefits observed in this case and the ongoing uncertainties regarding its efficacy.

P 02

Childhood stroke – subtile symptoms, major consequences: a case report

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Background: The annual incidence of strokes in childhood (non-neonates) varies between 2.0 and 3.7 / 100,000. Approximately half of the cases are ischemic strokes. The most common leading symptom (67%–90% of cases) is hemiparesis and hemifacial weakness. In addition, children present with non-localizing symptoms such as headache in 20–50% of cases. Unfortunately, despite these mostly classic symptoms, the correct diagnosis is often delayed and only one third of patients receive adequate treatment in time. This may also contribute to the fact that around two thirds suffer from lifelong neurological deficits. In this article, we describe the case of a 15-year-old boy without risk factors who developed headache and subtle central facial paresis as the only symptoms of an ischemic insult due to a dissection in the internal carotid artery.

Case presentation: A 15-year-old boy presented with left temporal throbbing headache and only slight facial asymmetry towards the right. The symptoms began when he had to give a presentation at a taster day a few hours earlier. He recalled no trauma. No history of neurological or coagulation disorders existed in the family. Clinical examination revealed no further neurological deficits. Accordingly, the patient had an NIHSS of 1. ECG and laboratory tests showed no abnormalities. We conducted a cCT, which revealed a caliber irregularity in the supracervical sections of the left internal carotid artery with a short contrast center recess. We started antithrombotic therapy with unfractionated heparin and transferred the patient to a stroke unit. Upon arrival, the patient was completely symptom-free. MRI showed a cerebrovascular ischemic insult in the left globus pallidus with left ICA occlusion most likely due to dissection. A vasculopathy was discussed as a cause but was considered rather unlikely. In the further course, subtle cognitive deficits (attention, verbal fluency, memory and action planning) were found.

Conclusion: This case demonstrates that subtle symptoms can conceal a fulminant clinical picture, which ultimately has far-reaching consequences for the patient's cognitive health. They have an impact on his everyday life and make the process of finding a career more difficult. Increased attention and a thorough clinical-neurological examination are necessary even with minimal symptoms and absent risk factors.

P 03

Do not underestimate back pain in children and adolescents – a case series

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Background: Lower back pain is a common condition. Most causes are benign and resolve without intervention. However, it is important to avoid missing a serious, albeit rare underlying cause such as infection or malignancy. Red flags include symptoms like nocturnal, severe, radiating, and constant pain, systemic symptoms, neurological abnormalities, and a history of trauma and warrant thorough evaluation.

Case presentation: Three male patients (age 7, 12 and 14 years respectively) presented to the pediatric emergency room with lower back pain. All reported nocturnal and chronic pain with only mild or no response to treatment with NSAIDs. None had pre-existing conditions, and all showed a limited range of motion.

Case 1: The 7-year-old's x-ray indicated a vertebral fracture. As there was no history of trauma, a whole-body MRI was conducted. Besides confirmation of the pathological fracture (level L1) it showed edema in a sacral vertebra (S1) and further lesions in the femur and the pelvis. A CT-guided biopsy ruled out an

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infectious cause. Histology confirmed the diagnosis of Langerhans cell histiocytosis and treatment with steroids and vinblastine was initiated.

Case 2: The obese 12-year-old`s initial x-ray only showed mild scoliosis. Worsening pain on NSAIDs prompted further imaging with MRI, which showed a pathological fracture of Th12 with surrounding soft tissue reaction and possible hematoma in the left psoas muscle. Inflammatory markers were slightly elevated. A first biopsy resulted inconclusive. Due to pain exacerbation, we repeated both imaging and biopsy and were able to confirm chronic osteomyelitis caused by S. aureus.

Case 3: The 14-year-old patient with prior trauma and intermittent fever initially had a normal x-ray. Persistent pain led to further imaging. MRI showed edema and erosive changes of Th11/12 and decreased intervertebral spaces. Salmonella was confirmed the causative agent for spondylodiscitis through biopsy.

In both case 2 and 3, serum inflammatory markers were only slightly elevated. Antibiotic treatment was initiated for a total duration of three months, as well as posture-supportive therapy.

Conclusion: Lower back pain in children needs close monitoring. Normal x-ray and laboratory workup do not rule out serious pathologies. Persistent symptoms and red flags in history and examination warrant through evaluation through imaging and, often indicated, biopsy.

P 04

Bowel perforation after blunt abdominal trauma – a diagnostic challenge

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Case report: A 6-year-old girl suffered blunt abdominal trauma (BAT) while biking. Initial assessment showed stable vitals, subtle flank hematomas and mild abdominal tenderness. Sonography revealed no fluid or organ lesions. The next day, she developed progressive abdominal pain, tympanitic percussion sound, rectal bleeding and elevated inflammatory markers. Follow-up sonography showed intestinal wall thickening, adjacent fluid collection, free fluid and free gas suggesting bowel injury. CT imaging confirmed a 4mm ileal perforation. Laparoscopy revealed putrid ascites with fibrin deposits without obvious site of perforation. In addition to draining multiple abscesses and intraoperative irrigation, she received antibiotics for 10 days. The patient had a favorable recovery and resumed biking two weeks later.

Literature review: Pediatric trauma has an overall incidence of nearly 15%. After head and limbs, the abdomen ranks third among trauma related injuries. BAT is much more frequent (85%) than penetrating trauma and can be treated conservatively in >95%. In <1% of BAT there is traumatic small bowel injury, which necessitates a surgical approach. Standard diagnostics, like sonography or CT imaging, have limited sensitivity for bowel injury, most notably in the early phase. This bears a challange in managing such cases. Contrast-enhanced ultrasonography is emerging as an effective alternative only for solid organ lesion. Often, serial clinical and laboratory evaluation combined with serial imaging are necessary before surgery is recommended, raising concerns about repetitive use of CT imaging in children. Studies suggest that an early delay in surgical intervention in stable patients with bowel injury after BAT does not significantly impact complication rate or hospital stay duration (Hong et al., 2020; Letton et al., 2010).

Conclusion: BAT in children is frequent and conservative management is often possible. Emerging contrast-enhanced ultrasound presents an alternative to CT after BAT, but only for solid organ lesions. Perforation of hollow organs due to BAT remains a diagnostic challenge requiring serial clinical, laboratory and imaging evaluations.

P 05

"When you hear hoofbeats… sometimes it's a zebra"

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Objective: Congenitally corrected transposition of the great arteries (ccTGA) is a rare, unique congenital heart defect (CHD) constituting less than 1% of all CHD. It is characterised by discordant atrioventricular and ventriculoarterial connections, where the right ventricle supports the systemic circulation. Despite anatomical aberrations, normal circulation may be present. Associated anomalies such as ventricular septal defects, pulmonary stenosis and progressive congenital heart block are common and often lead to diagnosis early in life due to clinical suspicion of a CHD. However, asymptomatic ccTGA may be missed.

Case: A 7-year-old boy was admitted to our hospital with a forearm fracture. On admission, he had a heart rate in the lower range of normal (61bpm; 2nd percentile) despite his pain. ECG monitoring during operation showed bradycardia between 48-57 bpm. Sinus bradycardia due to anaesthesia was suspected. In the postoperative course, even with physical activation, heart rate remained low. Closer inspection of the postoperative ECG monitoring revealed complete AV-dissociation, thus the diagnosis of 3rd degree AV block was made. Subsequent echocardiography led to the diagnosis of ccTGA. Reviewing the patient's past medical records revealed that transient bradycardia was first documented at the age of 2.5 years and a cardiac murmur was suspected one year ago. The boy has had no restrictions in his physical activities so far. Thus, regular follow up is planned due to the high risk of developing heart block and heart failure over time.

Conclusion: Knowledge of pediatric age-dependent standard values, questioning a diagnosis if things don't go as expected and re-assessment if the response to treatment is not appropriate is paramount in the diagnosis of rare conditions such as ccTGA in children.

P 06

My feet are cold when ice skating. Is it normal doc?

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A 10 y.o. girl practicing high level figure skating noticed her right big toe becoming cold and white when ice skating, especially when doing picks (movement involving a shock on tip toes). The same was noticed on lesser extent to other cold exposures. No leg pain nor claudication.

Examination showed no dystrophic changes, but posterior tibial pulses difficult to palpate, more on the right side.

The capillaroscopic examination was normal. US-Doppler examination showed a deviated right popliteal artery which was thrombosed from the femoro-popliteal junction to the the tripod. A collateral vascularisation was present. The distal pressures were above the ischemic level. MRI confirmed the lateral insertion of the gastrocnemius muscle, the obstruction of the

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P1 and P2 segments of the popliteal artery which was medially positioned. The anatomical variant was also present on the other side, without obstruction.

Findings are characteristic of the popliteal artery entrapment syndrome (PAES), without indication for surgery at the moment, the collateral vascularisation being well developed.

The PAES is an uncommon limb-threatening entity found in approximately 0.17%-3.5% of the population. It results mainly from an aberrant relationship of the popliteal artery with the popliteal fossa myofascial structures. The PAES is classified into six different types based on the relationship of the medial head of the gastrocnemius muscle with the popliteal artery. It usually presents in young male adults with intermittent feet and calves pain that mainly occurs after the exercise and disappears at rest. Cutaneous (coolness, discoloration) or neurologic (paresthesia) symptoms can be present. The differential diagnosis is vast, either with pain as the presenting symptom, or in case of distal hypoperfusion. The examination reveals diminished or absent pulses. Active plantar flexion and passive dorsiflexion worsen the symptoms, either on palpation or on the US-Doppler. The ideal definitive diagnosis relies on a combination of duplex ultrasonography and MRI. The treatment, depends on the clinical presentation and varies from expectant to surgical correction.

Arterial obstruction is an uncommon problem in pediatrics. Although in this case a Raynaud disease was initially suspected, a rare pathology was discovered. The patient's intensive practice of figure ice skating surely enhanced the presentation of this pathology. A high index of suspicion should be the rule in high level athletes.

P 07

Ulcero-glandular Tularaemia presenting mainly with abscess and erythema nodosum

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Tularaemia has been increasingly reported in Switzerland (1), even in children (2). Specific diagnosis and therapy is mandatory, inappropriately treated serious complications may result with subcutaneous abscess formation and extensive erythema nodosum.

Case: A 5 year old boy presented at the paediatric emergency department with painful cutaneous swellings on various body parts. Three weeks prior he had fever and a swelling behind the right ear, which diminished under anti-inflammatory therapy. However, a week later, the swelling returned and the mother noticed a blister on his scalp. Antibiotic therapy with Amoxicillin/Clavulanic acid for 10 days was ineffective. The boy exhibited fatigue, recurrent headache, nausea and reduced appetite. On clinical examination, we found submandibular and nuchal lymph node swellings, a 5x5 cm measuring abscess on the occiput and a painful crusted ulcer on the scalp. In addition, we found red nodules on the calves and skin-coloured nodules on the forearms, painful on pressure. Laboratory results showed no inflammatory signs. An ultrasound of the occiput revealed an echogenic free space suspicious for an abscess. The abscess was drained, the ulcer removed and the wounds left open. Microbiology and mycology exams yielded no pathogens. Eventually, Francisella tularensis serology was positive (IgG 41,8 U/ml, IgM 45,4 U/ml). Under antibiotic treatment with Ciprofloxacin for 14 days the lymphadenopathy and subcutaneous nodules regressed in size. One month later, the wounds were healed and follow-up serology confirmed past infection (IgG positive, IgM turned negative).

Discussion: F. tularensis is transmitted through arthropod vectors such as ticks or through contact with infected animals such as hares. The former was most likely the transmission route in our patient due to the eschar-like lesion on the scalp, as portal of entry, and the patients' origin from a rural area. Skin ulcer and lymphadenopathy are typical signs of ulceroglandular tularaemia. Delayed or inappropriate therapy may have resulted in massive abscess formation. Erythema nodosum is known as a secondary manifestation of tularemia (2). Noteworthy, the painful swellings were the main complaints of our patient.

In conclusion, clinical awareness for tularaemia is necessary in a patient with tender lymph node swelling, ulceration and erythema nodosum, especially in patients living in rural areas.

(1) BAG, access on 08.01.2024.

(2) Pädiatrie Schweiz, acess on 08.01.2024

P 08

Bone sequestration in the context of recurrent osteomyelitis caused by PVL + MSSA

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Introduction: Staphylococcus aureus (S. aureus) is the main infectious agent responsible for osteomyelitis in children over 4 years old. Some strains (2-5%) produce Panton-Valentine leukocidin (PVL), which is associated with more severe forms of osteomyelitis, causing significant inflammation, more frequent surgical intervention, and higher rate of recurrence. Furthermore, the inflammatory reaction during osteomyelitis can lead to vascular disorders and the formation of avascular replicative niches, known as bone sequestrations. These niches can constitute an obstacle to germ eradication, and lead to chronic or recurrent forms, whose treatment is mainly surgical.

Case report: A 7-year-old male child presented a severe methicillin-sensitive S. aureus positive for PVL (MSSA PVL +) osteomyelitis of his left distal femur with subperiosteal abscess and bacteriemia. The patient underwent 3 surgical drainages and lavages due to an unfavorable evolution and received a 6-week antibiotic therapy adjusted to the pathogen. One month after the antibiotics were stopped, he presented clinical, biological and radiological signs for a recurrence of the osteomyelitis with intraosseous, subperiosteal, muscular and subfascial abscesses. Drainage and surgical lavage were performed and an antibiotic therapy was re-introduced for 6 another weeks (intravenous for 3 weeks with co-amoxicillin, then switched to flucloxacillin with the addition of clindamycin, and finally, just oral clindamycin for 3 weeks). The cultures of the operative samples identified the implication of the same germ: MSSA PVL +. A CT scan showed the presence of an bone sequestration in the left femoral distal metaphysis which could explain the reactivation of the infection. The bone sequestration removal with aggressive local curettage were performed and antibiotic-loaded cement spacers were placed into the bone defect, with an excellent clinical and biological evolution. Two weeks after completion of the antibiotic therapy, the patient underwent a cement removal and bone grafting surgical intervention.

Conclusion: In severe presentation, large abscesses on imaging or poor response to treatment, PVL should be investigated. Early, aggressive surgical management is essential to eliminate germs and active inflammatory metabolites in osteomyelitis, especially in the presence of a S. aureus strain producing PVL. This is a reminder of how paramount it is to look for bone sequestrations in cases of recurrent osteomyelitis.

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P 09

Per continuitatem evolved infective aortitis – A complication of Salmonella spondylodiscitis

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Background: Salmonella has a high affinity to vascular endothelium and is isolated as causative pathogen in about 40% of cases with infectious aortitis. In children, infectious aortitis is rare and isolated cases of hematogenously spread infections are reported.

Case report: A previous healthy 15-years-old adolescent presented to our emergency department with fever and deterioration of flank pain. First symptoms occurred 9 weeks earlier with elevated inflammatory markers (CRP 34 mg/, Lc 9.8 G/l) followed by temporary clinical improvement and normalization of CRP over a 4-week period. At readmission CRP was increased (142 mg/l) and the MRI revealed a spondylodiscitis in the region of the thoracic vertebrae as well as an anterolateral soft tissue phlegmon. Blood cultures and samples from a puncture of the phlegmon revealed growth of Salmonella enterica. Intravenous antibiotic treatment was established but bacteremia persisted over 5 days. Echocardiography showed no signs for endocarditis, but a CT revealed dilatation of the descending aorta adjacent to phlegmon interpreted as per continuitatem caused aortitis. Antibiotic therapy was continued for 6 weeks and regular ultrasound of the aorta showed no progress in dilatation. Follow-up MRI 2 weeks after treatment revealed an abscess within the former soft tissue phlegmon. A surgical intervention was discussed but dismissed because of difficult accessibility and good general condition with normal inflammatory markers. A conservative approach with oral antibiotic treatment for another 10 weeks was established until the abscess was no longer visible one the MRI. Ultrasound 12 months after treatment showed no development of aneurysm.

Discussion: Aortitis and mycotic aneurysm are described extraintestinal complications of Salmonella infections, especially in elderly patients. Salmonella aortitis mostly evolves through hematogenous spread and is rare in childhood. Whether the risk of development of aortic aneurysm is lower in patients with a per continuitatem evolved infection as described in our patient remains uncertain. This case highlights the importance of carefully assessing vessels adjacent to infections for involvement so that adequate treatment is established and follow up controls are set up to assess for long term complications.

P 10

Even teenagers can be intravenous drug users !

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Case report: A 15-year-old Ukrainian refugee presented with a swollen painful forearm, cough, right basal crackles and fever. Medical records revealed prior heroin use currently on opioid substitution. Blood tests showed CRP at 120mg/l, leucocytosis at 15.9G/l. Chronic hepatitis C was diagnosed (viral load 37'000U/ml). Screening for hepatitis B, HIV was negative. Doppler-Ultrasound revealed thrombophlebitis of the cephalic vein. Thoracic-X ray and chest CT scan showed right posterobasal parenchymatous condensation and cavitation with hydroaeric level. Interferon-gamma release assay (IGRA), PCR and culture on sputum ruled out pulmonary tuberculosis (TBC). Transthoracic ultrasound showed no signs of endocarditis. The clinical context raised high suspicion for septic thrombophlebitis and pulmonary abscess secondary to septic emboli. The patient refused hospitalization and was discharged with daily monitoring for IV ceftriaxone, oral rifampicin and low molecular weight heparin. Due to the risks of IV antibiotic administration in a non-hospitalized patient, and given the favorable evolution with sterile hemocultures, treatment was switched to oral co-amoxicillin after 3 days. The patient discontinued follow-up and treatment at day 7. Collaboration with Neuchatel Addiction Center where the patient received his opioid substitution allowed treatment to resume on day 14. Medications were given daily. Anticoagulation was resumed with daily oral rivaroxaban. Treatments could be stopped after 5 weeks due to favorable radio-clinical evolution.

Discussion: One-third of injecting drug users (IDU) are aged between 15 and 25 years. This population is at high risk for bacterial infection including: skin (abscess, cellulitis), musculoskeletal (osteomyelitis, arthritis), endovascular (endocarditis, septic thrombosis) and lung (pneumonia, abscess) infections. Lung infections can be a consequence of aspiration or septic emboli. Co-infection with HIV, hepatitis, and TBC is frequent and should be ruled out. Commensal flora like S.aureus cause the majority of infections. Protective factors against readmission include drug control (arrest or substitution), risk reduction strategy, engagement with support team and clinical follow-up.

Conclusion: IDU and its complications can occur in pediatric population. An inventive, low-threshold approach, seeking collaboration between the patient and the health care team is important. Collaboration with an addiction center is needed.

P 11

Granulomatosis with polyangiitis and hypophysitis in an andolescent: a multidisciplinary collaboration

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KP and MB and BMA and WT contributed equally and should be considered as shared authors.

Background: Granulomatosis with polyangiitis (GPA) is a rare granulomatous ANCA associated vasculitis predominantly involving small vessels. GPA characteristically occurs in the second decade of life with the triad of upper and lower respiratory tract inflammation and renal disease. In pediatrics, GPA is very rare and presentation can be uncommon. Herein we present an adolescent with GPA and associated hypophysitis.

Case presentation: A previously healthy 16-year-old girl presented with chronic headache for six weeks, lethargy, nasal congestion and recurrent fever at a local general hospital. A cerebral magnetic resonance imaging revealed significant pituitary gland enlargement and she was referred to our tertiary care hospital. Clinical examination revealed unremarkable neurological status, otitis media and crusty nasal mucosa. Initial laboratory evaluation showed no pituitary hormone deficiency.

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However, two weeks later she developed polydipsia and polyuria. Central diabetes insipidus (CDI) was confirmed by a water deprivation test (max. serum osmolarity of 302mmol/kg; serum sodium of 146 mmol/l, copeptin <2.7 mmol/l) and oral desmopressin therapy was started. Further laboratory evaluation showed elevated inflammatory markers (CRP 91mg/l, ESR 50mm/h) and mild thrombocytosis. Liver, kidney, urinary examinations, lumbar puncture, echocardiography and chest computer tomography were unremarkable. A GPA with hypophysitis causing the CDI was suspected. Immunological testing revealed elevated ANA 1:320, c- ANCA 1:40, anti-PR3 43U/ml. Endonasal endoscopic mucosa and trans-sphenoidal tissue biopsy within the sella turcica revealed typical histopathological findings (granulomatous inflammation, vasculitis, tissue necrosis) confirming GPA. Treatment was initiated nine weeks after symptom onset with high dose steroids and rituximab. Soon after treatment start, general condition improved, and headaches resolved. One week after the 4th rituximab cycle, inflammatory markers normalized, complete B-cell depletion was reached and anti-PR3 decreased by 70%. The CDI persisted, no further pituitary hormone deficiencies were observed.

Conclusion: GPA in childhood is rare and the clinical presentation can include hypophysitis and CDI. While diagnosing GPA in childhood can be challenging, a close multidisciplinary collaboration can help to establish timely diagnosis and effective treatment.

P 12

Aeroportia and pneumatosis intestinalis in 2 infants with food protein-induced-allergic proctocolitis

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Bloody stools are a concerning in symptom in particular neonates and infants. The differential diagnosis reaches from life threatening to benign conditions.

We would like to present two infants who presented to the paediatric emergency department with bloody stools and showed pneumatosis on ultrasonography, which initially led to the suspicion of a potentially life-threatening condition, but was subsequently identified as Food Protein-Induced Allergic Proctocolitis (FPIAP).

Case A: A 25-days-old male term born, breastfed neonate, was presented to the emergency department with little blood in the stool in the morning, as well as watery, malodorous stools, and perianal redness. The patient had been treated at the age of 20 and 21 days with antibiotics due to a febrile infection airway infection.

Case B: A 4-months-and-6 days-old male infant, whose mother was already on a cow`s milk free diet presented with bloody stools to the emergency department.

Both infants were in good clinical condition and the clinical examination and vital signs were in large unremarkable, no fever, bowel sounds were regular. The bloodwork (CBC, CRP) was unremarkable, no pathogens could be detected in the stool.

However, in the abdominal ultrasound portal venous gas and pneumatosis intestinalis was found.

Considering all findings, there was no evidence of necrotizing enterocolitis and FPIAP was considered the most likely diagnosis. Nutritional counselling was provided and both patients were treated successfully as outpatients with a reassuring follow-up.

Discussion: The number of infants with an FPIEP and sonographic evidence of pneumatosis or portal venous gas is unknow, as FPIEP is normally a clinical diagnosis. The two cases illustrate that these radiological findings might also be present in neonates or infants with benign conditions like FPIAP.

It is be speculated that, similar to atopic dermatitis, food allergies alter e.g. the tight junctions and lead to an increased intestinal permeability which might result in pneumatosis intestinalis.

P 13

Unilateral intraventricular hemorrhage grade III in a term neonate: a case report.

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Background: Intraventricular hemorrhages (IVH) are common in preterm infants, however, they occur very rarely in term neonates, especially in those with unremarkable pregnancy and delivery. In this article, we report a case of an IVH grade III in a full-term neonate.

Presentation of case: The patient was born through spontaneous vaginal birth without complication at the end of an uneventful pregnancy. On the 3rd day of life, he was noted because of jaundice and high levels of total serum bilirubin (TSB) which raised above the phototherapy threshold. While in the phototherapy blanket, he developed fever up to a maximum of 38.4 °C. which always normalized within one hour after removing the blanket. No abnormalities and no signs of infection were observed during physical examination, and he was discharged home on the 6th day of life. On the following day, he presented to the emergency room with a temperature of 38.5°C. A full septic workup including a lumbar puncture was performed. There were no elevated inflammatory signs in blood and urine, nasal pharyngeal secretion was negative for respiratory viruses. The cerebrospinal fluid was bloody and showed a high lactate level along with a leucocyte number above 2000 per microliter. Noteworthy, a slightly bulging of the anterior fontanelle was noticed, otherwise the physical and neurological examination were normal. Within the following hours he presented an episode of somnolence and poor feeding, a head ultrasound revealed a suspect choroid plexus bleeding. aEEG showed no signs of seizures and a normal background pattern, cerebral MRI confirmed the diagnosis of IVH grade III in the left lateral ventricle as well as a bilateral collection of blood in the subarachnoid and subdural space. Evidence of significant vascular defect was not detected. Despite extensive workup (coagulation studies, metabolic screening and others), no cause could be found while still some results are pending. To date, the patient has not developed neither neurological symptoms nor a posthemorrhagic hydrocephalus, subsequent head ultrasounds showed a stable ventricular index and a mild reduction of the hemorrhage's size.

Conclusion: IVH is a rare condition in full-term neonates. The etiopathogenesis is often uncertain, symptoms and signs can be nonspecific. Unexplainable fever, high levels of TSB and poor feeding should alert the health personnel and be further investigated.

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P 14

Severe Anaemia at the age of 1 month after rhesus incompatibility with repeated intrauterine transfusions

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We report on a late preterm girl presenting at our emergency department at the age of one month due to severe anemia (Hb 3.9g/dl, Hct 11%), arterial hypotension and tachycardia. Hemolytic diseases oft he newborn (HDN) subsequent to Rhesus sensitization in the Rh negative mother had already occured in a previous pregnancy and prompted six intrauterine red blood cell transfusions during this pregnancy. The newborn girl suffered from early neonatal jaundice and had been treated in the birth hospital not only with phototherapy but also with immunoglobulines. Her hematocrit (Hct) on discharge on DOL 4 used to be 35%, she also showed mild thrombocytopenia, reticulocytes were not determined.

Due to signs of cardiocirculatory compromise a transfusion was initiated and resulted in immediate clinical improvement. A second transfusion was performed three days later, resulting in a hematocrit of 41%. Reticulocyte count on admission and before transfusion was supressed, so we decided to initiate a therapy with Darbepoetin alfa in order to stimulate erythropoiesis and to avoid further transfusions. On weekly follow-up examinations, hematocrit again decreased reaching a second nadir (23%) one month after initiation of stimulating therapy. From there on a sudden rise in reticulocyte count was observed and resulted in spontaneous increase in hematocrit, reaching 31% at the end of Darbepoetin alfa therapy.

Supression of hematopoiesis in infants with hemolytic disease oft he fetus and newborn is well known and is more profound in those infants having received a higher number of intrauterine transfusion. Follow-up after discharge is important to detect late anemia due to continuing hemolysis as well as reduced erythropoiesis. Erythropoetin alpha can reduce the need for subsequent transfusions.

P 15

Extensive mitral-valve endocarditis without history of previous heart malformation

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Introduction: Kingella kingae is a common pathogen in osteoarticular infections in preschool children. Besides, it can cause endocarditis, occult bacteremia, and other less likely infections. We present a case showing how important it is to examine for clinical signs of differential diagnoses.

Case presentation: We report the case of a 9-month-old boy presenting with persistent fever for 4 days and reduced general condition. The day before, he was dismissed after rehydration having an Adenovirus-positive infection with fever. At discharge, a systolic murmur had been documented for the first time. Due to his worsening condition with encephalitis-like symptoms, we took blood samples and started treatment with i.v. ceftriaxone and aciclovir. Laboratory results showed anemia and distinctive thrombocytopenia. A 3/6 systolic murmur was still audible. After recovery of the platelet count, a lumbar puncture ruled out meningitis and herpes encephalitis. Meanwhile, the blood culture showed growth of kingella kingae. Anamnestically and clinically, there was no obvious osteoarticular pain. Echocardiography showed a 7mm vegetation on the mitral valve with severe insufficiency but normal left ventricular function. Clinically, he had slight tachypnea but no further sign of heart insufficiency. He was transferred to the University Children's Hospital in Zurich. Full-body MRI showed two small septic embolisms in the brain without neurologic sequelae, no osteoarticular infection. After anesthesia for MRI, he developed transient pulmonary edema, with short-term need of respiratory support. Under maximized medical treatment, he recovered well. Regression of the vegetation was documented, the severe mitral valve insufficiency persisted. The boy was discharged 24 hours after completion of the antibiotic treatment over 4 weeks. Probably, a reconstruction of the mitral valve will be necessary.

Discussion: Detailed assessment with blood cultures should be performed generously in patients with secondary deterioration and prolonged fever before starting antibiotic treatment. In this case, growth of a specific pathogen mainly led to the correct diagnosis. Retrospectively, compatible clinical signs had been present.

Take home message: Most systolic heart murmurs in febrile children are benign. However, clinical surveillance of changing quality of the murmur and signs for heart insufficiency is important to assess if further diagnostics should be done.

P 16

Subdural collections due to arachnoid cyst rupture following a minor head trauma, a case report

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Background: Arachnoid cysts are membranous sacs filled with cerebrospinal fluid (CSF) that results during brain and skull development from the division of the arachnoid membrane during the early weeks after gestation. They are mostly benign, asymptomatic and can represent an incidental finding in brain imaging. They may become symptomatic if they rupture and cause complications such as the formation of a subdural collection (hematoma or hygroma). Subdural collections following the rupture of an arachnoid cyst after a minor head trauma are rare findings in pediatrics. With this case report, we aim to raise the attention on careful diagnostics and consequential neurosurgical treatment.

Case summary: A 5-year-old female presented at the emergency department with persistent and progressive headache during day and night, two weeks after a minor brain concussion. The patient was in reduced general condition, had loss of appetite and refused to play. In clinical examination, she was neurologically unremarkable. Due to the abovementioned "red flags" in medical history, the girl was hospitalized for observation and neuroimaging was performed. The brain MR showed a ruptured arachnoid cyst in the left temporal lobe with a bi-hemispheric subdural hygroma, a subtle shift of the midline and compression of the external CSF chamber. Clinical signs of intracranial hypertension associated with the neuroradiological findings advocated for the placement of a subdural-peritoneal shunt to alleviate the symptoms. Postoperative complete remission of the symptoms and amelioration of the general condition. The patient was discharged with ambulatory follow-up.

Conclusion: Minor head injuries are a common reason for admission at the pediatric emergency department. Neuroimaging is rarely executed in first instance because intracranial complications after a minor trauma in children are uncommon. However, in the presence of "red flags" in either medical history and/or examination, further investigation should be performed to rule out complications. For this reason, history and clinical examination must be carried out rigorously, as they remain the

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main pillars to determine the requirement for further diagnostics. Although rare, subdural collections resulting from the rupture of an arachnoid cyst should be considered as a potential differential diagnosis in children with minor head trauma accompanied with the presence of "red flags" (eg.symptoms or signs of intracranial hypertension).

P 17

Anterior Spinal Artery Syndrome in a 14-Year-Old Boy

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Acute flaccid paralysis caused by anterior spinal artery syndrome (ASAS) is rare in children. It typically manifests as bilateral loss of motor function, pain, and temperature sensation below the level of occlusion, with relatively little impairment in proprioception and vibration sense. We present such a case in a 14-year-old child who presented with a sudden onset of neck pain followed by the typical symptoms of ASAS with impaired breathing due to the height of the lesion, which was found in the magnetic resonance imaging examination at the level of C1–5. An initially suspected thrombogenic cause proved inapplicable. Ultimately, despite extensive diagnosis, as in most cases of ASAS in children, the cause remains unclear.

P 18

A case report of a girl with a homozygous likely pathogenic variant in the KIF7 gene – Acrocallosal or Joubert syndrome?

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Introduction: We present a girl diagnosed with an acrocallosal syndrome (ACLS) with a homozygous likely pathogenic variant in the KIF7 gene, highlighting the overlap with Joubert syndrome.

Case report: The girl was born at 39 weeks gestational age. She was noted for a postaxial polydactyly of all extremities. Upper extremity polydactylies were rudimentary, whereas lower extremity polydactylies were ossified. Furthermore, the clinical exam showed an large anterior fontanelle, hypertelorism, downslanting palpebral fissures, a broad nasal bridge, low-set ears, and a narrow philtrum. The parents were consanguineous. Echocardiography showed a persistent ductus arteriosus, persistent foramen ovale and small pericardial effusion. Abdominal and cerebral ultrasound and eye exam were unremarkable as well as an EEG and polysomnography, which were done because of recurrent desaturations. Initially, the cMRI was assessed to show no specific pathologies. Nevertheless, the clinical features led to the hypothesis of an ACLS (OMIM#200990). Genetic testing showed a homozygous likely pathogenic variants in the KIF7 gene which is a known cause of ACLS as well as Joubert syndrome type12. The likely pathogenic variant found in our patient (c.975C>A p.(Cys325*)) has not yet been described in literature. A retrospective reassessment of the cMRI showed cerebellar anomalies consistent with a mild form of Joubert syndrome.

Discussion: ACLS and Joubert syndrome are both classified as ciliopathy. The main features of ACLS are agenesis of the corpus callosum, facial dysmorphia, postaxial polydactyly, and developmental delay, all of which except for the corpus callosum agenesis are present in our patient. In 2011, Putoux et al identified mutations in the KIF7 gene, which is located on chromosome 15q26, as causative for ACLS. Interestingly, Joubert syndrome, characterized by a "molar tooth sign" of the cerebellum/brainstem on cMRI can also be caused by homozygous pathogenic variants in the KIF7 gene. Our patient presented with clinical features of ACLS but radiological signs of Joubert syndrome reflecting an overlapping syndrome.

Conclusion: As our example shows, clinical signs should guide genetic testing. Nevertheless, in genetic spectrum disorders it is worthwhile to critically reassess formerly done diagnostics such as MRI.

P 19

Think atypical!

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Mycoplasma pneumoniae (Mp) is one of the most common causes of community-acquired pneumonia (CAP) in school-age children and adults, which showed a delayed re-emergence after COVID-19 pandemic restrictions in late 2023. In general, Mp-CAP is mild and self-limiting, but severe forms have been reported in both immunocompetent and -compromised patients.

A 7-year-old boy with an unspecified inflammatory bowel disease, linked to a heterozygous TRAF3 deletion mutation and under Sirolimus treatment since 2022, was referred to our hospital due to diminished general conditions, accompanied by high fever, tachypnea, and a two-week history of cough. Initially treated with amoxicillin for suspected CAP, the pediatrician switched to clarithromycin 48 hours before referral due to persisting fever. A nasopharyngeal swab was tested positive for Mp by PCR. At admission, a chest X-ray showed left upper lobe consolidation and a basal right infiltrate. Initial CRP level was elevated (126 mg/l). The antibiotic treatment was extended to intravenous cefuroxime for suspected conventional bacterial CAP. In the next days, due to a lack of clinical response, the antibiotic treatment was changed to intravenous doxycycline. A chest computed tomography scan showed necrotizing pneumonia with a cavitary lesion in the left upper lobe. The patient was transferred to the University Children's Hospital Zurich for in-depth microbiological investigations via bronchoalveolar lavage. Again, exclusively Mp could be detected by PCR, but sequencing of the 23S rRNA gene revealed a A2063G mutation, which confers high-level macrolide resistance. Thereafter, a methylprednisolone treatment for 5 days was added, leading to a rapid resolution of fever and improvement of the child's general conditions. Antibiotic treatment was switched to oral doxycycline and continued for a total of 4 weeks due to necrotizing pneumonia.

This case highlights the importance of considering Mp as a possible pathogen causing necrotizing pneumonia, also in Switzerland. Severe courses are associated with macrolide-resistant Mp, irrespective of the patients' immune status. In case of clinical non-response to macrolides, genotypic analysis should be performed. However, immunosuppression, in the reported case by Sirolimus, may contribute to aggravation and haploinsufficiency in TRAF3 may have had an impact, being associated with higher susceptibility to infections, systemic inflammation and autoimmunity.

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P 20

Unmasking congenital anomalies of the kidney and urinary tract (CAKUT): A Case Report of Right Iliac Fossa (RIF) Pain Mimicking Appendicitis

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Congenital anomalies of the kidney and urinary tract (CAKUT) represent a broad range of disorders that result from abnormal embryonic development. This condition affects 4–60 in 10,000 live births. Renal agenesia, a subtype of CAKUT, can be also associated with genitourinary anomalies such as Obstructed HemiVagina with Ipsilateral Renal Agenesis (OHVIRA).

We present a case of a 8-year-old girl addressed to the emergency room for acute lower abdominal (RIF) pain without gastrointestinal symptoms. Puberty stade Tuner I, no menarche. Hemogram and inflammatory parameters were within normal range. Blood and urine tests showed normal kidney function and no urine infection. Renal and pelvic ultrasound and later magnetic resonance imaging (MRI) showed a dilated right ureter ending in a poly-lobed structure, suggestive of a hypotrophic ectopic right kidney. Cystoscopy showed a normal urethra, normal bladder, and left ureteral orifice, whereas the right ureteral orifice was absent. Vaginoscopy showed a normal hymen and the vaginal septum was partially deviated by a bulging structure at the right side. The initial collection was punctured, as a result of a liquid rich in creatinine, primarily reminiscent of urine. Dynamic kidney Scintigraphy showed no significant renal function on the right side.

Mesonephric ducts play an imperative role in the development of the urinary system. The mesonephros is the second transient kidney and appears in humans at 3 to 4 weeks gestation. Most of the embryonic mesonephric ducts are eventually replaced by metanephric ducts to form the permanent kidney.

The final diagnosis of mesonephrotic residue malformation is unclear. Since the anatomical assessment shows a possible genital malformation associated. Therefore, it cannot be excluded the OHVIRA syndrome or Herlyn–Werner–Wunderlich syndrome (HWWS). A complex congenital developmental anomaly of the genitourinary tract characterized by a didelphic uterus, obstructed hemivagina, and ipsilateral renal agenesis. The patient will be soon convocated for a gynecologist consultation.

The rarity of late-stage symptomatic CAKUT detection underscores the essential role of imaging, specifically MRI, in the diagnostic process. It's worth noting that abdominal pain mimicking appendicitis can conceal congenital malformations.

P 21

A challenging diagnosis of hematuria

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Introduction: Macroscopic hematuria is a relatively uncommon presenting symptom in children and adolescents often causing significant anxiety to both physicians and families and prompting an extensive evaluation. Differential diagnosis includes but is not limited to traumatic, infectious, glomerular etiologies, lithiasis and in rare cases factitious disorder.

Case presentation: A healthy 13-year-old boy presented to the emergency department for macroscopic hematuria. There was no history of fever, neither urinary nor upper respiratory tract symptoms. He had spent the day preceding the onset of hematuria at a water park. Family history did not reveal any renal or hematologic disease. Physical examination was unremarkable, except oral aphthous lesions. The patient was hospitalized for further investigations. During hospitalization, intermittent macroscopic hematuria of non-glomerular origin without proteinuria was confirmed. Abdominal ultrasound excluded renal or urinary tract anomaly. Finally, a possible traumatic urethral cause was suspected and the patient was discharged due to spontaneous improvement. He returned with recurrent hematuria. A thoracoabdominal scan showed no abnormalities. The urine culture performed revealed germs from the oropharyngeal flora and was considered as contamination. During hospitalization, the patient was discovered injecting himself bloody saliva from oral lesions induced by biting into his urethra using a syringe. The diagnosis of factitious disorder was made. A thorough social history revealed a psychologically stressed child linked to chronic school bullying. Psychiatric assessment ruled out psychotic features. The patient was discharged with a comprehensive psychological follow-up plan and a support network involving his pediatrician and the school.

Discussion: Recurrent hematuria without evident local (traumatic) or glomerular cause is rare in children and adolescents. In patients with recurrent hospital admissions for varied and changing symptoms, poor treatment response and incongruities in history, examination, and laboratory findings, the possibility of a factitious disorder must but examined. This case highlights the importance of a thorough clinical evaluation, including psychosocial history allowing prompt diagnosis and ultimately contributing to a comprehensive patient care.

P 22

Neurofibromatosis Type 1: Don't forget the spine!

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Introduction: Neurofibromatosis type 1 (NF1) is a common neurocutaneous disease with a wide range of clinical manifestations. The dilatation of the dural sac, known as dural ectasia, is a known complication of NF1. It leads to erosion of the vertebra and enlargement of the spinal canal and neuroforamina, causing spinal deformity, instability, fractures, and neurological deficits.

Case: A 15-year-old boy with known NF1 presented himself for his annual consultation at the neuropediatric department. At this scheduled follow-up, the boy did not describe any changes regarding his known skin lesions nor any new manifestation or complications, however he did mention, that he regularly suffered from back pain. In the clinical examination a new, previously not described significant s-shaped scoliosis with a thoracic dextroscoliosis and rib hump of 10 degrees, a lumbar levoscoliosis with a hump of 15 degrees and a shoulder elevation of 2 cm on the right side was seen. Pain could be provoked on palpation of the osseous part of the thoracic spine, focal neurologic signs were not present. An X-ray confirmed a severe scoliosis with a Cobb angle of 70 degrees between the vertebrae T3 and T8 (apex at T6), as well as a Cobb angle of 58 degrees between the vertebrae T8 und L3. The subsequent MRI showed a dystrophic scoliosis based on a distinct dural ectasia, while there were no neurofibroma in or adjacent to the spine. Based on the complexity and rapid evolution of the scoliosis, the patient was referred to a paediatric orthopaedist. As a segmental instability of the spine could not be ruled out, further investigations by a 3D reconstruction by CT were indicated. The patients was not allowed to participate in any sports anymore. Based on the clinical/neuroimaging findings and the

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rapid progression of the malformation, a surgical approach was indicated and will be performed in early 2024.

Conclusion: Dystrophic scoliosis with dural ectasia is a rare but potentially disabling complication of NF1. While scoliosis is frequently seen in children with NF1, rapid evolution of scoliosis along with new back pain is a red flag and needs to be timely addressed by an interdisciplinary team. Regular clinical examination including a detailed evaluation of the spine is mandatory in all children with NF1.

P 23

Conservative treatment approach for resolution of air leak in empyema

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Case: 6 5/12- year- old boy presented with a 7-day history of fever and worsening cough and general conditions. Clinical exam showed tachypnoea, Oxygen saturation 90% and attenuation of breathing sounds at the right lung. Diagnostic work up showed elevated inflammatory markers and widespread septated pleural effusion with pneumothorax on the right side with subtotal collapsed right lung in Xray and ultrasound. He was started on antibiotic with co-amoxicillin and supplemental oxygen. On day 7, despite improved general condition and no more need for oxygen supplementation planned chest Xray before discharge showed unexpected worsening of pneumothorax with mediastinal shift and a chest CT showed a totally collapsed right lung with mediastinal shift, persistent pyopneumothorax and cystic lesions within the collapsed upper lung. Patient was always hemodynamically stable without respiratory support. We inserted a chest drain with drainage of a great part of empyema and therefore opted for a conservative treatment strategy and a surgical intervention was deferred. Follow up chest x rays were done with gradual improvement of pneumothorax. Chest drain was discontinued after 19 and removed after 20 days, with no recurrence of air leak. Total air leak time since hospitalisation was 25 days. Antibiotics were given for a total of 21 days. Pneumococcal PCR of the empyema revealed positive. Patient was discharged 48 hours after discontinuation of the chest drain and followed regularly in the outpatient clinic with no recurrence of pneumothorax.

Discussion: British Thoracic Society defines PAL as an air leak persisting more than 48 hours. Most of the literature regarding PAL comes from adult patient, recommending most commonly early surgical intervention. To our knowledge no paediatric guidelines have been established however early surgical intervention is recommended by some authors and was initially also discussed in our patient. Retrospective data from paediatric patients suggests successful conservative management, especially in patient with an infectious aetiology. Absences of severe ARDS and high ventilatory support is described as important requirement for a conservative approach. Resolution was seen in most of cases between 2-4 weeks. Our patient characteristic and disease course with conservative treatment is comparable with retrospective data as well as other case reports.

Conclusion: Conservative Treatment for PAL is feasible, patient selection seems crucial.

P 24

Neonatal Re-entry Tachycardia – a challenge from diagnosis to therapy: a case report

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Background: The most common arrhythmia in infants is supraventricular tachycardia (SVT), the majority being atrioventricular re-entry tachycardia (AVRT) and atrioventricular nodal re-entry tachycardia. Onset of SVT often occurs within the first year of life, with a peak during the neonatal period. In most cases, SVT is sporadic and terminates spontaneously by the age of one year. As recurrent episodes SVT may be unrecognized and persistent or prolonged episodes may lead to increased morbidity and mortality, prophylactic treatment is usually initiated. There is no consensus on the optimal treatment.

Case presentation: We present a 13-days old full-term male neonate with recurrent dyspnea. Pregnancy and past medical history were unremarkable. At first visit, the patient showed strained breathing, a viral infection was suspected, and treated with high-flow nasal cannula. Blood gases, vitals, chest X-ray and nasopharyngeal swap for viruses were normal or negative. The patient was discharged after three days with normal cardiopulmonary monitoring. Two days later, he presented again with increased work of breathing after breastfeeding and restlessness. He expressed no additional signs of heart insufficiency. Physical examination revealed irregular heartbeats, which were confirmed by electrocardiogram, showing frequent premature atrial contractions (PACs). He was admitted for cardiac monitoring, which showed frequent PACs and triggered SVT within 12 hours. Blood gases showed a mild respiratory acidosis, slightly elevated lactate and a NT-proBNP of 7476ng/l. Echocardiography showed no structural abnormalities but cardiac function was in the lowest normal range for age, hence heart insufficiency was suspected. A combination therapy with propranolol and flecainide was necessary to suppress extrasystoles triggered reoccurrence of SVT. The boy was discharged after 17 days with dual therapy.

Conclusion: Intermittent abnormal breathing patterns in neonates born at full-term may be a symptom of cardiac distress and need further evaluation. Even though extrasystoles and SVT often terminate spontaneously, optimal treatment depends on individual constellation.

P 25

Case report – A Healthy 7-Year-Old Girl With Zoster Mandibularis and Zoster Oticus

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Background: Varicella-zoster virus (VZV) causes varicella (chickenpox) upon first contact and herpes zoster (HZ) upon reactivation, albeit rarely observed during childhood. Children presenting with HZ usually contracted VZV in early infancy when they still had some maternal immunoprotection. Typically, the initial disease is mild or even asymptomatic, and no sufficient immunity may develop. Several reasons may lead to reactivation of latent VZV. It typically presents as a painful unilateral dermatomal vesicular rash with blisters. Zoster mandibularis, affecting only the mandibular branch of the trigeminal nerve, is rare. Clinical manifestations include swelling of the lower lip and the gingiva of the lower jaw, as well as unilateral tooth/oral pain. HZ is quite uncommon in immunocompetent children. Information on HZ in children is limited. Varicella vaccine has had a

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great impact on the incidence of varicella with several studies also showing a decreased risk of HZ among vaccinated children. Recognized complications include bacterial skin infection, zoster ophthalmicus, zoster oticus (with and without facial paralysis), meningoencephalitis and postherpetic neuralgia. Zoster oticus can affect the facial and/or vestibulocochlear nerve, leading to dizziness and sensorineural hearing loss when the vestibular nerve is affected.

Case presentation: A 7-year-old girl initially presented with swelling, redness and small blisters on the upper right lip. She reported seeing a dentist because of toothache in the lower jaw two days prior. The lesions grew with distinct redness on the right side of the face, along the maxillary nerve, including the auricle. Serum inflammatory markers were only slightly elevated. With this clinical presentation and VZV positive PCR result of a lesion sample we diagnosed zoster mandibularis and started antiviral therapy with acyclovir iv. As bacterial co-infection was suspected, the patient was also treated with antibiotics. When the patient reported earache and the rash extended to the right auditory canal and eardrum, we diagnosed zoster oticus and started a supportive therapy with corticosteroids.

Conclusion: Zoster mandibularis is a rare presentation of HZ and can involve the cranial nerves, which can lead to hearing loss and facial paralysis of the affected side. Early corticosteroid treatment should be considered when involvement of the cranial nerves is suspected. A hearing test should be carried out during follow-up.

P 26

Posterior Reversible Encephalopathy Syndrome: case report of 2 paediatric patients without comorbidities

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Posterior Reversible Encephalopathy Syndrome (PRES) is an uncommon acute neurological disorder with different neurological symptoms and typical radiological images. The cause of this condition is thought to be an endothelial damage leading to a vasogenic oedema, frequently in the occipital region of the brain.

The cases of two 10-years-old boys diagnosed with PRES without any typical comorbidity, i.e. no renal failure, immunosuppressive or cytotoxic drug use, oncologic diseases, thrombocytopenia, or sepsis are presented. In both cases, PRES was triggered by hypertensive spike of unknown aetiology.

Both patients presented an acute confusion state with spatial and temporal disorientation, circumstantial amnesia, change in behaviour, and dizziness. Except for severe hypertension (>99th percentile), the physical examination showed focal neurological deficits for patient A but no particularities for patient B. Neither of the two patients had fever or convulsions. The brain MRI revealed vasogenic oedema compatible with PRES. Renal and cardiac ultrasound found no particularities. Blood and cerebrospinal fluid tests found no signs of infection. The clinical outcome of the two patients is rapidly and spontaneously favourable, confirming the diagnosis. The follow-up brain MRI is normal, with no oedema.

Both patients had infections (gastroenteritis, conjunctivitis, angina) a few days before the onset of neurological symptoms. Besides these infections, no cause was found to explain the sudden onset of PRES and the hypertensive peak in these paediatric patients.

Although PRES is more common in adults, it can also occur in children without any relevant medical history or clear comorbidity. The goal of treatment is to maintain normal blood pressure, treat the symptoms, and prevent the onset of seizures.

P 27

An intraventricular thrombus, subsequent pulmonary embolism and venous thrombosis of unknown origin in an 8 year old patient – a case report

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We would like to present the case of an eight 5/12 old patient admitted in October 2023 for shortness of breath and tachypnea that turned out to be pulmonary embolism, probably deriving from an intracardial thrombus and 4-tier venous thrombosis of to-date unknown etiology.

The patient had suffered from pain in his left shoulder, shortness of breath and cough for nine days before presenting himself at our emergency unit. He had a known Silver-Russell Syndrome treated with somatotropin. He underwent radiological and laboratory investigations that suggested pneumonia as being causative. The patient had neither had a trauma nor been immobilized prior to admission.

An antibiotic treatment with Co-amoxicillin was begun. One day after admission, further checks were run due to constant tachycardia and -pnea. Nt-proBNP was at 2838 ng/l, and echocardiography showed a possible thrombus in the right ventricle. Therefore, the patient was suspected to suffer from pulmonary embolism.

After being transferred to the ICU at Inselspital, Bern, echocardiography was repeated, and an MRI added, which showed massive central and paracentral pulmonary embolism with secondary severe right ventricular pressure overload. There was a large thrombus in the right ventricular apex measuring 21x24x31 mm, as well as a thrombus in the inferior pulmonary vein. Possible infarct pneumonia was confirmed during the exam, which was treated for a total of 8 days with Cefepime and Doxycycline. A causative pathogen could not be found. Echocardiography showed restricted right ventricular function with a tricuspid annular plane systolic excursion (TAPSE) of 13 mmHg and mild pulmonary valve insufficiency, mean pulmonary artery pressure (mean-PA pressure) at 21 mmHg. From November 8, 2023, the thrombus remained about the same size. Additionally, a left and right 4-tier venous thrombosis of unclear etiology was detected. Therapy was started with heparin, followed by a switch to phenprocoumon with therapy bridging using enoxaparin. Somatotropin was temporarily paused for the initial suspicion of a possible neoplasia and discontinued at parental request.

The reason for the thrombosis remains unclear. The patient suffered from none of the most common risk factors for thrombosis. Subsequent tests revealed nothing but slightly positive IgG anticardiolipin antibodies. Therefore, antiphospholipid syndrome has not been completely ruled out. Also, an association to Silver-Russel-Syndrome seems possible.

P 28

Under and over

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Case report: A 9-year-old boy presented to the emergency room with a reported change in behavior. His mother reported that she had heard a loud thump during his nights sleep and

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assumed he had bumped his head. Ever since waking up in the morning he has then not been responding to her properly and could no longer perform everyday tasks that hadn't posed problems for him before. His reaction time was prolonged, he had forgotten how to use his toothbrush, and wore his undershirt over his T-shirt. His mother reported that she sent him to school and was surprised by his teachers phone call, who reported that he could no longer spell any words correctly. The altered state lasted all morning. According to the mother there was one earlier episode a few months ago where the boy replied in an unusual way, which however quickly resolved after going to school. In his medical history an ADHD disorder and dyslexia were reported. Presenting at our emergency room apart from still wearing his undershirt inside-out and above his T-shirt we found no special behavior or abnormalities in the physical examination. Considered differential diagnoses of altered consciousness included infectious causes (encephalitis, meningitis), intoxication, psychogenic causes, craniocerebral trauma after the supposed "headbump" and metabolic disorders. Even though now the child presented without any abnormalities we assumed a non-convulsive status epilepticus because of the past peculiar presentation. Therefore we performed an EEG, which showed the characteristic pattern of spike-and-wave discharges associated with absence seizures. The boy was started on a medication called ethosuximide. The effectiveness of this therapy still needs further evaluation.

Discussion: This case describes a peculiar presentation of non-convulsive status epilepticus, which should be identified. In addition, one could ask how often this patient suffered from unnoticed absences and whether the diagnosed dyslexia and ADHD might regress if his epilepsy is treated adequately.

Conclusion: Children behaving strangely may have a genuine cerebral pathology until proven otherwise and therefore we think performing an EEG in this context is always recommended.

P 29

Diffuse Alveolar Hemorrhage in a Three-Year-Old: A Case Report

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Diffuse Alveolar Hemorrhage (DAH) is a rare and potentially life-threatening condition. Underlying etiologies include auto-immune diseases, systemic collagen disorders, immuno-allergic conditions and interstitial lung disease. A significant proportion of cases are idiopathic, and knowledge on this condition remains limited.

We herein report on a case of DAH in a previously healthy three-year-old male. Notable medical history included iron-deficiency without anemia, suspected cow-milk protein (CMP) allergy, and an isolated hospitalization for pneumonia with hematemesis. Four months after this hospitalization, blood-work performed by his primary care physician revealed new-onset anemia, in a paucisymptomatic patient. Iron-deficiency anemia was suspected in the context of ample cow-milk consumption. Iron supplementation was increased in addition to dietary counseling.

The following month, the patient presented with hemoptysis and isolated tachypnea. Anomalies on the chest X-ray prompted a chest-CT, showing bilateral ground glass opacities and pan-lobar alveolar condensations, indicative of DAH. He was hospitalized for oxygen-therapy and further investigations, and was placed on a diet with strict eviction of CMP. Bloodwork was negative, notably for ANA, ANCA, anti-dsDNA, coeliac disease markers and CMP specific IgE and IgG. Haematuria or other signs of bleeding diathesis were absent.

Whilst hospitalized, the patient received a blood transfusion for severe anemia. The only potentially curative treatment administered was the strict eviction diet. He did not receive corticosteroids. Clinical evolution was favorable and an ultra low-dose repeat CT scan showed resolution of the pulmonary opacities, after six weeks. Hemoglobin levels also normalized. CMP eviction was maintained, in the context of suspected Heiner syndrome.

After four months, the patient presented again with cough and anemia. A chest x-ray showed reappearance of bilateral chest infiltrates. Bronchoalveolar lavage confirmed recurrence of DAH, despite persistent CMP eviction, quashing the suspicion of Heiner Syndrome. Biomarkers for vasculitis or connective tissue diseases remained negative. Coagulopathy markers were negative. Genetic analysis is ongoing. This time, the patient was treated with corticosteroids. Clinical evolution was favorable.

This case contributes to the existing literature on childhood DAH and casts attention to a grave condition that is often little-known by clinicians.

P 30

Weill Marchesani Syndrome – identification of a patient presenting with clinical features of tenosynovitis and carpal tunnel syndrome

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Background: Carpal tunnel syndrome (CTS) is a rare phenomenon in children, however if severe, can be associated with significant functional consequences. Pediatric CTS is often associated with an underlying condition, with mucopolysaccharidoses (MPS) being the most common. We report a patient with bilateral severe CTS and clinical features of tenosynovitis secondary to Weill-Marchesani Syndrome (WMS).

Methods: A retrospective chart review was completed.

Results: A five-year-old female was referred for dactylitis with a suspicion of juvenile idiopathic arthritis. She also presented with a three-year history of impaired bilateral pincer grip and insensate digit two and three. Nerve conduction studies (NCS) revealed severe bilateral CTS and she ultimately underwent bilateral carpal tunnel release (CTR). Unfortunately, post-operative NCS was unchanged. Ultrasound showed significant median nerve compression with flexor tendon thickening. Screening for MPS was negative. Other prominent features were distensions of the tendon sheath of the flexor tendons in the carpal tunnel and the fingers, although the appearance was atypical for tenosynovitis. This led to further genetic testing, which revealed ADAMTS10 partial gene deletion, in keeping with WMS.

Conclusion: Identifying the etiology of CTS is important for understanding prognosis, response to CTR and risk of recurrence. In addition, atypical presentations of known entities like dactylitis or tenosynovitis should also prompt further diagnostic workup. WMS is a genetic connective tissue disorder that can cause brachydactyly and abnormal tendon thickening, which can have implications on surgical outcomes. Awareness of this diagnosis prior to surgery would allow for better patient counseling and consideration of alternative surgical techniques.

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P 31

Lemierre Syndrome in a 7-year-old boy

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Introduction: Lemierre Syndrome is a rare complication following an oropharyngeal infection with a mortality rate of about 5%. The incidence in the overall population is 3.6 cases per million, mostly occurring in young, otherwise healthy patients.1

Case report – clinical presentation: A 7-year-old boy presented to our emergency department with fever and a four-day history of otitis media acuta. He was in reduced general condition with clinical signs of sepsis (tachycardia, low systolic blood pressure, reduced responsiveness). Examination showed exudative tonsillitis, subsiding redness of the tympanic membrane and reduced range of neck rotation. No meningism nor clinical signs for tenderness on palpation on the mastoid.

Laboratory results: Investigations showed elevated inflammation markers (Lc 13.1 G/l, CRP 181 mg/l, PCT 125 µg/l). Both tonsillar swab and blood culture (time to positivity 6 hours 58 minutes) were positive for Streptococcus pyogenes.

Treatment: After initial stabilization with intravenous fluids and rapid application of Ceftriaxone the patient showed stable vital parameters and improved awareness. The antibiotic therapy was adjusted according to susceptibility data after 24h to Amoxicillin.

Further course: Due to persistently reduced motion of the neck further examinations were performed. On day 2 of hospitalization a neck ultrasound which did not show any abscess. On day 5 an MRI was performed which showed:

- purulent mastoiditis

- thrombophlebitis with occluding thrombus in the internal jugular vein ranging up to

the right transvers sinus (total length 7.5cm)

- pulmonary consolidations consistent with septic emboli.

Therapeutically the boy then underwent paracentesis and insertion of tympanostomy tubes, and a therapeutic anticoagulation was started. After 14 days the antibiotic treatment was stopped, and he was discharged from the hospital with continuation of the anticoagulation. Two weeks later the dosage could be reduced to a prophylactic dose.

Conclusion: Despite its low incidence Lemierre syndrome should be suspected in children with recent oropharyngeal or ear infection who present with signs of sepsis together with restricted range of head motion. For diagnosis, clinical examination, microbiological testing and radiographic imaging of the neck and chest is necessary. Currently there is no standardized treatment protocol especially concerning the anticoagulation therapy.1

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P 32

Short stature with genu varum in twins are clues for a genetic disorder X-linked hypophosphatemic rickets case report

Bokias Julia[1], Köller Marion[1], Mathez Ambre[1], Claude Fabien[2], Goischke Alexandra[3], Zoubir Sid Ali[1]

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Introduction: With an incidence of 3.9 per 100,000 births, X-linked hypophosphatemia (XLH) is the most common cause of inherited phosphate wasting, leading to rickets. XLH results from a mutation in the Phosphate-regulating protein with homology to Endopeptidase on the X chromosome (PHEX) gene leading to an overproduction of fibroblast growth factor 23 (FGF23), causing renal phosphate wasting and diminished synthesis of active vitamin D. The XLH phenotypic spectrum is wide. Multi-daily phosphate supplementation and calcitriol remain the mainstay of treatment. In patients ≥1 year, Burosumab – a new monoclonal anti-FGF23 antibody – can be offered.

Case report: We report a case of twins born at 36 weeks of gestational age in Côte d'Ivoire. The mother underwent surgery for leg bowing; the grandmother and the maternal uncle exhibit the same features. They were breastfed until age of 1 and supplemented with vitamin D. They started walking around 18 months. Bowlegs were noticed at 2 years. They underwent treatment with physiotherapy, and massage. Upon their arrival in Switzerland at the age of 3 years, their primary care physician observed growth and language delays, along with bone deformities. The diagnosis of hypophosphatemic rickets was suggested by laboratory and radiological findings, leading to a multidisciplinary assessment. XHL was confirmed by genetic analysis.

Discussion: In our cases, the family history of bone deformities (mother, grandmother, and mother uncle) and short stature are highly suggestive for a metabolic disorder. The presence of clinical signs of rickets with a previous vitamin D supplementation pointed to the diagnosis of vitamin D-resistant rickets, in these cases XLH. We aim to present this case report to raise awareness of the pathology, emphasizing the importance of early diagnosis and treatment to limit complications.

Conclusion: Despite its rarity XLH is a clinically significant disease whose delayed management may result in short stature, debilitating deformity, and other complications. New treatment strategies with Burosumab, directly target the pathomechanism of XLH, offering a promising alternative to conservative therapy. The early diagnosis of XLH in every case of short stature and hyperphosphaturic hypophosphatemia is necessary. Patients should be regularly assessed by a multidisciplinary team around bone diseases experts.

P 33

Fanconi Syndrome under ketogenic diet in a patient with NSF variant associated developmental and epileptic encephalopathy

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Purpose: We demonstrate a patient with a pathogenic variant of N-ethylmaleimide-sensitive factor (NSF) mutation with developmental and epileptic encephalopathy (DEE) who presented with severe acute SARS-CoV2 (severe acute respiratory syndrome coronavirus type 2) and RSV (respiratory syncytial

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virus), developed Fanconi syndrome under antiseizure drug treatment and ketogenic diet.

Methods: Case Report and review of the literature

Results: It was shown that NSF variants expressed in the developing eye of Drosophila severely affects eye development. De novo heterozygous mutations in the NSF gene are known to cause early infantile epileptic encephalopathy (1). Our female patient presented at neonatal age with an NSF variant associated DEE. Initial manifestations were atonic seizures with apnea and cyanosis. At the age of 20 months, she suffered from a respiratory tract infection with detection of SARS-CoV2 and RSV in the nasopharyngeal swab. Three days after being admitted to the hospital, the patient experienced a sudden decline in health, marked by acute encephalopathy and respiratory failure, which necessitated mechanical ventilation. Concurrently, she developed a Fanconi syndrome, characterized by excessive urinary excretion of phosphate, glucose, potassium, and bicarbonate, leading to metabolic acidosis, low blood phosphate levels (hypophosphatemia), and low blood potassium levels (hypokalemia). In response, suspecting that the ketogenic diet and valproic acid (VPA) might have triggered the Fanconi syndrome, her treatment was quickly adjusted by tapering off the ketogenic diet and VPA, so that she finally remained under Cannabidiol, Levetiracetam and Perampanel and slowly recovered. Possible causes of Fanconi syndrome and links to NSF pathogenic variant are discussed.

Conclusion: Children presenting the NSF pathogenic variant as a rare cause of a DEE under antiseizure polytherapy including ketogenic diet in the presence of viral infections like SARS-CoV2 and RSV are at risk of developing Fanconi syndrome and severe acute encephalopathy. These are potentially reversible under discontinuation of ketogenic diet and VPA (2,3).

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P 34

Is a family history still important in the era of next generation sequencing? A case report.

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Introduction: Part of a a good anamnesis is always to take a comprehensive family history. We present a case with a remarkable family history with early diagnosis of a rare unbalanced reciprocal translocation of Chromsome 7;9 in a neonate presenting with a complex syndromal disorder.

Case report: The individual, a boy, is the first child of healthy parents. He was born at 38 1/7 weeks of gestation. The postnatal period was complicated by a transient postnatal respiratory distress syndrome with CPR after birth. Anthropometric measurements at birth showed IUGR. He showed following dysmorphisms: microcephaly, microstomy, blepharophimosis, hypertelorism, low set ears, high arched palate, crossing of fingers, rocker bottom feet, crowding of toes and syndactyly of toes. In the sonographic organ screening on the first day of life, we found a small VSD. He needed persisting high flow for respiratory distress syndrome and feeding via nasogastric tube. On day 5 of life, he started developing repeated seizures and sinus arrests leading to the need of intensive care. Initially, there was a clinical suspicion of trisomy 13/18 and a positive anamnesis with the older sister of the child`s mother that died of trisomy 18 within 24 hours after birth. Rapid genetic testing via FISH for the latter was initiated which resulted negative. Detailed family history with a pedigree was taken together with the parents and grandparents. There was a suspicious family history with a cousin on maternal side with trisomy 21, the sister of the mother with trisomy 18, a brother of the mother with suspicion of an arteriovenous malformation and early death, a cousin of the father with an unknown intellectual disability and a cousin that had two children who died soon after birth. Further investigation revealed the presence of an unbalanced reciprocal translocation of chromosome 7;9 in the children of the father`s cousin with a balanced translocation of the latter in the cousin. The first tier analysis was a standard karyotype with region specific FISH probes for chromosome 7q and 9q, which confirmed the suspicion of the unbalanced translocation in the newborn. A SNP-microarray was done to establish the exact gene content of the chromosomal imbalance.

Conclusion: We want to emphasize the importance of a detailed and correct family anamnesis, leading to rapid diagnosis, correct initiation of care and adequate counselling of the family.

P 35

AN UNEXPECTED ENDOSCOPIC FINDING IN A SEVEN-YEAR OLD BOY WITH IRON-DEFICIENCY ANEMIA – A CASE REPORT

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Objectives and study: Esophageal webs are infrequent findings and could present as congenital forms or being associated with other medical conditions. If presenting with iron deficiency anemia, Plummer-Vinson syndrome (PVS) could be one of the differential diagnosis. This syndrome is associated with single or multiple webs in the upper esophagus with frequent iron deficiency and is observed in late adulthood and even rarer in children (1, 2). Data remain scarce, as only few case reports exist (3).

Methods: Case report presentation.

Results: A seven-year-old boy was referred for therapy refractory iron deficiency anemia. After reevaluation of the medical history, an eating disorder with undernurishment due to difficulty in swallowing was revealed. Symptoms had been already present since the infant age. There was no history of pica, bleeding manifestations, worm infestation, difficulty in breathing, or recurrent episodes of respiratory infections. On examination, a malnutrition status with failure to thrive was observed and in the laboratory testing an iron-deficiency anemia with a hemoglobin at 81g/l resulted. Upper GI endoscopy was performed to rule out eosinophilic esophagitis, but surprisingly showed two esophageal mucosal strictures in the proximal and mid esophagus. A 4.3 mm scope was not able to pass through the stenosis. Further investigation in form of barium swallow test confirmed the presence of two very fine esophageal strictures. An endoscopic intervention to open and dilate the strictures was performed using endoscopic needle knife technic and ballon dilation.

Conclusion: This case highlights the importance of an accurate evaluation of the medical history in patients with refractory clinical or laboratory symptoms, to avoid diagnostic errors and to allow timely management. If esophageal webs or stricures are causal for iron defiency anemia or vice versa in Plummer-Vinson syndrome remains a point of debate.

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P 36

Primary cutaneous Nocardiosis in an immunocompetent child

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Background: Nocardia species, aerobic gram-positive filamentous actinomycetes, mainly cause cutaneous and pulmonary, rarely disseminated disease. We report on a 2-year-old child initially presenting with painful plantar lymphangitis.

Case report: A 2-year-old girl, so far healthy, presented with a one-day history of pain and redness of the left foot. The clinical diagnosis of an acute lymphangitis was made and empiric treatment with clindamycin (iv.) was started. After an improvement of clinical and local signs the girl was discharged two days later. Oral treatment was stopped after 7 days, but the girl showed an immediate relapse 2 days after stopping the therapy. Clinical examination revealed a patient in a good general condition, body temperature was 38 °C, but there was a progression of the local signs including an abscess. Surgical revision was done, a foreign body was excluded and cultivation of the pus was initiated. Antibiotic treatment was extended (amoxicillin/clavulanic acid). Cultivation results in the detection of Nocardia spp. five days later, therefore treatment was adapted to Trimethoprim and Sulfamethoxazole (10 mg per kg body weight per day). Clinical response was favourable, treatment duration was five months and the last follow-up showed a total recovery.

Conclusions: The clinical affection of Nocardiosis ranges from cutaneous, lung to disseminated disease. Isolated involvement of the skin is very rare in children. Cutaneous Nocardiosis manifests as mycetoma, lymphocutaneous infection, superficial cellulitis and localized abscess. Immunocompromised patients are at higher risk being infected and have a more severe course. As plantar lymphangitis is a common reason for emergency consultations in pediatrics, cutaneous Nocardiosis should be considered as possible diagnosis, especially in those patients not responding to initial treatment with antibiotics.

P 37

SCN2A developmental and epileptic encephalopathy in an infant with bilateral polymicrogyria and opercular dysplasia

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SCN2A mutations have been associated with a wide phenotypic spectrum that includes, among others, developmental and epileptic encephalopathy (DEE), usually not associated with any brain structural counterpart.

We report the occurrence of a super-refractory status epilepticus (SRSE) in a 2-month-old infant, who presented at birth with refractory neonatal seizures attributed to an extensive bilateral polymicrogyria and cortical dysplasia. Upon his SRSE, he responded radically to the sodium-channel blocker phenytoin with complete seizure resolution and has remained seizure free during the 2-year follow-up period. A SCN2A pathogenic variant was found with predicted gain-of-function effect. Notably, brain MRI findings during the neonatal ictal phase showed signs of hypoxia with cytotoxic and vasogenic oedema, corresponding to the ictal localisation. These changes were not observed upon repetition of the brain MRI during the SRSE at 2 months of age, perhaps suggesting increased neonatal vulnerability to hypoxia in the presence of an SCN2A variant, that modifies over time.

Our case report highlights the importance of challenging our clinical management in the presence of refractory seizures attributed solely to a structural cause, with genetic testing providing a key insight for therapeutic management.

P 38

Severe hypercalcemia in a patient with CYP24A1-mutation after intensive sunlight exposure

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Background: Loss-of–function mutation of CYP24A1 results in accumulation of 1,25-dihydroxyvitamin D in children with prophylactic vitamin D supplementation, known as idiopathic infantile hypercalcemia. Patients present with polyuria, episodes of dehydration and weight loss. Typical laboratory findings are hypercalcemia, hypercalciuria and hypoparathyroidism accompanied with nephrocalcinosis on ultrasound.

Case report: A 4-year-old girl was diagnosed with idiopathic infantile hypercalcemia after incidental renal ultrasound revealed nephrocalcinosis. Further investigations indicated hypercalciuria and hypoparathyroidism leading to the genetic diagnosis of a compound heterozygote mutation of CYP24A1. At the age of 7 years, she was admitted to our emergency unit after a 2-week summer vacation in Spain. She suffered from nausea, vomiting and general weakness. Clinical examination revealed muscular hypotonia and dehydration. Laboratory investigations indicated hypercalcemia (Ca ion. 1.84 mmol/l, Ca total 4.32 mmol/l) hypophosphatemia (0.71 mmol/l), low potassium (2.1 mmol/l), hypoparathyroidism (0.4 pmol/l), high levels of 1.25-Di-OH-vitamin D (498 pmol/l) and hypercalciuria (Ca/Crea 2.8). As initial therapy with intensive intravenous fluid treatment and furosemide was not successful, zoledronic acid (25 µg/kg body weight) was given as a single-dose. Additionally, potassium and phosphate was administered. Thereafter, the girl's condition improved rapidly, and serum calcium normalized (Ca ion. 1.26 mmol/l, Ca total 2.32 mmol/l) and she was discharged in a good clinical condition.

Conclusions: Idiopathic infantile hypercalcemia based on mutations in CYP24A1 is a rare disease resulting in polyuria, episodes of dehydration, hypercalcemia, hypercalciuria, hypoparathyroidism and nephrocalcinosis. Affected patients are at increased risk of severe hypercalcemia not only whilst vitamin D is supplemented, but also after intensive sunlight exposure. Patients with idiopathic infantile hypercalcemia therefore need comprehensive sun protection measures.

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P 39

Prolonged QT interval following inhaled salbutamol administration: a case report

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We report a case study of a 13-year-old boy who developed prolonged QT syndrome after inhaled salbutamol. Past medical history revealed cardiac surgery at the age of 2, and a Ross procedure at the age of 11. Echocardiograms were normal on regular cardiological check-ups with a QTc interval of 408ms one month prior to the event. He had already used salbutamol 3 years before for viral wheeze, without any adverse effects. The patient presented to the pediatric emergency department with fever, running nose, mild cough and right upper chest pain triggered by coughing. General condition was good with normal vital signs. Lung auscultation revealed mild wheeze. Palpation revealed reproductible chest pain. A previously decribed 3/6 holosystolic murmur was audible over the tricuspid area. Physical examination was otherwise unremarkable.

The patient received 1200 mcg inhaled salbutamol with a spacer. He became tachycardic (107 bpm). The electrocardiogram showed transient prolonged QT interval (534 ms). After 3 hours observation without any cardiac complaint, ECG returned to normal (heart rate 90 bpm, QT interval 398 ms). The patient's electrolyte status was not assessed.

Although prolonged QT interval is known to be a secondary effect of salbutamol, only a few clinical cases have been reported in the literature. Salbutamol is a selective beta-2 agonist. Its main effect is bronchodilation through smooth muscle relaxation. However, it can also stimulate intracardiac beta-receptors, potentially causing adverse myocardial effects such as tachycardia, prolonged QT and arrhythmias. Other adverse effects of salbutamol include hypokalemia, hyperglycemia and hyperlactatemia. Hypokalemia itself is also a well-established risk factor for prolonged QT interval. Long QT syndrome increases the risk of torsades de pointes, ventricular fibrillation, and cardiac arrest. Causes of cardiac conduction defects include individual genetic susceptibility, heart defects, electrolyte imbalances and medications known to prolong the QT interval.

Clinicians should be aware of possible serious cardiac events with salbutamol. They should identify patients who are at risk through a careful assessment of past and family history. In high-risk patients, salbutamol should be administered in hospital settings with close monitoring, so-that QT abnormalities and arrhythmias may rapidly be detected. Patients should be monitored until QT interval returns to its normal value.

P 40

Transient pseudohypoaldosteronism associated with pyelonephritis and urinary tract malformation in a neonate

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Adrenal disorders should be considered in newborns with failure to thrive, poor feeding and electrolyte disorders, as they can result in life-threatening conditions like

We report the case of a 29-day-old patient with progressive weight loss, in whom severe hyperkalemia and hyponatremia with renal insufficiency were found in a context of urinary tract infection associated with significant bilateral hydronephrosis due to ectopic insertion of the ureters. Further investigations (including Guthrie) ruled out corticotropic damage and congenital adrenal hyperplasia as the cause of the electrolyte disturbances. Finally, mineralocorticoid insufficiency due to aldosterone resistance was selected. Hyponatremia and hyperkalemia were corrected with intravenous solutions, mineralocorticoid insufficiency was stabilized with fludrocortisone and pyelonephritis was treated with antibiotics.

From a surgical point of view, the ectopic insertion of the ureters was corrected with a right terminal ureterostomy and a left reimplantation allowing a reduction in pyelocalicdilatations. Subsequently, the mineralocorticoid insufficiency was fully corrected with the decrease in pyelocalic dilatation. The diagnosis of transient pseudohypoaldosteronism due to urinary tract malformation was accepted.

It is therefore important to look for adrenal disorders innewborns presenting with severe electrolyte disorders associated with pyelonephritis or urinary tract malformations.

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A colorful surprise: case report of a 6-year-old girl with colic-like abdominal pain

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Case report: A previously healthy 6-year-old girl presented to our emergency department with colicky abdominal pain that had been present for over a week. The parents observed painful episodes without vomiting or fever, and daily hard stools. Communication with the family was challenging due to a language barrier. Clinically, she presented with a soft abdomen without tenderness. Constipation was suspected and she was discharged home with stool regulation. She returned the next day with increasing abdominal pain and vomiting. On physical examination, the abdominal wall was still soft with new diffuse tenderness. Laboratory values included an elevated white blood cell count with neutrophilia, normal C-reactive protein, and normal blood gas and urinalysis. Abdominal ultrasound was unremarkable with no evidence of acute appendicitis, invagination, or volvulus. She was subsequently admitted for observation and reevaluation, and a high rectal enema was performed. Her general condition improved significantly and she was discharged the next day. She returned the following night with exacerbated colic-like abdominal pain with vomiting and diarrhea. Physical examination revealed periumbilical tenderness but no peritoneal signs. Laboratory results showed no signs of inflammation and normal lactate. After analgesic escalation with i.v. morphine and repetition of high rectal enema, the pain decreased again. An abdominal x-ray was performed showing no free air but the surprising diagnosis of 23 spherical metal-dense foreign bodies projected caudal to the umbilicus. There was a set of brightly colored magnets in the household, and the girl confirmed that she had swallowed them over a week ago. The subsequent laparotomy revealed six covered small bowel perforations and two meso-perforations. All 23 magnets were progressively removed through the existing perforations and the intestinal wall was sutured. Post-operative recovery was uneventful.

Discussion: The ingestion of multiple magnets by children is associated with an increased risk of mortality and morbidity. The observed increase in incidence is certainly due in part to their colorful appearance. Efforts are being made to regulate magnetic products through withdrawals and recalls, and to raise public awareness through media attention and national campaigns. This case highlights the importance of a complete

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history including foreign body ingestion and abdominal radiography in cases of exacerbated abdominal pain.

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Management of Purpura Schönlein Henoch

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Background: Henoch Schonlein Purpura (HSP) is a systemic IgA-Vasculitis common in children. Most cases are self-limiting within several weeks. Serious complications such as HSP glomerulonephritis with different evolutions can occur and must be differentiated from IgA nephropathy. Therapy of severe gastrointestinal symptoms and joint pain may be a clinical challenge.

Methods: Case report, review of literature.

Case report: A 3-year old girl presented at our hospital with purpura on the lower extremities one week after an upper respiratory tract infection. Diagnosed with HSP she was admitted to our unit for rehydration and analgesia. She developed severe abdominal pain, bloody diarrhea and hematemesis. An intussusception was ruled out sonographically. Blood pressure remained normal. Mild proteinuria (P/C-Quotient 1.6 g/mol) disappeared after 1 week. A therapy with corticosteroids was initiated after 5 days with bloody diarrhea and severe abdominal pain. Abdominal symptoms improved within 3 days and the patient could be discharged. A regular follow-up to rule out kidney involvement was scheduled. To date, no complication was registered.

Discussion: The typical organ involvement consists of the skin, joints, GI-tract and kidneys. Inflammation of reproductive organs, central nervous system or lungs is rare. In the GI-tract abdominal pain, hematemesis, hematochezie, intussuception and in worst cases necrotizing enterocolitis and perforation can occur. Poorest prognosis is associated with kidney involvement, although renal symptoms are usually mild and without long-term sequalae. However, HSP can also lead to glomerulonephritis with nephrotic/nephritic syndrome and acute renal failure up to 12 months after the first manifestation of HSP. Therefore, regular monitoring of blood pressure and proteinuria is mandatory. Beside supportive therapy, the use of corticosteroids in the treatment of HSP remains controversial. They seem to relieve symptoms without slowing down the progression of renal disease or shortening the duration of the disease. However, a single short course of steroids at 1-2 mg/kg/day for a week is not associated with side effects significant enough to preclude such a therapeutic trial in cases with severe abdominal or joint symptoms even though there is no clear evidence in current literature.

Conclusion: While most cases of IgA-vasculitis are self-limiting, patients with severe abdominal symptoms or joint pain may benefit from a short course with corticosteroids.

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Systemic juvenile idiopathic arthritis in a child: a case report on challenges in diagnosis

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Abstract: Systemic juvenile idiopathic arthritis (SJIA) is a rare childhood auto-inflammatory disease of unclear aetiology. SJIA is a subtype of juvenile idiopathic arthritis (JIA) and accounts for 10-20% of total JIA. We report an estimated incidence of 1/166 000 and a prevalence of 1/32 000 in the paediatric population. There is no gender predominance in SJIA. Its clinical presentation is marked by fever, rashes, hepatosplenomegaly, lymphadenopathy, serositis and sometimes joint pain. The presentation can be variable, and arthritis can be a later feature. This case report illustrates the clinical course and diagnostic challenges in young children.

Case presentation: We report the story of an eight-and-a-half-year-old boy referred by his paediatrician due to unexplained fever spikes for the past ten days without localized symptoms. Past medical history was uneventful. A biological assessment was already performed and showed increased inflammatory signs. Physical examination revealed no abnormalities. After five days, the daily fever peaks persisted. Inflammatory parameters had increased, the viral serology was negative. During admission, he reported pain in his knee, but no signs of arthritis were observed and a rash first on the eyes and then the trunk appeared. SJIA was considered, but the diagnostic criteria were not met. After a thorough infectious disease screening which was negative and discussions with onco-haematologists, an assessment of rheumatological causes was undertaken with a consultation in tertiary center. In UKBB, physical examination performed by paediatric rheumatologists revealed salmonid rash, lymphadenopathy but no signs of arthritis. Other complementary examinations were carried out, such as the search for specific cytokines. The diagnosis of SJIA could be made and treatment started with a corticosteroid first then an immunosuppressant, canakinumab at 4mg/kg every 4 weeks, with an excellent result.

Conclusion: This case provides an example of how clinical suspicion of SJIA can arise in the diagnostic process and of the difficulties associated with diagnosing SJIA when arthritis is not present or clinically manifest. SJIA is a rare acquired auto-inflammatory disease in children with significant morbidity and sometimes even mortality. Early diagnosis is important but can be difficult. We recommend considering SJIA in any child presenting with unexplained prolonged fever in the absence of an obvious infectious focus.

P 44

«Enigmatic Movements: Acute Rheumatic Fever Unmasked in the pediatric Emergency Department»

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Background: Acute rheumatic fever (ARF) is a nonsuppurative sequela following Group A Streptococci (GAS) infection impacting multiple organs and may consist of arthritis, carditis, chorea, erythema marginatum and subcutaneous nodules. Sydenham's chorea (SC) is a neurological manifestation that poses diagnostic challenges in the absence of a history of GAS infection, requiring a high index of suspicion for ARF.

Case: A previously healthy 10-year-old girl presented to the emergency room with a four-week history of progressive hyperkinetic movements, including occurrences during sleep. No prior neurological disorders were reported, and she denied prior infections. Examination revealed generalized choreatic movements affecting motor skills, speech, and swallowing, with no sign of encephalopathy, alongside a alongside a 3/6 holosystolic murmur at the cardiac apex with radiation to the axilla. Based on high clinical suspicion of ARF a multidisciplinary approach with early involvement of further specialists was established. Rapid antigen testing and throat swab culture resulted

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positive for Streptococcus pyogenes (GAS). Blood parameters indicated mild inflammation (ESR 32 mm/h, CRP 10 mg/L) and elevated antistreptolysin O titer (>1566 IU/mL). Brain MRI and CSF analysis revealed normal findings. Echocardiography unveiled polyvalvulopathy with relevant mitral and aortic regurgitation. The clinical constellation including two major criteria (i.e. SC and carditis) together with the evidence of prior GAS infection, led to the diagnosis of ARF according to the revised Jones criteria. Antibiotic therapy with Penicillin V for GAS eradication and steroid therapy were established. 10 days after discharge the choreatic movements had improved while cardiac involvement was stable. The patient will need to continue prophylactic antibiotic therapy for at least 10 years depending on the course of cardiac involvement. The steroid therapy will be tapered gradually based on the clinical response.

Discussion: This case emphasizes considering ARF in children with hyperkinetic movement disorders without prior ENT infections or fever. Broader diagnostic steps (MRI, laboratory testing) should be evaluated to exclude differential diagnosis. Treatment focuses on eradication of GAS carriage and prevent further infections. Steroids should be considered in disabling SC. Multidisciplinary collaboration among specialists is crucial for optimal management and long-term care.

P 45

Hypokalemic paralysis a side-effect of short action beta2-agonist

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Introduction: Hypokalemic paralysis is one of the known side effects of the beta2-agonists.

Case report: A previously healthy six-year-old girl was admitted to the pediatric emergency room for acute onset of coughing. She has no allergies and is immunized. She was eating her usual food when she felt a slight throat discomfort and started to cough. She did not presented foreign body aspiration syndrome or anaphylactic reaction symptoms. The cough was dry, with no dysphonia, stridor, wheezing or respiratory distress. At admission, all her vital signs were normal but pulmonary auscultation revealed a mild hypoventilation at the right base. She received 12 pushes of Salbutamol 100mcg/dose, an inhaled beta2-agonist. In the following minutes, cough improved and auscultation was symmetric. However, she presented a sudden ascending paralysis from the lower limbs until the neck with complete anesthesia and no osteotendinous reflexes; facial mimicry was preserved and there was no involvement of breathing muscles. A venous blood gas analysis showed a hypokalemia at 2,5 mmol/l with a compatible ECG findings as a ST segment depression. An intravenous potassium replacement was done over a period of 3 hours during which she had a progressive and complete recovery of the paralysis and sensitivity. The extended laboratory analysis was unremarkable, including no other electrolytes disturbance. Clinical neurological examination and kalemia after the correction was normal and remained stable after 12 hours.

Discussion: Our patient is a healthy child that has never received any beta2-agonist before. She received a one-time dose of Salbutamol, but presented a severe side effect, raising the question of any pre-existing disease. One of the differential diagnosis is the Hypokalemic Periodic Paralysis, a rare genetic disorder that facilitates the K+ shunt between intra and extracellular spaces, expressing an episodic severe muscle weakness, usually triggered by strenuous exercise or high carbohydrate diet. Patients often show a dramatic clinical response to correction of potassium deficit. The diagnose must be one of exclusion and considered only when more serious etiologies are ruled out.

Conclusion: The patient is being followed by a multidisciplinary team and is waiting for complementary investigations. She has been advised to avoid all the beta2-agonist treatment, and if beta agonists are strictly indicated, the patient should be monitored in hospital environment during treatment.

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Case report of a preschooler boy with rapid language regression

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A 3.5-year-old boy with previous normal development was sent by his psychologist for developmental speech difficulties and mild behavioral regression. The symptoms first started 6 months before presentation coinciding with the moving of the family from the German to the French-speaking part of Switzerland. He first showed speech difficulties and was rapidly unable to verbally communicate. Parents also described regression in toilet habits and paradoxical laugh. There was no relevent past medical or family history besides parental consanguinity.

Physical examination showed an absence of verbal communication but occasional echolalia. The remainder of his examination was unremarkable. Brain MRI, EEG and a screening for metabolic diseases, including the analysis of urinary oligosaccharides by thin-layer chromatography were all normal. After discussion with the family and staff geneticist, a whole exome sequencing (WES) with targeted bioinformatics analysis on a panel of neurodevelopmental-related genes was performed. This revealed a novel homozygote variant of the AGA gene NM_000027.4:c.376C>G:(p.Leu126Val). Sanger sequencing confirmed that the variant was inherited from both parents, who were heterozygote carriers. Finally, the activity of the ASP-Beta glucosaminidase in leucocytes was shown to be reduced, confirming the pathogenicity of the mutation (7.74 nmol/24h/mg Prot.; Norm. [20.4-55.4]).

Aspartylglucosaminuria (AGU; OMIM#208400) is an autosomal recessive lysosomal storage disease due to biallelic pathogenic variants of the aspartylglucosaminidase (AGA) gene. AGA is responsible for the cleavage of asparagine from N-acetylglucosamines as one of the final steps in the lysosomal breakdown of glycoproteins. Reduction of AGA activity leads to an accumulation of uncleaved glycoasparagines in tissues and body fluids.

Aside from specific implemented newborn screening programs, AGU diagnosis can be challenging due to the lack of early symptoms specificity. One of the pitfalls illustrated by this case is that, depending on the technique used, urinary oligosaccharides can be falsely negative. Yamamoto et al. have prevously shown that Reverse-Phenotyping is a valuable method in the context of parental consanguinity and clinical suspicion of metabolic disease (Yamamoto T et al. 2017). Using a similar approach, we identified a novel likely pathogenic homozygote variant for AGU in a preschooler boy with a rapid language regression.

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"Of children, not cyclops": a rare case of diplopia.

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Background: Tolosa-Hunt Syndrome (THS) is a condition characterized by painful ophthalmoplegia, rarely described in children.

Case: A previously healthy 8-year-old girl was admitted to our pediatric ER department with left eye pain and sudden diplopia. Clinical examination showed unilateral swelling of the left eyelid and horizontal nystagmus with possible III, IV and VI cranial nerve palsy. The rest of the neurological exam was unremarkable. The clinical presentation suggested, a broad differential diagnosis including ischemic, infectious, autoimmune and neoplastic diseases. Laboratory work-up (including CSF) was unremarkable. MR-imaging (3 Tesla) showed a clear hyper signal from the cavernous sinus to the orbital left sinus and the orbital left apex with strong signal enhancement and swelling of orbital muscles. These results were suggestive of THS; the patient was started on i.v. corticosteroids with rapid clinical improvement after 3 days and was discharged with mild but progressively improving deficit.

Discussion: The incidence of TSH is unknown in children. Symptoms are explained by an inflammation of cavernous sinus and nearby structures, radiologically and histologically proven, and associated with granulomatous inflammation that would be the cause of pain and the ophthalmoplegia. The mechanism of this process remains unclear. Biopsy is rarely performed due to the risks of complications. The diagnosis relies on clinical and radiological criteria as well as on early response to corticosteroids and has to be one of exclusion. MRI is an essential diagnostic as well as a follow up tool, as it can evaluate the corticosteroids response and THS relapse. Our patient presented a unilateral orbital pain less than two weeks before the occurrence of an ipsilateral oculomotor paresis; diagnostic features were fulfilled according to the THS criteria based on International classification of headache Disorders (ICHD).

Conclusion: THS in children has no specific guidelines; the highly variable clinical manifestations make diagnosis extremely difficult, also due to lack of evidence for relevant differences between presentation in adults and children. The aim of this report is to highlight some particularities of pediatric presentation of THS and to provide elements for the development of specific Pediatrics guidelines. THS must be considered in the differential diagnosis when confronted with sudden onset of painful double vison with no other neurological deficit.

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Tardive manifestation sickle cell anemia triggered by parvovirus B19 infection

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Abstract: Sickle cell anemia is a hemoglobinopathie due to a unique mutation of beta-globine gene lead to a deformation of the red blood cells in the blood. It is therefore at the origin of the formation of hemoglobin S. The disease has different genotypes with variable symptoms and severity. It is a major public health problem throughout Africa and Sub-Saharan Africa. As a result of adoptions and immigration, the number of patients suffering from sickle cell disease has increased in Switzerland over the last ten years. The development of sickle cell disease depends on genetic and environmental properties and underlying interactions. Our case deals with tardive presentation of Sickle cell anemia and require rapid and patient-specific management.

Case report: We report an eleven-year-old boy presented to our hospital with severe abdominal, lower back and lower limb pain. The discovery of the disease is made late by the presence of these sudden symptoms. He was diagnosed with compound heterogeneous double sickle cell-B+ Thalassemia discovered through a vaso-occlusive pain crisis complicated by an infection of Parvovirus B19. Until that age, this patient had never any clinical symptoms of sickle cell anemia. Past medical history and familial history of the patient was negative. However, her father was originally from the Congo, her mother from Guadeloupe and her brothers, aged 16 and 12, presented with the same symptoms 2 weeks later in emergency. In this case report, parvovirus B19 affected our patient and triggered severe anaemia. The condition is made more severe by the fact that this virus suppresses erythropoiesis, known as a transient aplastic crisis. Patients with sickle cell disease are already prone to anaemia due to the intense destruction of abnormal red blood cells by the spleen and therefore require multiple blood transfusions throughout their lives.

Conclusion: The late onset of the disease in our patient and the unknown of diagnosis by the parents proved difficult to manage. This shows the need for screening for this type of event, even in the absence of a significant history. Newborn screening programmes for sickle cell disease could help clinicians and parents to plan early treatment, appropriate prophylaxis and better management of the complications of this disease. Systematic screening for the disease could help avoid late discoveries, which can have fatal consequences.

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A swollen knee: frequent presentation, unusual diagnosis

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Case report: A 15-year- boy comes to the ER with a swollen knee. He started having pain in his left knee three days ago, progressively getting worse, with an increasing swelling. He had no trauma, no fever, no other symptoms. Physical examination revealed swelling of the left knee with sign of intra-articular effusion. There was no redness or warmth. No other joints were affected. He had a history of hemarthrosis of the right knee two years earlier following a trauma. During childhood he had one episode of prolonged epistaxis, also following trauma, and a prolonged bleeding from a cut on the finger, a few weeks earlier. Laboratory tests show no inflammatory syndrome and a prolonged aPTT at 58s. The prothrombin time, fibrinogen and blood count are in normal range. An X-ray of the knee showed a large intra-articular effusion. A knee puncture was performed to assess the origin of the effusion and rule out infection. It shows hemorrhagic fluid. A broader laboratory screening, including coagulation factors (VIII, IX, XI, XII), Von Willebrand factor, platelet function and anti-phospholipid antibodies shows a factor VIII deficiency, at 6%, leading to a diagnosis of mild hemophilia A.

Discussion: The median age at the time of diagnosis in mild hemophilia A is 28 months, but epidemiologic studies suggest that this condition remain under-recognized and under-diagnosed globally. Despite the milder phenotype as compared with

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their severe counterparts, the quality of life of these patients is impacted. Early diagnosis is challenging because spontaneous bleeding is rare, they generally experience bleeding only after serious injury, trauma or surgery. In addition, difficulty in the diagnosis is the absence of family history in 30% of cases, because they are sporadic. Prompt diagnosis is important to prevent complications such as hemorrhage associated with surgery, trauma or childbirth and hemophilic arthropathy due to repeated intra-articular bleeding. This case is useful to remember to the general pediatrician to think about hemarthrosis in front a swelling knee without evidence of inflammatory/infectious disease, despite the age at onset.

Conclusion: Hemophilia is a rare diagnosis, but in the event of prolonged or unexplained bleeding, coagulation screening tests should be performed to diagnose a bleeding disorder as early as possible, even in the absence of a family history.

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Perception of integrative medicine in pediatrics

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Introduction: With a growing interest in integrative medicine (IM) approaches among patients and healthcare professionals, Switzerland grapples with a noticeable gap between the rising demand for such practices and their current utilization in everyday medical care.

Methodology: Two comprehensive online surveys were conducted between August and December 2022 to address this disparity. The surveys included socio-demographic questions and focused on participants' current engagement with complementary medicine (CM) practices. Healthcare professionals (n = 124) received one questionnaire via email or in-person, while parents or guardians of hospitalized children (n = 54) and parents of children in daycare centers received the other.

Results: Osteopathy emerged as the most preferred and commonly used CM practice among both healthcare professionals and parents, alongside homeopathy and acupuncture. Primary reasons for seeking these treatments included lower back or joint pain, as well as stress and anxiety. Notably, 72% of hospitalized parents and 82% of outpatient parents expressed a desire for integrated care, while 66% of healthcare professionals conveyed a willingness to undergo training in CM, with a particular interest in hypnotherapy (52%).

Conclusion: This study underscores the popularity of CM practices and the shared willingness of both patients and healthcare staff to incorporate more integrative approaches at the Children's Hospital. However, additional research projects are imperative to explore various complementary treatments, delineate their scope, and assess associated risks comprehensively.

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Incidence and outcome analysis of pediatric in-hospital resuscitation in a tertiary children's hospital

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Background: In-hospital resuscitations are rare and feared events in pediatric care. Our goal was to determine the frequency and outcomes of these critical events in our hospital in order to identify interventions to improve outcomes.

Methods: All children resuscitated in a tertiary pediatric hospital between 01/2022 and 12/2023 were included. Cases were identified using CHOP code 99.63 (external chest compressions). Patient characteristics including underlying diseases, treatment and outcome were collected from the electronic medical records.

Results: A total of 16 patients were included in the study, 31% (5/16) of whom were female. All patients were mechanically resuscitated, 13% (2/16) underwent defibrillation and 69% (11/16) were administered adrenaline. The most common underlying diseases were infection (6), malformation (4), cardiovascular disease (2) and asphyxia (2). 6 infants were preterm born. Only 13% (2/16) had no risk factor. 81% (13/16) of resuscitations occurred on intensive care unit. 50% (8/16) of the infants died. The other half of the survivors left hospital after a median of 45 days (range 0–118). At a median follow-up of 64 days, 3 patients had fully recovered.

Discussion: Our results show that the prognosis for in-hospital resuscitation remains poor, which is consistent with the current literature. The majority of children had an underlying medical condition. No obvious interventions to improve outcomes were identified in our retrospective analysis. This highlights the need for further prospective research.

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Growing up trans: An international longitudinal qualitative investigation of trans youth access to gender affirming medical care, affirmation and well-being

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Introduction: Over the past two decades, research data on transgender and non-binary youth (TNBY) have been increasing, indicating that their wellbeing is more closely associated with the social context and environment than with gender identity itself. In Switzerland and globally, models of care for TNBY have been and continue to be implemented and developed taking into account the growing medical evidence. While the connection between access to gender-affirming medical care (GAMC) and well-being appears well-established, there is still limited research providing a comprehensive understanding on how the environment and care trajectories influence the well-being of TNBY over time.

Objectives: The project aims to bring innovative and integrative knowledge about how TNBY navigate their environment with

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regard to accessing GAMC from the onset of puberty. It will also shed light on how they are affected in that process by various family, educational and other social dynamics, and how their experiences of affirmation and well-being evolve as a result through these interactions. Ultimately, the project will increase understanding about different possible trajectories of care, of how and why young people decide whether or not to pursue medical transition, what prevents or facilitates access, and how these decisions and specific contexts affect their well-being. The findings will also indirectly address fears around GAMC, especially discontinuation and possible regrets, by producing a nuanced understanding of trajectories. The project started in late 2022. It is a multicentric study taking place in 6 countries: Canada, Australia, Switzerland, England, India, and the United States. This allows an intercultural analysis and a better understanding of how different GAMC models affects the well-being.

Methodology: We conducted a first wave of semi-structured interviews with approximately 10 TNBY and their families at each site during the first year of the project. The inclusion criteria included age between 8 and 15 years and the seeking of GAMC. The survey is planned to continue over 4 years, with one interview conducted each year, covering the period of the onset of puberty and exploring the research and trajectories within GAMC. The analysis uses a qualitative thematic approach, incorporating both cross-sectional and longitudinal perspectives. Preliminary results obtained from the Swiss cohort during the first year will be presented.

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BOrrelia BUrgdorferi Infections IN Children and Adolescents– a seroprevalence study (BOBUINCA)

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Lyme borreliosis is one of the most prevalent tick-borne diseases in Europe. Since studies on seroprevalence of anti-B. burgdorferi IgG antibodies in children are rare, the aim of this study was to determine the seroprevalence of B. burgdorferi IgG antibodies in children without symptoms of Lyme borreliosis residing in North-Western Switzerland and bordering regions of France and Germany.

This is an ongoing prospective cross-sectional observational single-centre study with further use of data and left-over plasma from clinical routine, based on general consent. IgG plasma antibodies against B. burgdorferi were determined according to a two-tier algorithm. All samples were screened by ELISA (Tecan, Switzerland) and positive or borderline result were confirmed by line blot (Virotech, Germany). Samples with positive or borderline ELISA results and positive line blot were considered as seropositive. Also, a subset of ELISA-negative specimens (matched with positive specimens by collection month, chronic disease, sex and age) will be tested by line blot to determine the sensitivity of the ELISA analysis.

Preliminary results: Specimens obtained from 794 children (average age 9.6 years, range 1-17, 53.4% males) between June 2023 and January 2024 were tested by ELISA; 105 (14.8%) were positive and 36 (5.1%) borderline positive for B. burgdorferi IgG. Of those, a total of 108 individuals (13.6%) were seropositive after lineblot confirmation. There was an equally high seroprevalence in both sexes and no higher seroprevalence could be demonstrated with increasing age. There is a trend towards more positive samples over the course of the year (7.5% in July vs. 21.8% in November). ELISA and line blot results of further 168 individuals as well as matched ELISA-negative samples are pending and will be presented at the meeting along with updated serology results.

This study provides an estimate of IgG antibody seropositivity for B. burgdorferi s.l. in children and adolescents in North-Western Switzerland. The current seroprevalence of 13.6% in this study is markedly higher than previously noted. These results confirm that B. burgdorferi infection is common in children and adolescents and may point towards an increasing risk of B. burgdorferi infection.

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Needs assessment for pediatric nurse practitioners in pediatric practices – the families' perspective

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Introduction: The current pediatric healthcare system in Switzerland is reaching its capacity limits. New care approaches are needed to close gaps in care. This study investigated the needs of families in pediatric practices and identified expectations for the new role of Pediatric Nurse Practitioners (PNP) in primary care for children.

Method: The qualitative study used a descriptive design and comprised 14 semi-structured individual or paired interviews with parents and children in the canton of Bern. Data were analyzed using inductive thematic analysis following Braun and Clarke.

Results: Families appreciated the warm atmosphere in pediatric practices and experienced dedicated and professional care. However, deficiencies in time management and interprofessional communication were identified. The unclear role concept of the PNP makes it difficult for families to analyze their needs. Nonetheless, they see potential in preventive care, emergency consultations, home visits, and telephone consultations. In particular, the importance for chronically ill children was emphasized.

Discussion: The identified PNP application areas provide avenues for targeted closure of gaps in pediatric primary care. Families demand a holistic approach in order to ensure patient-centered and effective care. PNP could help to address these needs and improve existing care. However, the unclear role model requires more detailed education to pro- mote understanding among families and health care workers.

Keywords: Families, Pediatric Primary Care, Pediatric Nurse Practitioner

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Better understanding of the PFAPA syndrome

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Context: Periodic Fever with Aphthous stomatitis Pharyngitis and Adenitis (PFAPA) is a syndrome that usually affects children under 5 years and causes recurrent episodes of fever every 3-5 weeks, associated with other symptoms, such as pharyngitis, adenopathy and aphthous stomatitis. The exact cause is unknown.

Aims: The aims of this study were to develop a better understanding of the functional dysregulations of the immune system in children with PFAPA syndrome, compared to control patients. We wanted to base our observations on both clinical symptoms and biological data.

Methods: This is an observational prospective study in Geneva, among patients already known and newly diagnosed with

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PFAPA syndrome and followed in the unit of Pediatric Immunology and Vaccinology at HUG. The patients had one visit during fever episode and one visit at steady state. These samples were compared to control patients, recruited among children coming for an electives blood sampling or surgery.

Results: Between April 2022 and February 2023, 16 PFAPA children were recruited, and 7 controls children. During the fever episodes, the main symptoms observed in PFAPA children were fever (100%), pharyngitis (69%) and swollen lymph nodes (54%). The duration of the fever crisis lasted on average 4.9 days and occurred every 4.8 weeks. A family history of recurrent fever was found in 46% of patients. During a fever crisis, an inflammatory syndrome was observed with an increase in CRP and leucocytes, as well as an increase in monocytes and neutrophils. An immunology workup with dosage of serum immunoglobulins, as well as vaccine antibodies was normal for all the PFAPA patients. The blood of the control children has been stored for the moment.

Conclusion: This study confirms the characteristic symptoms of children with PFAPA, but underlines the fact that diagnosing PFAPA syndrome can be challenging at disease onset, as PFAPA patients have unspecific symptoms and biologic inflammatory response during fever, which mimics viral infections. Further studies are necessary to find better biological markers of this syndrome and to increase the understanding of PFAPA, which could also contribute to better treating affected children.

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An apple detergent a day doesn't always keep the doctor away

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A healthy 10-month-old boy attends the ER for discomfort and irritability after ingesting an unknown quantity of "bio" apple detergent. Initial assessment reveals free airways with bubbles in the mouth and salivation, 100% saturated with room air, tachypneic at 35/minute, and mild respiratory distress with intermittent stridor. Tachycardic at 200/minute, no signs of shock. Conscious and alert, cried but remained calm by his mother. He receives Simeticonum for increased salivation. Respiratory distress persists as well as hypoventilation on the right base with sibilance and crackling rales with no response to Salbutamol. A chest X-RAY confirms a right basal infiltrate. He is admitted for close respiratory monitoring. He presents a progressive clinical deterioration with respiratory distress and acute hypoxemic respiratory failure requiring up to 50% oxygen by Ventury mask despite administration of hourly adrenaline aerosols. The ENT team fails to evaluate the airways by nasofibroscopy. Due to a high suspicion of caustic injury leading to upper and lower airway damage, he is transferred to the ICU of the CHUV for further management. At arrival, the CT scan shows multiple endobronchial impactions signing a probable chemical pneumonia, no indirect evidence of esophageal or gastric perforation, the trachea is permeable without stenotic narrowing. He benefits from non invasive ventilation for 5 days, antibiotic therapy, corticosteroid therapy and enteral feeding with progressive amelioration. An endoscopy performed on day 5 (given an initial high risk of perforation) shows no esophageal or tracheal lesions. He is retransferred 6 days later, weaned from NIV and parenteral nutrition and is discharged home on day 7, with a full recovery. Caustic ingestion is a rare but significant issue in the Swiss pediatric population with a peak incidence between 12-24 months. Management is based on history and clinical examination. The majority of these ingestions being unwitnessed, the history is often incomplete. A patient presenting with respiratory distress following a history of chemical product ingestion, even with mild respiratory symptoms, or a clinical deterioration, should be considered to have potential serious airway damage until proven otherwise and must prompt a transfer to an ICU. A "bio" substance should not be considered as less harmful and should not be a criterion for reassurance.

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Severe hypertriglyceridemia: A rare but serious complication of diabetic ketoacidosis in children

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Introduction: Ketoacidosis is an acute metabolic complication often indicative of diabetes in children. It can be severe and life-threatening, especially when complicated by major hypertriglyceridemia (HTg). This association is rare in pediatrics but should not be overlooked.

Observation: A 8-year-old girl admitted for treatment of severe diabetic ketoacidosis (DKA). The biological assessment, apart from the diagnostic criteria, revealed an opalescent appearance of the serum with a blood sugar level of 27.5 mmol/L and an HTg of 96 mmol/L. The lipidogram showed a high rate of chylomicrons and VLDL, thus confirming the diagnosis of HTg type V. Furthermore, lipase and amylase were normal. Treatment was initiated in an intensive care unit according to the DKA protocol with intensive insulin therapy and adequate hydration.

Discussion: The increase in ApoB induces an increase in VLDL and may therefore play a role in the development of HTg. In addition, insulin is an activator of lipoprotein lipase (LPL) which is the key enzyme in Tg metabolism. Insulin deficiency during type 1 diabetes therefore induces a reduction in LPL activity and can therefore induce or aggravate HTg. Type V HTg cannot, however, be explained by these factors alone; one or more LPL mutations are therefore suspected. It is in order to identify the LPL mutation involved that a molecular study is essential.

Conclusion: Any patient suffering from major HTg complicating DKA must be informed of the risk of overeating and the importance of consulting in the event of the occurrence of abdominal pain which could reveal a real emergency, namely acute pancreatitis.

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Wolf-Hirschhorn syndrome: severe short stature and growth hormone deficiency

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Introduction: Wolf-Hirschhorn syndrome (WHS) is a rare congenital disorder occurring in approximately 1/50.000 births, with a female predominance. It results from the hemizygous deletion encompassing the 4p16.3 region. The typical craniofacial phenotype is described as a "Greek warrior helmet appearance."

Observation: A 5-year-old boy is brought to the pediatric endocrinology consultation for short stature. He was born at term to a non-consanguineous couple with intrauterine growth restriction. Follow-up for epilepsy and treatment for 2 years. The clinical examination revealed a particular craniofacial phenotype, namely: a wide nasal saddle, microcephaly, a high forehead and a prominent glabella, hypertelorism, a nose with

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straight and parallel edges, a thin upper lip and corners. drooping, a small chin and micrognathia. Examination of the genitals reveals hypospadias with cryptorchidism. In addition, there is mental retardation, poor language and severe growth retardation. Bone age corresponded to a delay of 3 years. The rest of the physical examination was unremarkable apart from a hemangioma. IGF1 levels were low with GH peaking at ≤7 ng/ml during stimulation tests. The brain MRI was without abnormality.

Discussion: For our patient, the genetic study was carried out by objectifying: 46, XY ish dell (4) (p16.3p16.3) (WHSCR-) thus confirming the diagnosis. Genetic counseling is desirable. Paraclinical exploration in search of other associated malformations returned normal. Given the severe short stature with confirmed GH deficiency, treatment was initiated.

Conclusion: The diagnosis of WHS is based on physical examination and confirmed by molecular genetics or cytogenetic analysis. Most cases are sporadic, but an unbalanced translocation can be inherited from a parent with a balanced rearrangement. Treatment is symptomatic and requires a multidisciplinary approach.

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Morbid obesity revealing a rare genetic disease

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Introduction: Prader-Willi syndrome (PWS) is a rare genetic disease characterized by hypothalamic-pituitary dysfunction associated with major hypotonia during the neonatal period. In childhood, the main problems are the appearance of hyperphagia with the risk of morbid obesity, learning difficulties and behavioral disorders. It concerns one case in 25,000 births.

Observation: A boy aged 15, from a non-consanguineous marriage. Referred to our specialist consultation for the management of severe obesity. Parents report the notion of hyperphagia with absence of satiety. The clinical examination revealed: almond-shaped eyes, thin upper lip and drooping corners of the mouth with abdominal obesity as well as impuberism. Furthermore, we note a metabolic syndrome retained according to the IDF 2007 criteria. The rest of the biological and hormonal assessment was without abnormality. Abdominal ultrasound was normal. The genetic study was able to confirm the diagnosis.

Discussion: Today there is consensus among experts on the fact that the diagnostic suspicion of PWS is clinical (criteria of Holm et al. from 1993, revised in 2001) and its confirmation is genetic. It is due to an abnormality of chromosome 15 (15q11-q13). These genetic abnormalities are often accidental and sporadic and familial recurrence is very rare.

Conclusion: PWS requires global and multidisciplinary care. The use of growth hormone has transformed the quality of life of these children. The metabolic syndrome in our patient constitutes a real vascular risk factor and its management must involve healthy eating behaviors as well as physical activity.

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Orbital myositis revealing TRAb negative Graves' disease: an exceptional situation

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Introduction: Graves' disease (GD) is an autoimmune hyperthyroidism characterized by the presence of TSH receptor antibodies (TRAb) present in 95% of cases. GD is the most common cause of exophthalmos, which is unilateral in 15% of cases, and falling within the framework of Graves orbitopathy (GO). GO concerns half of patients with GD. The presence of GO is very rare in patients with negative TRAb.

Observation: This is a 12-year-old girl, with no previous history, who consulted for a right unilateral exophthalmos, of sudden onset, associated with pain. On ophthalmological examination of the right eye, visual acuity remained at 10/10. Examination of the appendices showed conjunctival hyperemia localized nasally, axile exophthalmos, and painful limitation of abduction. The fundus examination was without abnormalities. Ophthalmological examination of the left eye was normal. The general examination did not show any associated extra-orbital clinical signs. Cranio-orbital MRI revealed myositis of the right medial rectus muscle. The etiological assessment (inflammatory, immunological and infectious) was negative. The thyroid assessment returned in favor of TRab negative hyperthyroidism. Thyroid ultrasound was normal. Thyroid scintigraphy showed homogeneous hyperuptake. The GO was treated with IV bolus corticosteroids then oral relay and a step down. After 4 weeks of monitoring, the evolution was favorable under treatment.

Conclusion: A minimal assessment should be considered in the event of any unilateral exophthalmos in order to exclude a tumoral, inflammatory process or lymphoma. However, GO must be considered in the face of any exophthalmos, and the thyroid assessment must be complete. Lymphoma can mimic GO, by infiltrating the oculomotor muscles, which may be its only manifestation. An orbital fixation in PET-CT points towards this etiology. Idiopathic intra-orbital inflammation syndrome remains the main differential diagnosis. In our patient, we retained the diagnosis of GD based on scintigraphy and hyper-FT4 evidence although the TRAbs were negative. These patients likely have low TRAb concentrations, which may be difficult to measure with current assay methods.

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An unusual thrombosis revealing a rare metabolic disease

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Introduction: Homocystinuria due to cystathionine-beta-synthase (CBS) deficiency is a rare abnormality of methionine catabolism. The diagnosis is suspected on the increase in plasma total homocysteine (Hcyt) and plasma methionine (Met). The diagnosis is confirmed by looking for bi-allelic mutations in the CBS gene.

Observation: A 14-year-old boy from a consanguineous marriage with no history. 48 hours before his admission, he presented 02 episodes of convulsions in an afebrile context. The clinical examination revealed a disturbed neurological examination: drowsiness, motor aphasia, left facial paralysis, paralysis of the left 6th cranial pair and left hemiplegia. Furthermore, a marfanoid appearance was noted. Brain CT came back in favor of venous thrombosis (VT) of the sagittal sinus complicated by

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an edematous-hemorrhagic infarction. We note hyper-Hcyt at 340 µmol/L, homocystinuria at 140 µmol/L with a high level of (Met). The rest of the assessment was normal, notably the vitamin dosage.

Discussion: Patients with CBS deficiency present a spectrum of clinical manifestations, ranging from asymptomatic to severe forms with multi-system involvement. The most common symptoms essentially affect 4 types of organs: the eye, the brain, the bone and the vascular system. The phenotype and severity of the disease are essentially defined by the degree of response of the CBS deficiency to vitamin B6 which is the cofactor of the CBS enzyme. It is established in the literature that early diagnosis and treatment make it possible to avoid the usual complications of the disease, if compliance with treatment is good. Interest in neonatal screening.

Conclusion: The Hcyt dosage must be part of the thrombophilia assessment with a genetic analysis when faced with a picture of unusual thrombosis at an unusual site in a young subject. Management of VT often involves long-term anticoagulant treatment to prevent further thromboses

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Pituitary stalk interruption syndrome: a pathology not to be ignored

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Introduction: Pituitary stalk interruption syndrome (PSIS) is a congenital anomaly of the pituitary gland responsible for pituitary insufficiency. Its prevalence is unknown but approximately 1000 cases have been reported to date. It is characterized by a triad associating a very thin or interrupted pituitary stalk, an ectopic or absent posterior pituitary gland (EPP) and hypoplasia of the anterior pituitary gland, visible on MRI. Its etiology remains unknown.

Observation: A 4-year-old boy referred to our pediatric endocrinology consultation for short stature. He was born at full term to a non-consanguineous couple. The clinical examination revealed a delay in stature (height –2.5 Zs). The remainder of the somatic examination was unremarkable. Bone age corresponded to a delay of 2 years. IGF1 levels were low with GH peaking at ≤7 ng/ml during stimulation tests. The rest of the hormonal balance was normal. Hypothalamic pituitary MRI showed an interrupted pituitary stalk with EPP at the level of the third ventricle infundibulum.

Discussion: Our patient presented an isolated anterior pituitary deficiency explaining the clinical picture. The prognosis is good if diagnosis and treatment are early.

Conclusion: PSIS is a rare congenital malformation, responsible for an isolated or multiple anterior pituitary deficiency. MRI is currently the most efficient means of imaging for diagnosis and a prognostic approach. Treatment is based on replacement therapy with deficient hormones. The risk of familial recurrence is less than or equal to 5%.

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Gayet-Wernicke encephalopathy: an exceptional pathology in pediatrics

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Introduction: Gayet-Wernicke encephalopathy (GWE) is a disorder characterized by acute onset confusion, nystagmus, partial ophthalmoplegia, and ataxia due to thiamine deficiency. The diagnosis is mainly clinical. The disorder may resolve with treatment, persist, or degenerate into Korsakoff psychosis.

Observation: A 5-year-old boy, born at full term, referred to our specialist consultation for growth retardation. The clinical examination revealed severe failure to thrive. Furthermore, we noted a divergent strabismus, exophthalmos of the left eye with ptosis. The ophthalmological examination showed paralysis of the adduction of the left eye with limitation of elevation. The fundus was normal. Cerebral angio-MRI showed an appearance suggestive of GWE. Furthermore, the IGF1 level was low with a GH peak at 7 ng/ml during stimulation tests and the bone age corresponded to 2 years.

Discussion: The diagnosis of hypovitaminosis B1 is confirmed by the spectacular and favorable response to thiamine with disappearance of the signs of deficiency. The little one was immediately put on parenteral vitamin B1 as replacement therapy as well as multiple water-soluble vitamins with dietary intake of thiamine. Furthermore, his GH deficiency was treated according to consensus recommendations.

Conclusion: GWE is an exceptional pathology in pediatrics. Early diagnosis as well as urgent treatment are necessary to restore this deficiency.

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When tuberculosis masquerades as a lower respiratory tract infection.

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Case report: A two-month-old infant born in Switzerland was admitted in early winter for RSV bronchiolitis requiring noninvasive ventilation. Shortly after, she was readmitted for right sided pneumonia and treated with empiric antibiotic therapy. Fever and respiratory distress recurred each time the antibiotic was stopped, and thoracic X-rays didn't normalize. Thoracic CT-scan was therefore performed and revealed signs of necrotic right sided pneumonia with ipsilateral adenopathies, partial compression of the trachea and major compression of the right intermediate bronchus, suggesting pulmonary tuberculosis. Bronchoalveolar lavage microbiological cultures confirmed the diagnosis. Congenital tuberculosis was ruled out as the mother's interferon gamma release assay (IGRA) and pelvic MRI were negative. There was no travel since birth apart from a brief stay in France. The household survey didn't find any index case. RIPE therapy (Rifampicin, Isoniazid, Pyrazinamide, Ethambutol) was started with Pyridoxine supplementation. Given the risk of respiratory compromise due to tracheal compression, corticosteroid therapy was started at hospital. Extension work-up showed no meningitis but a small left peripheral cerebellar tubercle on MRI. Abdominal US and ophthalmological exams were normal. Because of intermediate resistance to Isoniazid and

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presence of cerebellar tubercle, Isoniazid, Rifampicin and Pyrazinamide were increased and Levofloxacin added. Ethambutol was stopped after two months. The treatment was well tolerated and co-managed between the pediatrician, specialists and under the Directly Observed Treatment (DOT) system. Nine months after the initiation of treatment, tracheal and bronchial compressions resolved, only with persistence of slightly enlarged hilar lymph nodes. The cerebellar lesion disappeared and the treatment could be stopped.

Discussion: The incidence rate of active tuberculosis in children born in Switzerland is 0.4-1.3/100'000. Fifteen percent of infected children under one year old will develop progressive intrathoracic or disseminated tuberculosis, because of an immature immune system. Extension work-up searching for organ complications (brain, liver, eyes) must be carried out as it determines the duration of treatment.

Conclusion: A high degree of suspicion for tuberculosis must prevail in an infant with recurrent lower respiratory tract infections, even if born in Switzerland and in the absence of known exposures.

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KCNMA1-linked encephalopathy: overview including a recent case with severe insomnia

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Introduction: The KCNMA1 gene encodes the four alpha-subunits that form the potassium calcium-activated channel, also known as the "Big K+" channel due to its large conductance and sensitivity to both calcium and voltage. KCNMA1-linked channelopathies are linked to various neurological conditions such as epilepsy, ataxia, paroxysmal dyskinesias, developmental delay, and cognitive disorders.

Methods: A narrative literature review, including a recent case report, was conducted to expand the already heterogeneous phenotype.

Results: So far, around 50 clinical cases of KCNMA1-linked channelopathy have been described, involving individuals with various disorders such as paroxysmal non-kinesiogenic dyskinesia, generalized epilepsy, developmental delay, cerebellar atrophy, and other cortical malformations. Our patient presented at the age of 2 years with episodes characterized by a fixed stare, lack of response when spoken to, and occasional hand fidgeting. He underwent numerous investigations including several long-term video-EEG monitorings, MRI, and neurometabolic workup, all of which were inconspicuous. With antiseizure treatment no positive impact was observed. The clinical focus eventually shifted to a sleep disorder, with excessive daytime sleepiness resulting from severe insomnia. Due to the initial differential diagnosis of therapy-resistant epilepsy, trio exome sequencing was performed, revealing a likely pathogenic de novo KCNMA1 variant c.1511C>T (p.(Ser504Leu)). Neurodevelopmental assessment at 3 years of age revealed average cognitive development, a slight delay in expressive language development and mild motor clumsiness. Insomnia and daytime sleepiness improved significantly with sleep hygiene measures, rhythmizing and adjustment of bedtime to sleep needs as well as medication with prolonged-release melatonin.

Conclusion: This summary of a novel variant causing KCNMA1-linked channelopathies highlights a highly heterogeneous phenotype. Whether the sleep-wake and behavioral issues in our patient are directly caused by the genetic alterations or are related to the already known novel childhood movement disorder in the broadest sense, remains unclear. Further studies investigating possible other correlations with melatonin and/or hypocretin/orexin metabolism are needed.

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Quality of drug prescription before and after implementation of an electronic prescription system on paediatric intensive care unit

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Aim: Paediatric drug prescription is complex and error-prone. Widespread use of electronic prescription (e-prescription) is a national goal. Therefore, we assessed the quality of drug prescriptions before and after implementation of e-prescription system in our tertiary paediatric University Hospital.

Methods: This quality improvement study was conducted during implementation of an e-prescribing system on the paediatric intensive care unit (PICU) offered within KISIM (Cistec AG, Zürich) (September 2022), with PEDeDose (Pedeus AG, Switzerland, webserver-based) implemented as Clinical Decision Support (CDS) for paediatric dose selection. Manual prescriptions before and e-prescriptions after implementation were assessed for (1) dose calculation errors, (2) eight quality criteria defining a formally complete prescription according to the internal medication standard (criteria categorized as present/absent/not applicable, prescription as complete/incomplete) and (3) dose compatibility with PEDeDose recommendations.

Results: A total of 767 (348 manual, 419 electronic) prescriptions from 107 patients (53 before, 54 after implementation) were collected. In 3 manual prescriptions (0.8% (0.2-2.7%)) from 3 different patients (5.6% (1.5-16.6%)) dose calculation errors were detected versus no calculation errors in e-prescriptions ($p = 0.18/0.23$ on prescription/patient level). 16 (5%) of manual prescriptions were formally complete versus 197 (47%) of e-prescriptions ($p < 0.001$). Most frequently missing elements in were: total daily dose (64% manual- versus 38% e-prescriptions) and pharmaceutical form (58% versus 25%). In $n = 235$ (68%) of the manual prescriptions doses corresponds to PEDeDose recommendations versus 313 (75%) of e-prescriptions ($p = 0.035$).

Conclusions: Findings of this quality study provide arguments for the potential of e-prescription with implemented CDS to improve medication safety on the PICU. Still, only half of e-prescriptions were formally complete. This requires continuous monitoring of e-prescription and close interdisciplinary collaboration to adjust according to user experience.

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Facial swelling is not always infectious! A rare presentation of facial Aneurysmal Bone Cyst (ABC)

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An 8-year-old female child presented to the pediatric emergency department (PED) with left facial swelling involving the maxillary region on day 3 following a dental extraction after an

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initial 4-day trial of systemic antibiotics for a suspected dental abscess. She was afebrile, with no history of prior facial trauma, fever or weight loss. On examination, a firm non tender maxillary swelling was visible, the overlying mucosa was normal in aspect but fluctuant on palpation, with hypoesthesia in the trigeminal nerve territory (V2) regarding the swelling, and no focal cranial nerve deficit on clinical examination. There was no inflammatory syndrome, and bloodcounts were normal. An orthopantomogram showed a radiolucent oval image of 2x1.5 cm, associated with a diffuse opacity projecting over the ipsilateral mandible. An intrajugal hematoma following the initial dental procedure was suspected and surgically drained, with discharge of brownish bloody fluid. The next day she presented to the PED with worsening swelling, involving the whole left hemiface. An emergency CT-scan, later confirmed by MRI, revealed a large plurilobar heterogenous osteolytic lesion in the left maxillary bone invading the homolateral maxillary sinus, extending to the base of the left orbit. The differential diagnosis was an infected, inflammatory lesions (infected dental cysts, chronic osteomyelitis) or suspicion of malignant cells invading the surrounding tissues (Ewing sarcoma or osteosarcoma). In our patient, a neoplasm was first suspected. The chest X-ray was normal. A biopsy revealed an aneurysmal bone cyst (ABC) of the maxillary sinus, with an associated rearrangement of the USP6 gene. (1) ABC's are benign tumors most commonly encountered in the long bones of pediatric patients, rarely showing malignant transformation. Only 2% of ABCs are facial. Of these, 66% are found in the mandible or maxilla. (2, 3) Long thought to be reactive, recent molecular advances have demonstrated a majority of primary ABCs harbor rearrangements of the USP6 gene (4,5), confirming the neoplastic nature of the lesion. Due to the extent of the lesion for our patient, surgery remains a highly invasive option. Different other therapeutic options are being studied, including non-surgical approaches with radio-embolisation, injection of phosphocalcique ciment of phenols, or medical treatment with denosumab (anti-RANKL), a fully human monoclonal antibody targetting osteoclasts and reducing bone turnover.

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Headnodding and falls – leading to a rare diagnosis

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Introduction: Subacute sclerosing panencephalitis (SSPE) is a fatal complication of measles. It is an inflammatory, neurodegenerative brain disorder, presenting itself with progressive symptoms caused by a slow and persisting viral infection. SSPE is a rare disease with a prevalence of 1:100.000 worldwide, it is however even rarer in countries with a high vaccination coverage such as Switzerland.

Methods: We aimed to collect data on all known SSPE cases diagnosed in Switzerland throughout the years 2000 – 2023 by developing a questionnaire and distributing it among all neuropediatric departments at Swiss hospitals.

Results: Overall, we were able to analyse 5 cases. The patients' mean age at the time of SSPE diagnosis was 8.5 years. In three of the five cases the time of measles infection is unknown, so that the period between measles infection and diagnosis of SSPE is not clear. In the two other cases the latency since the measles infection and the diagnosis of SSPE was 4 and 5 years. All patients were not Swiss nationality, only one of them was born in Switzerland. All patients were in stage I or II at diagnosis and had increased level of measles IgG in CSF and an increased measles IgG CSF/Serum quotient. Four of them also had Radermecker complexes in the EEG at the time of diagnosis. Two of the patients received no therapy after multidisciplinary discussion and family wish and died after a few months. Three of the patients are still alive today. Antiviral, immunomodulating and anti-seizure medications were used in these cases achieving a short stabilisation, but with a cognitive and motoric decline as the disease progresses.

Conclusion: Until today, there are still cases of SSPE in Switzerland. This underlines the importance of prevention through the MMR vaccination, also in terms of herd immunity, in order to prevent this always fatal long-term complication of measles.

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Neonatal health outcomes among refugees and asylum seekers in Geneva: A Cross-Sectional Retrospective Study

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Aims and objectives: Migration is one of the key determinants of health at any age. The neonatal period is one of the most vulnerable in life and highly influenced by the health condition of the mother before and after birth. Migrant women in Switzerland, as every other individual living in the country, have the right to health protected by the Swiss federal law and thus access to a health care insurance, regardless of their legal status. In Geneva's canton, more than 40% of the population are migrants. In 2022, there were more than 13000 asylum seekers in the canton, which represents 2.5% of the total population. Some recent studies conducted in developed countries have shown worse neonatal outcomes of newborns born from refugees and asylum seekers mothers. Little is known about the outcomes of this population in Switzerland. This valuable information would help to analyse the effectiveness of the current migrant health policies and design further lines of work. Our aim is to determine if newborns from migrant mothers have a higher risk of hospitalisation in the neonatal/intensive care unit than newborns born from either local and migrant mothers but with a non-provisory migratory status. We also aim to determine if there is a higher risk of prematurity, IUGR, unplanned c-section and neonatal mortality in this population and the most frequent pathologies of hospitalisation.

Methods: This is a cross-sectional retrospective study. Data of all newborns born in the maternity of Geneva's Children University Hospital (HUG) has been collected for a 10-year period (2012-2022) from the hospitals' registry. Logistic regression analysis will be performed to calculate the odds ratio for each variable.

Expected results: Statistical analysis being in progress, no definitive results are available to date. However, based on previous studies that have shown worse outcomes from those born from refugees and asylum seeker mothers and reports of the Federal Office of Public Health (OFSP in French) which show insufficient access to health for this population (despite being in benefit of an insurance) we estimate that our results could be similar to what has been found in previous studies.

Further conclusions will be extracted once the definitive results are available.

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Copeptine as a Diagnostic Marker for Diabetes Insipidus in Pediatrics: Insights from a Case Series

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Introduction: Copeptin, a stable precursor of ADH, is released concurrently with ADH and measurable in the bloodstream. Its stability and measurable attributes make it a valuable diagnostic marker for diabetes insipidus in adults, potentially superseding urinary osmolality tests. However, the application of Copeptin in pediatric care remains under-explored. In our study, we utilized water deprivation tests, ADH substitution tests, and MRI scans to discern the etiology of diabetes insipidus—central or nephrogenic—in six patients. We also incorporated Copeptin measurement to establish a threshold for differentiating these conditions.

Methods: From 2022 to 2023, we examined patients presenting with polydipsia-polyuria syndrome at the pediatric emergency department of Geneva University Hospital. Copeptin levels were measured during a restriction test, irrespective of the initial diagnosis. The final diagnosis was based on the outcomes of the restriction test, occasionally supplemented by an ADH substitution test. Copeptin values were then analyzed retrospectively.

Results and discussion: Our analysis included six patients presenting with polydipsia-polyuria syndrome. Following the restriction and ADH tests, we diagnosed two with central diabetes insipidus, one with nephrogenic diabetes insipidus, and found no evidence of diabetes insipidus in three patients. Literature suggests a Copeptin threshold of >20pmol/L for diagnosing nephrogenic diabetes insipidus in adults at T0 (pre-restriction test). In our cohort, the patient with nephrogenic diabetes insipidus exhibited a Copeptin level of 70.13pmol/L at T0. The restriction test protocol was halted due to patient intolerance. Studies in adults indicate that a Copeptin level below 2.6 pmol/L suggests a central origin. Our findings align with this, as the two patients with central diabetes insipidus had Copeptin levels of 2.23 pmol/L and 1.91 pmol/L at T0. For Copeptin levels ranging between >2.6 pmol/L and <20pmol/L, diagnosis becomes more ambiguous. The three patients without diabetes insipidus showed Copeptin levels ranging from 2.72-13.4pmol/L at T0 and 4.21-18pmol/L post-restriction test. Our experience suggests the utility of Copeptin in diagnosis for diabetes insipidus.

Conclusion: Copeptin measurement holds potential as a diagnostic tool in pediatric patients. It may eventually replace the restriction test in children, but further research is required to establish normal and pathological Copeptin values in pediatric care.

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EXAMINING YOUTH PROFILES IN RELATION TO THEIR PERCEPTIONS OF SEXUAL CONSENT

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Background: Ensuring sexual health and preventing sexual violence hinges on a comprehensive understanding of sexual consent. Understanding adolescents' perceptions of sexual consent and expectations for receiving or giving consent in sexual encounters, can contribute to the design of developmentally appropriate communication strategies and prevention programs that promote healthy adolescent dating and sexual relationships.

Objective: The purpose of this study is to explore the individual, family, health and social factors associated with the perceptions and understanding of sexual consent among young people in Switzerland and Liechtenstein.

Methods: We analyzed data from a national cross-sectional survey on the mental health of young people aged 14-19 years in Switzerland and Liechtenstein in which participants (N = 1197) responded questions about sexual consent. Data were collected through an online self-reported questionnaire disseminated through social media between June and August 2021. Participants were presented with eight statements on sexual consent and had to answer whether they agreed, disagreed or did not know, enabling different groups to be established according to their perceptions of sexual consent. Analyses compared these groups regarding various factors (sociodemographic and personal data, occupation, substance use, adverse childhood experiences (ACE) and resources).

Results: Preliminary results show that there is no clear consensus in the study population regarding sexual consent. Overall, only 12% of participants responded to the expected answers for explicit consent (yes = yes). Up to 70% of participants felt that it is not always easy to know when a person wants to have sex or not. Gender differences were found for certain statements, particularly in relation to the definition of rape and the principle of coercion (use of force or threat). More detailed results are still being analysed, and will be presented.

Conclusion: The subject of sexual consent is central during adolescence, as it is a cornerstone to promote a healthy sexual development, which is one important development task of that period. The results of this study will provide a better understanding of the issues that can potentially influence perceptions of sexual consent. This echoes the political context in Switzerland, where the recent reform of the penal code, including a new definition of rape, is due to come into force on 1 July 2024.

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New way to determine total and direct Bilirubin non-invasively by SpectralPad

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Our innovative, small and energy-efficient wearable sensor can quickly and reliably measure Bilirubin non-invasively through the skin. Total Bilirubin but also direct Bilirubin can be determined. Current devices on the market lack sensitivity and are only able to determine total Bilirubin without differentiation between direct / conjugated (2 sugar molecules added in the liver) and indirect / unconjugated Bilirubin. For example, Däger lists an accuracy of 1.5mg/dl total Bilirubin for its "Jaundice Meter" System. As 1.2mg/dl is regarded as upper limit for adults the use of current devices is limited to the niche of neonate jaundice. To solve this issue, we developed a new and comparatively more precise patent-pending optical technology to determine total and direct Bilirubin non-invasively with a small wearable device emitting blue light and measuring the resulting fluorescence changes at different wavelengths. We will present further results obtained in collaboration with the Zurich University of Applied Sciences (Sensors and Measuring Systems group) demonstrating good agreement between in-vivo and in-vitro experiments and validating the proof of concept of our technology.

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Further information: Preliminary results have been presented in form of a poster ("Novel light based approach to detect Bilirubin & distinct direct & indirect Bilirubin non-invasively" by Jan Haarer, PHD & Christiane Haarer, MD at the DGKJ Congress (Berlin) in October 2021. Additionally we presentet our new technology to determine direct and total Bilirubin non-invasively with a short presentation in the category machine learning / AI in pediatric care at the DGKJ Kongress 2022 in Düsseldorf. Actually we are starting now our new innosuisse project with team Prof. Bonmarin, team Prof. Lehmann (ZHAW) and Prof. Witthauer (Sensortechnik Inselspital Bern Diabetologie) including our first clinical trial with newborns.

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New migraine prophylactic treatment with Calcitonin Gene-Related Peptid monoclonal antibodies (CGRP-Abs) in 4 adolescents with frequent episodic or chronic refractory migraine

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Background: The prevalence of episodic migraine in adolescence varies from 9-15%, for chronic migraine it is estimated to be 1-2%. Frequent episodic and chronic migraine often lead to significant disability and treatment resistance. In adults monoclonal antibodies targeting to CGRP are used as first drugs to specifically influence migraine pathogenesis in the preventive treatment. The results of the ongoing RCTs with CGRP-Abs in adolescents <18 yrs with episodic and chronic migraine are expected in a few years, and real-world-data of CGRP-Abs in adolescents is rare.

Methods: We studied the efficacy and safety of the CGRP-Ab erenumab retrospectively in four adolescents (17 years old, three female and one male) with frequent episodic (>8 episodes/month) or chronic migraine, three of them having additional headaches of tension type. All of them have received at least 3 different prophylactic medications according to international guidelines: nutraceuticals and additional complementary methods (acupuncture, cefaly), propranolol, flunarizine, lamotrigine, topiramate, amitriptyline. All of them showed no significant effect on migraine frequency and a persistent impact on apprenticeship or school. Therefore, we decided to treat our patients "off-label" with erenumab subcutaneously (s.c.) 70 mg every month. In two of them the monthly dose was increased to 140 mg s.c., with a follow-up of ½-2 yrs.

Results: The four patients received initially monthly 70 mg erenumab s.c. Three of them developed a significant and persistent decrease in migraine attacks, defined as more than 50% decrease in frequency of disabling migraine attacks and simultaneously an increase in quality of life. One female patient with chronic migraine showed a further, significant improvement after increasing the dosage to 140 mg monthly. The only male patient showed an increase of migraine episodes after 3 doses of 70 mg, and even after the increase of the dose to 140 mg, he showed no improvement, so erenumab was discontinued after a total of 5 doses. The only adverse reaction, observed in one female patient, was constipation.

Conclusions: In four patients our results confirm the experience from only 2 published articles with "real-world data", that CGRP-Abs seem to be an efficient and safe prophylaxis also for adolescents <18 yrs with high impacting, refractory migraine, without significant adverse reactions.

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Diagnostic delay in cerebral creatine deficiency disorders: Lessons learned from the analysis of guanidinoacetate/creatine measurements in Switzerland from 2015-2023

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Cerebral creatine deficiency disorders (CCDD) are caused by defects in the enzymes L-arginine:glycine amidinotransferase (AGAT) or guanidinoacetate-N-methyltransferase (GAMT), which are involved in the synthesis of creatine; or by a mutation in the creatine transporter (CRT), which is essential for the uptake of creatine as important energy source into the target cells. Patients with CCDD can present with a variety of unspecific symptoms: global developmental delay, speech/language delay, behavioral abnormalities and seizures. Early treatment initiation (<2 years) is essential in AGAT and GAMT deficiencies to achieve a favorable outcome. According to literature, CCDDs are largely underdiagnosed and if diagnosed, the window for effective treatment has often closed.

The CCDD patient cohort at Kinderspital Zurich and guanidinoacetate/creatine measurements performed in entire Switzerland by laboratories in Lausanne and Zurich between 2015 and 2023 were analyzed in detail.

Five patients with CCDD (2 GAMT, 3 CRT) treated at Kinderspital Zurich were initially referred to different specialists depending on main symptoms (status epilepticus, speech delay, epilepsy). A diagnostic delay ranging from 3-27 months was observed between first referral (age range: 2.5-11 years) and final diagnosis, resulting in a likewise delayed treatment initiation.

Analysis of laboratory samples measured in Switzerland show a constantly increasing number of samples since 2015, with a large proportion of tests done in urine, which is necessary to detect all three disease entities. In 2022, a majority of samples (>90%) were sent in by large hospitals and only a minority by pediatricians in private practice (<10%). Within the large hospitals, most samples were sent by neurology, developmental pediatrics and metabolic departments.

In Switzerland, screening for CCDD has been successfully implemented into diagnostic algorithms in neurology and developmental pediatrics, but not in other specialties, who may see patients at an even earlier age. Even though an increasing number of samples are being analyzed, pediatricians in private practice rarely provide samples. To support earlier diagnosis and reduce the diagnostic delay, the current practice of sample referral should be reflected and first-contact specialties should be encouraged to implement selective screening.

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Low antibiotic use in a NICU practicing integrative medicine

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Introduction: Despite a generally very low rate of proven neonatal sepsis in Western countries, the use of antibiotics in neonatal intensive care units (NICUs) remains high, so that the burden of the treatment is disproportionate to the burden of disease. Different strategies have been established to reduce the use of antibiotics in neonates. The approach of integrative medicine integrating appropriate complementary therapies into conventional standard care has not yet been evaluated in this context. Studies demonstrate that physicians with additional training in complementary medicine have lower antibiotic prescribing. The objective of our study was to assess the use of antibiotics in a NICU practicing integrative medicine and to compare the results with the benchmarks of the recently published AENEAS study.

Methods: We conducted a retrospective analysis at the NICU of the Filderklinik, an integrative medicine hospital in Southern Germany, to compare antibiotic use locally and internationally. To enable comparison to the AENEAS study, we performed a subanalysis including all infants born alive at a gestational age of ≥34 weeks to assess antibiotic exposure started in the first postnatal week. Main outcomes were the proportion of neonates started on antibiotics per 100 live births, the number of antibiotic days per 1000 live births, the incidence of culture-proven early onset sepsis (EOS) per 1000 live births and the mortality rate. In addition, use and tolerance of complementary medicinal products (CMPs) was documented.

Results: Between 2014 and 2017, there were 7677 live births of ≥34 weeks of gestation at the Filderklinik and 160 neonates were started on antibiotics during the first week of life, resulting in a proportion of 2.08% of all live births exposed to antibiotics (AENEAS 2.86%). The number of antibiotic days was 100 per 1000 live births (AENEAS 135). The incidence of culture-proven EOS and the all-cause mortality were 0.65 and 0 per 1000 live births, respectively (AENEAS 0.49 and 0.82). Neonates frequently received CMPs in addition to conventional care for both infectious and non-infectious indications. The Filderklinik NICU had lower antibiotic use than NICUs with similar disease burden in the AENEAS cohort.

Conclusion: The low antibiotic use in this NICU confirms an association between integrative medicine practice and low antibiotic prescribing in neonates. The impact of CMP use on decreasing neonatal antibiotic exposure should be further investigated.

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Effectiveness of high-dosage avalglucosidase alfa in infantile-onset Pompe disease

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Pompe disease (glycogen storage disease II, OMIM #232300) is a rare inborn error of metabolism belonging to the group of lysosomal storage diseases. Biallelic pathogenic variants in the GAA gene lead to significantly reduced activity of the enzyme alpha glucosidase (GAA) gene resulting in storage of mainly glycogen in muscular lysosomes. Infantile-onset Pompe Disease (IOPD) manifests before the age of 12 months with generalized hypotonia, feeding difficulties, cardiac involvement, and respiratory distress. Without treatment, patients die before the age of two years.

Intravenous enzyme replacement therapy in form of a human recombinant GAA enzyme called alglucosidase alfa (Myozyme©) is available since 2006 and allowed a significant improvement of the general survival rate. However, even under treatment with alglucosidase alfa, the situation of IOPD patients deteriorates with time leading to loss of mobility, need of invasive ventilation and premature death. Avalglucosidase alfa (Nexviadyme©), a new recombinant human GAA enzyme with more mannose-6-phosphate residues allowing a better cellular uptake, was recently developed. In Switzerland, Nexviadyme© is currently only licensed for late-onset Pompe disease.

Here, we report two patients, aged 6 and 14 years with IOPD treated since the age of 1 week and 6 months with alglucosidase alfa 20 mg/kg every second week. Due to a clinically meaningful decline in muscular function, both patients have recently been switched to an off-label use with high dosage avalglucosidase alfa (40 mg/kg every second week). Clinically, the situation of both patients stabilized or even slightly improved which was accompanied by improvement of life quality. Laboratory monitoring showed a decline or even normalization of transaminases and to a lesser extend CK levels. The current observation period of 6 and 10 months is too short to conclude on any changes in respiratory function.

In spite of the short observation period, high dose avalglucosidase alfa appears to have beneficial effects on disease progression in IOPD patients. This therapeutic option should be taken into consideration as an alternative to alglucosidase alfa when patients show a decline in their motor function.

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Improvement of HbA1c in children and adolescents with Type 1 Diabetes Mellitus following Transition to Hybrid Closed Loop Pump Therapy: A Retrospective Study

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Background: Insulin management and good metabolic control in children and adolescents with type 1 diabetes mellitus (T1DM) remains a challenge, particularly regarding the maintenance of stable blood glucose levels and the prevention of hypo-and hyperglycemias in daily life but also of long-term complications. Hybrid closed loop pump therapy (i.e. combination of insulin pump and continuous glucose monitoring (CGM)

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linked together by an algorithm to optimize glucose control) has the potential to address these challenges. We did a retrospective study in our hospital to investigate the potential benefits of a hybrid closed loop pump in childhood and adolescence.

Methods: In this retrospective study, 24 children and adolescents aged 3 to 17 years (mean age 11.5 years; 54% male) with T1DM were enrolled. All participants initially received either multiple daily injections (MDI) or had an insulin pump only (Omnipod Insulin Management System) and were subsequently transitioned to a hybrid closed loop pump therapy (to Medtronic 780G, Tandem t:slim X2 or YpsoPump CamAPS FX). The primary endpoint was the change in Hemoglobin A1c (HbA1c) levels. HbA1c levels were measured and compared 9, 6, and 3 months before and after the introduction of the hybrid closed loop pump therapy.

Results: The change to hybrid closed loop pump therapy resulted in a better glycemic control. HbA1c decreased statistically significant ($p < 0.05$); 9 months before to 9 months after initiation from 7.97% (±1.12) to 7.31% (±0.78) and 3 months before to 3 months after initiation from 7.87% (±1.12) to 6.98% (±0.65).

Conclusion: The present study suggests that transitioning from MDI or an insulin pump only to hybrid closed loop pump therapy with combination of insulin pump, CGM and connecting algorithm is associated with a significant improvement in metabolic control in the children and adolescents treated in our hospital with T1DM. These findings support further investigation and implementation of hybrid closed loop pump therapies to optimize the management of children and adolescence with T1DM in order to prevent long-term complications of this young group of patients.

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Which maternal risk factors are linked to child placement at birth?

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Background: Placement of the child at birth is sometimes necessary to avoid negative consequences for the infant linked to a potentially abusive environment, although the literature has also shown the negative effects of placement on the child's development, such as psycho-affective disorders. In this context, it is pertinent to study the risk factors associated with infant placements, in order to improve early detection and management of these situations, which could jeopardize children's development. This study therefore aimed to address this gap, providing valuable insights to inform clinical practice.

Objective: This study aimed to evaluate the associations between the maternal perinatal risk factors and the child placement at birth in the Canton de Vaud in Switzerland.

Participants and setting: This retrospective cohort study included 386 mother-child dyads. Eligibility criteria included (1) referral to the Child Abuse and Neglect Team at the Lausanne University Hospital from 1st January 2020 to 31st December 2022 and (2) ensuring the child's survival until hospital discharge. The study was approved by the local ethics committee.

Methods: Based on the literature, the following risk factors were selected: (1) personal history of abuse, (2) alcohol and/or drug dependence, (3) psychiatric illness, (4) minor parent, (5) lack of post-compulsory education of the parent, and (6) psychosocial fragility (e.g., stress or anxiety at a non-pathological level). Descriptive and risk factors information was retrieved from single items completed by clinicians in a secure database (i.e., REDCap). Chi-square test of independence was carried out to assess the associations.

Results: Of 386 dyads, 26 (6.7%) newborns were placed at birth. 257 (92.1%) dyads lived in the canton de Vaud and 22 (7.9%) in another Canton. 25 (6.5%) mothers were minor at the time. Psychiatric illness and alcohol and/or drug dependence emerged as significant risk factors for child placement ([$X2$ (1, N = 386) = 7.64, $p = 0.006$] and [$X2$ (1, N = 386) = $32.8, p =< 0{,}001$] , respectively). The other risk factors remained non-significant.

Conclusion: Increased risks of child placement at birth were found only when mothers had a psychiatric illness or alcohol and/or drug dependence. In a preventive context, our results advocate for the importance of developing healthcare structures adapted to this specific population, aimed at preventing mother-infant separation and to promote a positive mother-child relationship.

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Undescended testes and a micropenis at birth: "red flags" for early diagnosis of Congenital Hypogonadotropic Hypogonadism (CHH) and a chance for optimised treatment during minipuberty to increase future fertility

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Background: Male individuals with CHH are born with severe deficiency of gonadotropin releasing hormone (GnRH) and/or gonadotropins during the three physiologic waves of hypothalamo-pituitary-gonadal (HPG) axis activity in life. While the absence of the first wave of hormonal activity in foetal life can lead to undescended testes and a micropenis at birth, the absence of the second wave during 'mini-puberty' leaves the number of testicular Sertoli cells low due to lack of cell expansion. As future quantitatively normal sperm production is determined by the number of Sertoli cells, the absence of mini-puberty will result in an impaired response to central hormone treatment during adolescence or adulthood, when induction of testicular maturation and fertility is desired. Factors that contribute to reduced male fertility in this patient group, in addition to reduced testicular Sertoli cell counts, include testicular trauma caused by orchidopexy.

Currently, some clinicians will treat male infants with a small penile size with a 3-month course of intramuscular testosterone or apply dihydrotestosterone (DHT) locally, while cryptorchidism is treated by surgery with or without pre-treatment with nasal GnRH or intramuscular injections of human chronic gonadotropin (hCG). However, these therapeutic approaches cannot facilitate expansion and development of Sertoli cells. This requires the replacement of gonadotropins or GnRH.

So far, only case reports and small descriptive patient series have been published on hormonal replacement of minipuberty in infants with CHH. These data confirm that treatment with gonadotropins or GnRH is safe, well tolerated and effective.

Aims of the European project, funded by an ESPE collaborative research grant:

1.To define protocols for best practice for therapeutic management during mini-puberty of male infants with CHH

2.To develop the infrastructure to allow research into whether central hormone replacement results in improved short and long-term outcomes regarding

- testes descent

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- testes and penile growth
- normalization of biochemical markers of Sertoli cell function
- future spermatogenesis and/or fertility following pubertal induction by central HPG

axis hormone replacement during adolescence or adulthood.

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Hair-thread strangulation syndrome in childhood: A systematic review

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Introduction: Hair-thread strangulation syndrome describes the constriction of a body part by a tightly wound hair or thread. This research aims to review the literature about this entity.

Methods: A systematic review was performed to characterize hair-thread strangulation syndrome in subjects aged ≤16 years. This pre-registered review (PROSPERO ID: CRD42022363996) followed the PRISMA methodology.

Results: Subjects with digital strangulation were significantly younger (median = 4.0 [interquartile range: 2.0–6.1] months; n = 143) than females with genital strangulation (9.0 [6.8–11] years; n = 36), males with genital strangulation (5.1 [1.9–8.0] years; n = 36), and subjects with non-digital and non-genital strangulation (24 [13–48] months; n = 11). Digital strangulation was followed by an amputation in five (3.5%) and a reconstructive surgical intervention in seven (4.9%) cases. Sequelae occurred in four (11%) cases after female genital strangulation: clitoris autoamputation (n = 2) and surgical removal of a necrotic labium minus (n = 2). Severe complications were observed in 14 (39%) cases with male genital strangulation: urethral fistula (n = 7), urethral transection (n = 2), and partial penile autoamputation (n = 5). A partial uvular autoamputation was observed in one case (9.0%) with non-digital and non-genital strangulation.

Conclusions: Early recognition and management are crucial to avoid sequelae or long-term care in hair-thread strangulation syndrome.

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