Free communications

2 S  FM 1 – FM 3

Posters

3 S  P 1 – P 35

Index of first authors

14 S
Tocilizumab for induction and maintenance of remission in giant cell arteritis: a randomized placebo-controlled trial

**Background:** Tocilizumab, a humanized monoclonal antibody against the interleukin-6 receptor, showed rapid induction and maintenance of remission in published case series. This first RCT was intended to prove a beneficial effect.

**Methods:** This single-center, randomized, placebo-controlled trial included patients satisfying the 1990 American College of Rheumatology criteria for giant cell arteritis. Patients with new-onset or relapsing disease were randomized in a 2:1 ratio to receive either tocilizumab (8 mg/kg) or placebo intravenously. Thirteen infusions were given in 4-week intervals. Both arms received oral prednisolone, starting at 1 mg/kg/d and tapered down to 0 mg according to a standard protocol. The primary outcome was defined as the number of patients with complete remission at a prednisolone dose of 0.1 mg/kg/d (week 12).

**Results:** Seventeen out of 20 tocilizumab-treated and 4 out of 10 placebo-treated patients reached complete remission by week 12 (p = 0.03). Relapse-free survival was achieved in 17 tocilizumab-treated and 2 placebo-treated patients by week 52 (p = 0.008). The mean survival-time difference to stop glucocorticoids was 12 weeks in favor of tocilizumab (p <0.001), leading to a cumulative prednisolone dose of 43 mg/kg in the tocilizumab group versus 110 mg/kg in the placebo group (p <0.001) after 52 weeks. Seven patients in the tocilizumab group and 5 in the placebo group experienced serious adverse events.

**Conclusion:** This first randomized controlled trial demonstrates the efficacy of tocilizumab in the induction and maintenance of remission in patients with giant cell arteritis.

**Incidence Predictors of Organ Manifestations in the Early Course of Systemic Sclerosis: A Longitudinal EUSTAR Study**

**Methods:** Patients from the EUSTAR cohort with early SSc, defined as those who had a visit within the first year of RP onset were studied. Outcome measures were analysed as a function of time after RP onset using Kaplan-Meier methods and Cox regression analysis was used to evaluate predictors of incident organ manifestations.

**Results:** Out of the 9,891 patients in the EUSTAR database who fulfilled the ACR criteria for SSc, 695 patients had a baseline visit within one year after RP onset. The incident non-RP manifestations (in order of frequency) were: skin sclerosis (75%) Gl symptoms (71%), impaired diffusing capacity for monoxide <80% predicted (65%), digital ulcers (34%), cardiac involvement (32%), impaired forced vital capacity (FVC) of <80% predicted (31%), increased resting systolic pulmonary artery pressure estimated by echocardiography (PAPsys) >40 mmHg (14%), and renal crisis (3%). In the heart, incidence rates were highest for diastolic dysfunction followed by conduction blocks and pericardial effusion. While the main baseline risk factor for a short timespan to develop FVC impairment was diffuse skin involvement, for PAPsys >40 mmHg it was higher patient age. The main risk factors for incident cardiac manifestations were anti-topoisomerase autobody positivity and older age. Male sex, anti-RNA-polymerase-III positivity, and older age were risk factors associated with incident renal crisis.

**Conclusion:** In this study of incidence rates in SSC patients presenting early after RP onset, approximately half of all incident organ manifestations occur within two years and have a simultaneous rather than a sequential onset. These findings have implications for the design of new diagnostic and therapeutic strategies aimed to ‘widen’ the still very narrow ‘window of opportunity’. They may also enable physicians to counsel and manage patients presenting early in the course of SSC more accurately.

**Rebound-associated vertebral fractures after denosumab discontinuation: A series of 9 women with 5 spontaneous vertebral fractures.**

**Incidence Predictors of Organ Manifestations in the Early Course of Systemic Sclerosis: A Longitudinal EUSTAR Study**

**Methods:** Patients from the EUSTAR cohort with early SSc, defined as those who had a visit within the first year of RP onset were studied. Outcome measures were analysed as a function of time after RP onset using Kaplan-Meier methods and Cox regression analysis was used to evaluate predictors of incident organ manifestations.

**Results:** Out of the 9,891 patients in the EUSTAR database who fulfilled the ACR criteria for SSc, 695 patients had a baseline visit within one year after RP onset. The incident non-RP manifestations (in order of frequency) were: skin sclerosis (75%) Gl symptoms (71%), impaired diffusing capacity for monoxide <80% predicted (65%), digital ulcers (34%), cardiac involvement (32%), impaired forced vital capacity (FVC) of <80% predicted (31%), increased resting systolic pulmonary artery pressure estimated by echocardiography (PAPsys) >40 mmHg (14%), and renal crisis (3%). In the heart, incidence rates were highest for diastolic dysfunction followed by conduction blocks and pericardial effusion. While the main baseline risk factor for a short timespan to develop FVC impairment was diffuse skin involvement, for PAPsys >40 mmHg it was higher patient age. The main risk factors for incident cardiac manifestations were anti-topoisomerase autobody positivity and older age. Male sex, anti-RNA-polymerase-III positivity, and older age were risk factors associated with incident renal crisis.

**Conclusion:** In this study of incidence rates in SSC patients presenting early after RP onset, approximately half of all incident organ manifestations occur within two years and have a simultaneous rather than a sequential onset. These findings have implications for the design of new diagnostic and therapeutic strategies aimed to ‘widen’ the still very narrow ‘window of opportunity’. They may also enable physicians to counsel and manage patients presenting early in the course of SSC more accurately.

**Rebound-associated vertebral fractures after denosumab discontinuation: A series of 9 women with 5 spontaneous vertebral fractures.**

**Incidence Predictors of Organ Manifestations in the Early Course of Systemic Sclerosis: A Longitudinal EUSTAR Study**

**Methods:** Patients from the EUSTAR cohort with early SSc, defined as those who had a visit within the first year of RP onset were studied. Outcome measures were analysed as a function of time after RP onset using Kaplan-Meier methods and Cox regression analysis was used to evaluate predictors of incident organ manifestations.

**Results:** Out of the 9,891 patients in the EUSTAR database who fulfilled the ACR criteria for SSc, 695 patients had a baseline visit within one year after RP onset. The incident non-RP manifestations (in order of frequency) were: skin sclerosis (75%) Gl symptoms (71%), impaired diffusing capacity for monoxide <80% predicted (65%), digital ulcers (34%), cardiac involvement (32%), impaired forced vital capacity (FVC) of <80% predicted (31%), increased resting systolic pulmonary artery pressure estimated by echocardiography (PAPsys) >40 mmHg (14%), and renal crisis (3%). In the heart, incidence rates were highest for diastolic dysfunction followed by conduction blocks and pericardial effusion. While the main baseline risk factor for a short timespan to develop FVC impairment was diffuse skin involvement, for PAPsys >40 mmHg it was higher patient age. The main risk factors for incident cardiac manifestations were anti-topoisomerase autobody positivity and older age. Male sex, anti-RNA-polymerase-III positivity, and older age were risk factors associated with incident renal crisis.

**Conclusion:** In this study of incidence rates in SSC patients presenting early after RP onset, approximately half of all incident organ manifestations occur within two years and have a simultaneous rather than a sequential onset. These findings have implications for the design of new diagnostic and therapeutic strategies aimed to ‘widen’ the still very narrow ‘window of opportunity’. They may also enable physicians to counsel and manage patients presenting early in the course of SSC more accurately.

**Rebound-associated vertebral fractures after denosumab discontinuation: A series of 9 women with 5 spontaneous vertebral fractures.**

**Incidence Predictors of Organ Manifestations in the Early Course of Systemic Sclerosis: A Longitudinal EUSTAR Study**

**Methods:** Patients from the EUSTAR cohort with early SSc, defined as those who had a visit within the first year of RP onset were studied. Outcome measures were analysed as a function of time after RP onset using Kaplan-Meier methods and Cox regression analysis was used to evaluate predictors of incident organ manifestations.

**Results:** Out of the 9,891 patients in the EUSTAR database who fulfilled the ACR criteria for SSc, 695 patients had a baseline visit within one year after RP onset. The incident non-RP manifestations (in order of frequency) were: skin sclerosis (75%) Gl symptoms (71%), impaired diffusing capacity for monoxide <80% predicted (65%), digital ulcers (34%), cardiac involvement (32%), impaired forced vital capacity (FVC) of <80% predicted (31%), increased resting systolic pulmonary artery pressure estimated by echocardiography (PAPsys) >40 mmHg (14%), and renal crisis (3%). In the heart, incidence rates were highest for diastolic dysfunction followed by conduction blocks and pericardial effusion. While the main baseline risk factor for a short timespan to develop FVC impairment was diffuse skin involvement, for PAPsys >40 mmHg it was higher patient age. The main risk factors for incident cardiac manifestations were anti-topoisomerase autobody positivity and older age. Male sex, anti-RNA-polymerase-III positivity, and older age were risk factors associated with incident renal crisis.

**Conclusion:** In this study of incidence rates in SSC patients presenting early after RP onset, approximately half of all incident organ manifestations occur within two years and have a simultaneous rather than a sequential onset. These findings have implications for the design of new diagnostic and therapeutic strategies aimed to ‘widen’ the still very narrow ‘window of opportunity’. They may also enable physicians to counsel and manage patients presenting early in the course of SSC more accurately.

**Rebound-associated vertebral fractures after denosumab discontinuation: A series of 9 women with 5 spontaneous vertebral fractures.**

**Incidence Predictors of Organ Manifestations in the Early Course of Systemic Sclerosis: A Longitudinal EUSTAR Study**

**Methods:** Patients from the EUSTAR cohort with early SSc, defined as those who had a visit within the first year of RP onset were studied. Outcome measures were analysed as a function of time after RP onset using Kaplan-Meier methods and Cox regression analysis was used to evaluate predictors of incident organ manifestations.

**Results:** Out of the 9,891 patients in the EUSTAR database who fulfilled the ACR criteria for SSc, 695 patients had a baseline visit within one year after RP onset. The incident non-RP manifestations (in order of frequency) were: skin sclerosis (75%) Gl symptoms (71%), impaired diffusing capacity for monoxide <80% predicted (65%), digital ulcers (34%), cardiac involvement (32%), impaired forced vital capacity (FVC) of <80% predicted (31%), increased resting systolic pulmonary artery pressure estimated by echocardiography (PAPsys) >40 mmHg (14%), and renal crisis (3%). In the heart, incidence rates were highest for diastolic dysfunction followed by conduction blocks and pericardial effusion. While the main baseline risk factor for a short timespan to develop FVC impairment was diffuse skin involvement, for PAPsys >40 mmHg it was higher patient age. The main risk factors for incident cardiac manifestations were anti-topoisomerase autobody positivity and older age. Male sex, anti-RNA-polymerase-III positivity, and older age were risk factors associated with incident renal crisis.

**Conclusion:** In this study of incidence rates in SSC patients presenting early after RP onset, approximately half of all incident organ manifestations occur within two years and have a simultaneous rather than a sequential onset. These findings have implications for the design of new diagnostic and therapeutic strategies aimed to ‘widen’ the still very narrow ‘window of opportunity’. They may also enable physicians to counsel and manage patients presenting early in the course of SSC more accurately.
Efficacy and safety of baricitinib in patients with active rheumatoid arthritis and inadequate response to tumour necrosis factor inhibitors: 24-week phase 3 RA-BEACON study results

Zamani O1, Combe B2, Tony HP3, Sanchez Burson J4, Tahir H5, Östergaard MF6, Jugend-Ferrante B6, Beselin A7, Larsson E8, Casillas M9, Smolen J10

1Rheumazentrum Favoriten, Vienna, Austria; 2CHRU Montpellier, France; 3Dept. of Rheumatology, University Hospital of Würzburg, Germany; 4Division of Rheumatology, Hospital de Valme, Seville, Spain; 5Whips Cross Hospital University, London, UK; 6Copenhagen Center for Arthritis Research; Center for Rheumatology and Spine Diseases, Rigshospitalet, Copenhagen, Denmark; 7Lilly France, Neully-sur-Seine Cedex, France; 8Eli Lilly Ges.m.b.H., Vienna, Austria; 9Eli Lilly Sweden AB, Solna, Sweden; 10Eli Lilly Spain, Alcobendas, Spain; 11Dept. of Internal Medicine III, Medical University Vienna, Austria

Background: Baricitinib (BARI), an oral JAK1/JAK2i, was investigated in the phase 3 RA-BEACON study. Methods: 5072 patients with active rheumatoid arthritis (RA) despite previously using ≥1 tumour necrosis factor inhibitor (TNFi) were randomised to placebo (PBO) or BARI (2 or 4 mg, QD). Primary endpoint was wk12 ACR20 response with BARI 4 mg vs PBO. Results: Wk12 ACR20 was higher with BARI 4 mg vs PBO (55% vs 27%; p<0.001). Improvements in ACR20/50/70 and DAS28-CRP occurred with BARI 4 mg (1 prior TNFi) at wk12/wk24; improvements in CDAI/SDAI/HAQ-DI were observed at wk24. A decrease ≥0.6 in DAS28 and ≥2 in CDAI at wk4 was observed in 79% and 80% of patients on BARI 4 mg, respectively, associated with LDA/remission at wk12/wk24. More TEAEs occurred with BARI 2 and 4 mg vs PBO, including infections. TLC changes in BARI groups were similar vs PBO at wk12/wk24. There were increases in T-cells, B-cells and NK-cells at wk4, and decreases in T-cells, NK-cells, and an increase in B-cells at wk12/wk24 for BARI groups (all TLC changes within normal range). NK-cell decrease was not associated with increased infection.

Conclusions: BARI showed clinical improvements wk4–wk24 with acceptable safety profile. Wk4 clinical response might predict later LDA/remission.

Efficacy and safety of baricitinib in patients with active rheumatoid arthritis and inadequate response to tumour necrosis factor inhibitors: 24-week phase 3 RA-BEACON study results

P 3

Predictors for the development of anti-citrullinated protein antibodies in individuals genetically at risk for rheumatoid arthritis

Alpizar-Rodriguez D1, Bruhlart L1, Müller R2, Möller B3, Dudler J4, Ciurea A5, Walker U6, Von Mühlenen F7, Kyburz D8, Zufferey P9, Mahler M8, Bö S1, Gascon D1, Lamachia C1, Roux-Lombard P1, Lauper K1, Nissen M1, Couvreur D1, Gabay C1, Finckh A1

1HUG, Geneva; 2KSSG, St Gallen; 3Inselspital, Bern; 4HFR, Fribourg; 5USZ, Zurich; 6USB, Basel; 7CHUV Lausanne; 8Inova Diagnostics, San Diego, CA, United States

Background: Different risk factors may be relevant for the development of this systemic autoimmune, one of the phases preceding the onset of rheumatoid arthritis (RA).

Objective: To identify predictors for the development of systemic autoimmune association with RA in individuals genetically at increased risk.

Methods: This is an ongoing prospective cohort study of individuals at increased risk of developing RA, namely first degree relatives of patients with RA (FDRs). Those without clinical evidence of RA were enrolled and followed-up yearly. We included all subjects with available anti-citrullinated protein antibodies (ACPA) status (anti-CCP 2, 3.0, or 3.1). We used logistic regression to analyze univariable and multivariable associations between ACPA positivity and putative risk factors or symptoms, including the Connective Tissue Disease Screening Questionnaire (CSTQ), 3 or more positive responses represented possible RA.

Results: A total of 1064 of FDRs were analyzed, of which 57(5%) were ACPA- positive. FDRs had a median age of 45 (interquartile range(IQR): 34–56) years, 76% were female, 25% had at least one self-reported episode of joint swelling, however on examination only 12% had >1 swollen joint. In univariable analyses, ACPA-positivity was associated with older age, female sex, tender joints (self reported, on examination and mean count), mean swollen joint count, CSQ score and self-reported symptoms associated with possible RA by CSQ. Tobacco smoking, alcohol consumption, obesity or tooth loss were not
significantly associated with ACPA status. In women, ACPA-positivity was significantly associated with age (OR: 1.1, 95%CI: 1.0–1.1), but not in men (OR:1.0, 95%CI:0.9–1.1). In the multivariable adjusted analysis, older age than 46 (OR: 3.2, 95%CI:1.2–8.0) and self-reported symptoms associated with possible RA (OR: 2.4, 95%CI:1.1–5.2), remained independently associated with ACPA positivity. Female sex and tobacco smoking ever having a strong but not significant association.

Conclusions: In individuals at high risk for RA, the development of ACPAs was associated with older age and self-reported symptoms related with possible RA. We found a trend for an association between female sex and tobacco smoking with ACPA positivity, which did however not reach statistical significance. These findings suggest similar risk factors for the development of ACPAs and for classifiable RA, suggesting that the development of ACPAs is a valid proxy for RA development.

P 5
Immediate Release of Peripheral Neutrophil Myeloperoxidase and Elastase and Formation of Extracellular Traps up to Cigarette Smoking in Rheumatoid Arthritis
Franz Juliane1, Giaglis Stavros1–2, Deman Erik2, Schäfer Günther2, Thüller Andreas3, Hahn Sinuhe2, Hasler Paul3
1Clinic of Rheumatology, Kantonsspital Aarau, Switzerland; 2Laboratory of Prenatal Medicine, Department of Biomedicine, University Hospital Basel, Switzerland; 3Division of Rheumatology, Kantonsspital Baden, Switzerland

Background: Smoking is an independent risk factor for rheumatoid arthritis (RA) [1]. In response to infectious agents, neutrophil granulocytes extrude their nuclear contents known as neutrophil extracellular traps (NETs) [2]. RA neutrophils display a vastly greater NET formation than normal neutrophils [3, 4]. Since NETs are proinflammatory and immunostimulatory and neutrophils show increased activity in inflammatory lung conditions, we investigated the responsiveness of peripheral blood neutrophils in RA to cigarette smoke.

Methods: Regular smokers with RA (n = 6) and without (n = 9) were examined at baseline and after a 16 hour abstinence from smoking. After smoking of 2 cigarettes within 10 min measurements were repeated at 0, 30, 60 and 120 min. Parameters included exhaled carbon monoxide (CO), myeloperoxidase (MPO), neutrophil elastase (NE) and cell free nucleosomes, measured by ELISA. Routine laboratory tests included blood counts, CRP, BSR and clotting parameters. In addition, neutrophils from healthy donors were incubated with cigarette smoke extract (CSE) for assessing NET formation by SytoxGreen extracellular DNA staining and combined immunohistochemistry (ICH) with anti-MPO, anti-cit-H3 and DAPI.

Results: RA smokers and controls showed similar courses of CO levels. RA neutrophils displayed higher baseline levels for MPO, NE and nucleosomes. In RA patients, exposure to smoke caused a pronounced increase of leukocytes and neutrophils, a 3-fold rise of MPO and NE at 30 minutes after re-exposure and a subsequent time-dependent reduction up to 120 min. Unexpectedly, this was paralleled by a sharp reduction in circulatory cell free nucleosomes. No changes were observed concerning parameters of inflammation and clotting. In vitro, freshly isolated neutrophils also showed diminished PMA-driven NET release after treatment with CSE.

Conclusions: In RA, peripheral blood neutrophils are pre-activated. Moreover, cigarette smoke provokes immediate release of toxic neutrophil granular enzymes into the circulation and transient reduction of NET formation, reflecting the systemic effect of smoking. The reduced NET formation in-vivo was unexpected, but was confirmed by the diminished CSE-induced NET formation in-vitro.

References

Functional disability and its predictors in systemic sclerosis: a study from the DeSScipher project within the EUSTAR group


1Department of Rheumatology, University Hospital Basel, Basel, Switzerland; 2Department of Rheumatology and Immunology, University of Pecs, Pecs, Hungary; 3Department of Rheumatology, Second University of Naples, Naples, Italy; 4Leeds Musculoskeletal Biomedical Research Unit (LMBRU), University of Leeds, Leeds, United Kingdom; 5Department of Rheumatology, University Hospital Zurich, Zurich, Switzerland; 6Department of Rheumatology, University College London, Royal Free Hospital, London, United Kingdom; 7Department of Rheumatology and Immunology, University Hospital Charité, Berlin, Germany; 8German Rheumatism Research Centre, Charité, Berlin, Germany; 9Department of Rheumatology, University of Florence, Florence, Italy; 10Department of Rheumatology and Clinical Immunology, Justus-Liebig University Giessen, Klinikum Bad Nauheim, Bad Nauheim, Germany; 11Federation of European Scleroderma Associationsaisy, Budapest, Hungary; 12Institute of Rheumatology, Russian Academy of Medical Science, Moscow, Russia; 13Rheumatology Unit, Department of Clinical and Experimental Medicine, University of Padova, Padova, Italy; 14Department of Rheumatology, University of Marmara, Ataköy-Istanbul, Turkey; 15Universitätsklinikum Köln, Köln, Germany; 16Department of Rheumatology, University of Cagliari-Policlinico Universitario, Monserrato, Italy; 17Krankenhaus St. Josef, Wuppertal, Germany; 18Clinica Reumatologica, University of Medicine & Pharmacy, Clin-Napoca, Romania; 19Division of Reumatologia, Università di Roma La Sapienza, Roma, Italy; 20Endokrinologikum Frankfurt, Frankfurt, Germany; 21Istituto di Clinica Medica Generale, Emorologi e Immunologia Clinica, Università Cattolica del Sacro Cuore, Rome, Italy; 22Servizio di Reumatologia, University Hospital Universitario Madrid Norte Sanchinarro, Madrid, Spain; 23Division of Rheumatology & Rehabilitation, Rehabilitation Hospital, iasi, Romania

Background: Systemic sclerosis (SSc) can greatly impact the patients’ quality of life due to the multinear impact of limited joint mobility. The health assessment questionnaire (HAQ) is one of the most commonly used measures of disability in musculoskeletal disorders and was extended to form the scleroderma HAQ (SHAQ), a more disease-specific disability scale that incorporates the HAQ and 5 visual analogue scales (VAS) into one score. This study aims to identify contributors of disability in SSc by means of the SHAQ.

Methods: Adult patients from the DeSScipher cohort were included in the analysis if they had one complete SHAQ (range 0–3) recorded and fulfilled either the 1980 ACR or the 2013 ACR/EULAR criteria for SSc. Multiple linear regression analysis was used to assess the combined effect of factors possibly associated with disability. Variables included in the model were defined a priori.

Results: 813 patients had one complete SHAQ recorded between June 2015 and January 2016 (34% of all patients followed in the DeSScipher cohort).

The patients had a mean SHAQ score of 0.86 (standard deviation [SD] 0.65) and an average HAQ score of 0.92 (SD 0.77), 60% of patients were in the “mild to moderate difficulty” SHAQ category (score of 0–1), 34% in the “moderate to severe disability” category (score of 1–2) and 6% in the “severe to very severe disability” category (score of 2–3). In order of magnitude, the means of the five VAS included in the SHAQ were: overall disease severity (36 mm, SD 26), Raynaud’s phenomenon (30 mm, SD 28), pulmonary symptoms (23 mm, SD 27), gastrointestinal symptoms (19 mm, SD 25) and digital ulcers (19 mm, SD 18).

In multiple linear regression, the main contributor to functional disability was dyspnoea. The SHAQ scores reported by patients with NYHA class 4, 3 or 2 were on average 0.65 units (95%CI:0.40–0.90) higher than patients with NYHA class 1. The presence of fibromyalgia, GERD or Raynaud’s phenomenon (30 mm, SD 28) as well as muscle weakness (0.25 units, 95%CI:0.14–0.36) were also associated with higher levels of disability. Patients reporting oesophageal, gastric and intestinal symptoms simultaneously had, on average, a SHAQ score of 0.45 units (95%CI:0.30–0.60) as well as patients reporting no gastrointestinal symptoms.

Conclusions: Patients perceive dyspnoea, pain, muscle weakness and gastrointestinal symptoms as the main factors driving their level of disability.
Nodular regenerative hyperplasia of the liver – a rare vascular complication of systemic sclerosis
Maurer B', Grat L', Allarone Y', Dobrota R', Jordan S', Distler O'
1Department of Rheumatology, University Hospital Zurich, 2Hôpital Codin, Paris, France

Background: Nodular regenerative hyperplasia (NRH) is a rare liver disease causing non-cirrhotic intrahepatic portal hypertension with life-threatening complications. Among the autoimmune diseases, SSc has been hypothesized to be associated with NRH. Since in both entities microvascular injury is considered one of the earliest pathologic events, it might be hypothesized that NRH represents a yet unidentified vascular complication of SSc.

Objectives: To investigate the prevalence and clinical phenotype of NRH in SSc.

Methods: Published cases of SSc-NRH were identified by systematic literature review. Next, we screened the Zurich SSc cohort. In accordance with international guidelines, the diagnosis of NRH had to be established by liver biopsy showing a characteristic diffuse micronodular transformation without fibrous septa. SSc characteristics were derived from the EUSTAR database. Information on NRH was extracted from the patients' charts. The study was approved by the local institutional review board.

Results: The literature search retrieved 9 cases of SSc-NRH. In the Zurich cohort, 5 out of 278 patients with established SSc were diagnosed with NRH resulting in a prevalence of 1.8%. The majority of patients was female (69.2%). Mean age was 44.5 ± 12.3 years at diagnosis of SSc with a disease duration of 8.2 ± 7 years when NRH was diagnosed. NRH occurred in diffuse and limited cutaneous SSc. In most patients, vascular features of SSc were present at the diagnosis of NRH including digital ulcerations (over 100%), active telangiectasia (74%), and pulmonary hypertension (50%). The most prevalent auto-antibodies were anti-centromere (40%) and anti-U1RNP (33%), whereas no patient was positive for anti-ScI70 or anti-RNA Polymerase III. In most patients, an elevation of AP and GGT (75%, 60%) occurred, whereas transaminases were not increased. Melaena and haematemesis occurred in 66.7%, resp. 50% of patients. Ultrasound detected ascites (60%) and splenomegaly (75%), but no pathologic liver morphology, although an increased stiffness was diagnosed by fibroscan (75%). Portal hypertension was diagnosed in 85.7% with oesophageal varices (70%) and variceal haemorrhages (75%) as main complications.

Conclusion: NRH might represent a rare, yet clinically important, potentially life-threatening complication in SSc patients, especially in those with prominent vascular features and positivity for anti-centromere.

Impaired micronutrient status in patients with systemic sclerosis
Lubbi J', Dobrota R', Maurer B', Jordan S', Miselwitz B', Fox M', Distler O'
1Division of Rheumatology, University Hospital Zurich, Zurich, Switzerland; 2Division of Gastroenterology, University Hospital Zurich, Zurich, Switzerland.

Background: Micronutrients are essential dietary factors involved in many metabolic processes like oxidative stress, collagen synthesis and wound healing, which are also important for the pathogenesis of systemic sclerosis (SSc). Given the frequent gastrointestinal involvement and impaired nutritional status, we hypothesized that micronutrients could be profoundly affected in SSc patients.

Methods: Patients meeting the ACR/EULAR 2013 classification criteria for SSc were prospectively recruited between 2009–2014. Clinical assessment, data recording and quality controls were done according to EUSTAR standards. In addition, the UCLA SCTG GIT 2.0 questionnaire and the circulating levels of several micronutrients were measured: zinc, selenium, prealbumin, holotranscobalamin, vitamin B12, folinic acid, red cell folate. Patients with micronutrient deficiency (-ies) were compared to those with a normal micronutrient pattern. The two-sided Fisher's exact test, Double T-test and the Mann-Whitney U-test were used, as appropriate. Binary logistic regression was applied to identify risk factors for deficiency in micronutrients.

Results: Nearly half (44%) of the 176 patients with SSc included into the study showed a deficiency in at least one of the measured micronutrients, most frequently in selenium (22%), folinic acid (17%) and prealbumin (18%). Nearly a fifth (19%) of these patients had multiple deficiencies. There was a significant association between low levels of zinc and selenium, prealbumin and folinic acid, respectively. Patients with lower body mass index had significantly lower zinc levels, and those with low prealbumin had more frequent stomach symptoms. Advanced skin fibrosis (higher modified Rodnan skin score, p = 0.007; skin thickening proximal to the metacarpophalangeal (MCP) joints, p = 0.009; positive ACR 1980 classification criteria, p = 0.014), as well as lower hemoglobin levels (p <0.001), were strongly associated with deficiency in micronutrients. The predictive model revealed skin thickening proximal to MCP as strongest risk factor for deficiency in micronutrients (OR 4.96, 95%CI [1.1–22.4], p = 0.037).

Conclusion: Deficiencies in micronutrients are a frequent and often complex burden in patients with SSc. Especially patients with more advanced skin fibrosis are at high risk for an impaired micronutrient status. These novel data have potential clinical implications, suggesting that screening for micronutrients should be performed in these patients.

Early detection of lung involvement in systemic sclerosis using molecular targeted nuclear imaging
1University Hospital Zurich, Department of Rheumatology; 2Paul Scherrer Institute Villigen, Center for Radiopharmaceutical Sciences ETH-PSI-USZ; 3Medical University of South Carolina, Division of Rheumatology/Immunology

Background: Intestinal lung disease (ILD) is one of the major causes of systemic sclerosis (SSc)-related deaths. SSc ILD gives rise to irreversible organ damage, there is an urgent need for the non-invasive diagnosis of ILD at earliest, still reversible disease stages.

Objective: Therefore, we assessed nuclear imaging as a highly sensitive methodology for the early detection of SSc-ILD by targeting integrin αvβ3 as a pathophysiologic key molecule of early inflammation-dependent fibrosis.

Methods: Expression of integrin αvβ3 was analysed in lung sections from patients with SSc-ILD, idiopathic pulmonary fibrosis (IPF), healthy controls as well as from bleomycin-challenged mice and Fra-2 transgenic (tg) mice using immunohistochemistry. In vivo small animal SPECT (single photon emission computed tomography) imaging was performed at early disease time points to visualise inflammation-dependent pulmonary fibrosis using 117Lu-DOTA-RGD radioconjugates specifically targeting integrin αvβ3. The specific pulmonary accumulation of the radiotracer was confirmed by ex vivo SPECT/CT scans, biodistribution, and autoradiography studies.

Results: Expression of integrin αvβ3 was significantly increased in lung sections of patients with SSc-ILD and IPF versus healthy controls (p <0.009, p <0.02). In line with the results observed in the human diseases, lungs of bleomycin-treated and Fra-2 tg mice showed higher expression levels of integrin αvβ3 as compared to controls (p <0.003 each). Notably, nuclear SPECT/CT with 117Lu-DOTA-RGD targeting integrin αvβ3 successfully visualised pulmonary inflammation and incipient fibrosis in the model of bleomycin-induced lung fibrosis at day 7. Consistently, imaging of integrin αvβ3 in Fra-2 tg mice at 13 weeks of age, the starting point of pulmonary fibrosis, showed a higher pulmonary radiotracer accumulation compared with wild type littermates. Ex vivo SPECT/CT scans, biodistribution and autoradiography studies of isolated lungs confirmed the in vivo results and validated the specific tracer uptake in lungs from bleomycin-challenged mice and Fra-2 tg mice.

Conclusion: Our data provide evidence that targeting pathophysiologic key molecules of inflammation-dependent fibrosis with nuclear imaging is a promising sensitive, non invasive approach for the early detection of lung involvement in SSc.

Safety and efficacy of extracorporeal shock wave therapy (ESWT) in calcinosis cutis associated with systemic sclerosis
Blumhardt Sandra1, Frey Diana1, Tonioli Martin1, Alkadhi Hatem2, Held Ulrike2, Distler Oliver1
1Universitätsklinikum Ulm, Klinik für Rheumatologie, 89091 Ulm; 2Universitätsklinikum Ulm, Institut für diagnostische und interventionelle Radiologie, 89019 Ulm; 3Universität Zürich, Horton Zentrum, Pestalozziistrasse 24, 8032 Zürich

Objective: Calcinosis cutis is a frequent, difficult to treat manifestation of systemic sclerosis (SSc) associated with morbidity. The aim of this prospective, controlled, monocenter study was to assess safety and efficacy of extracorporeal shock wave therapy (ESWT) for calcinosis cutis of the finger in SSc patients.
Occurrence of anti-Infliximab antibodies and associated co-factors in children with refractory arthritis and/or uveitis

Angélique Pain, Aeschlimann Fabienne, Hofer Kopp, Canizzaro Schneider Erika, Schneider Kohler Sam, Lauener Ralf, van der Kleij Dick, Rispen Tobi, Saurenmann RK

1RehabClinic Zurfach, Bad Zurfach, Switzerland; 2Department of Rheumatology, University Children's Hospital, Zurich, Switzerland; 3Department of Pediatric Rheumatology Tübingen, Oldenburger Strasse, Tübingen, Germany; 4Sanquin Research and Landsteiner Laboratory, Academic Medical Centre, Amsterdam, The Netherlands; 5Division of Pediatrics, Kantonsspital Winterthur, Switzerland

Background: Infliximab (IFX) is a monoclonal TNF-α alpha inhibiting antibody used for the treatment of children with refractory arthritis and/or uveitis. In adults, immunogenicity is associated with infusion reactions and lack of clinical response. In children, corresponding data are scarce. We aimed to describe the occurrence of anti-IFX antibodies and determine co-factors associated with anti-IFX antibodies.

Methods: A longitudinally observed cohort of consecutive (2009-2012) children treated with IFX was retrospectively analyzed. Blood samples were collected every 6 months before IFX infusion and tested for anti-IFX antibodies using Radio Immuno Assay. Clinical characteristics and potential co-factors were reviewed in the patients' records. Associations to the presence of anti-IFX antibodies were quantified by bivariate odds ratios (OR). Stepwise multivariate logistic regression was used to identify independent risk factors.

Results: Anti-IFX antibodies occurred in 14/62 treated children (23%) and in 32/253 tested blood samples (12.6%). Infusion reactions were observed in 10/62 (16%) children during the treatment period and in 32/253 tested blood samples (12.6%). Anti-IFX antibodies occurred frequently and at any time during IFX treatment. The high-risk group included young age (means 7.01 versus 9.88 years) and absence of uveitis (bivariate OR = 11.32). Further statistically significant co-factors were highly associated with anti-IFX antibodies (bivariate OR = 15.00 / multivariate OR = 11.32). Further statistically significant co-factors were: young age (means 7.01 versus 9.88 years) and absence of uveitis as indication for IFX treatment (bivariate OR = 6.00 / multivariate OR = 11.32).

Conclusion: Anti-IFX antibodies occurred frequently and at any time during IFX treatment. The high associations of IFX antibodies with young age, uveitis, and potential uveitis may have consequences for therapeutic management in future. However, prospective data of large, representative cohorts are needed.

J Rheumatol 2016;in review.

Introduction: IxE is an anti-IL-17A monoclonal antibody under investigation for PsA treatment.

Methods: 417 bDMARD-naive patients with active PsA were randomized to PBO or 1 of 3 doses of IXE (40 mg Q2W, 80 mg Q2W, or 160 mg Q12W) for 52 weeks. Safety data were pooled at the pt level with a data cut-off of Wk52 visit of the last observation carried forward. Safety data were assessed using a Meso Scale Discovery bridging assay. Safety data were pooled at the pt level with a data cut-off of Wk52 visit of the last observation carried forward.

Results: 382 patients completed 24 weeks: 30.2%, 57.4%, 62.1% and 57.3% of PBO-, ADA-, IxE Q2W- and IxE Q4W patients, respectively, had ACR20 responses. At 12 (ACR70 not eligible for comparison) and 24 weeks, a higher percentage of IxE Q2W/IxE Q4W- than PBO patients achieved ACR20/50/70 and PASI75/90/100 responses (p ≤0.001). IxE groups experienced greater reductions than PBO in DLI-B (p ≤0.05) and LEI (Week 12 Q2W only; p ≤0.05). DAS28-CRP and HAQ-DI scores improved, and both IxE doses inhibited radiographic progression of joint structural damage (mTSS (p ≤0.025 vs PBO). 24-week treatment-emergent adverse events (TEAE) incidence was higher (p ≤0.025) with IxE and ADA vs PBO. Discontinuation due to TEAE was similar across groups. No deaths occurred.

Conclusion: IxE patients showed greater disease marker improvement than PBO and no unexpected safety findings were observed in bDMARD-naive patients with PsA.

Safetyp and Tolerability of Secukinumab in Patients With Active Ankylosing Spondylitis: Pooled Safety Analysis of Two Phase 3, Randomized, Controlled Trials

Kurbuz D1, Deodhar A2, Baeten D4, Sieper J2, Porter B5, Widmer A5, Richards H6

1Department of Rheumatology, University Hospital Basel, Basel, Switzerland; 2Oregon Health & Science University, Portland, Oregon, USA; 3Academic Medical Center / University of Amsterdam, Amsterdam, The Netherlands; 4Charité University Medicine Berlin, Berlin, Germany; 5Novartis Pharmaceuticals Corporation, NJ, USA; 6Novartis Pharma AG, Basel, Switzerland

Background: Secukinumab, an anti–IL-17A monoclonal antibody, improved signs and symptoms of ankylosing spondylitis (AS) in 2 randomized double-blind placebo (PBO)-controlled studies, MEASURE 1 and 2. Here, we report pooled safety data through ≥52wks from these studies.

Methods: In MEASURE 1, 371 patients (pts) with active AS fulfilling the modified New York Criteria were randomized to secukinumab or PBO. Pts on secukinumab received 10mg/kg intravenously (IV) at baseline, Wk2 and 4, followed by 75 or 150 mg subcutaneously (SC) every 4wks (q4w) from Wk4. PBO was given according to the same IV to SC schedule. In MEASURE 2, 219 pts were randomized to receive SC secukinumab (75/150 mg) or PBO at BL, Wk1, 2, and 3, and q4w starting from Wk4. At Wk16, PBO pts were re-randomized to receive secukinumab 75/150 mg SC q4w. Anti-drug antibodies (ADAs) were assessed using a Meso Scale Discovery bridging assay. Safety data were pooled at the pt level with a data cut-off of Wk52 visit of the last pt enrolled in each study.

Results: 571 pts received ≥1 dose of secukinumab (691.1 pt-yrs of exposure). Demographic and disease characteristics were well-balanced in the secukinumab and PBO populations. The incidence of adverse events (AE)/serious AE (SAE) during the 16wk PBO-controlled period was 85.7/3.3% and 58/4.1% in the secukinumab and PBO groups. Incidence rates of AE/SAE across the entire study period (mean exposure: secukinumab, 442.1 days; PBO, 118.5 days) were 206.8/7.9 and 559.5/12.8 per 100 pt-yrs with secukinumab and PBO; 27 (4.7%) pts receiving secukinumab and 11 (5.6%) for PBO discontinued due to AEs. Three deaths were reported: 1 suicide (PBO); 1 due to respiratory failure (IV→75 mg) and 1 due to acute myocardial infarction (75 mg), both pts with multiple cardiovascular risk factors. During the entire study period nasopharyngitis was the most frequent AE with secukinumab (179 per 100 pt-yrs vs 19.5 in PBO).

The incidence (per 100 pt-yrs) of inflammatory bowel disease (1.2) and Candida infections (0.9) with secukinumab was low. Uveitis AEs were reported in 7 (1.2%) pts on secukinumab and 2 (1.0%) on PBO and ADAs were detected in 2 (0.3%) pts (efficacy maintained). There were no suicidality-related AEs with secukinumab.

Conclusion: Secukinumab was well-tolerated in pts with active AS, with a low incidence of SAEs and discontinuations due to AEs.

Secukinumab Efficacy in Anti-TNF-Naive Patients and Patients Previously Exposed to Anti-TNF Therapy: Results of a Randomized, Double-Blind, Placebo-Controlled Phase 3 Study (MEASURE 2) in Active Ankylosing Spondylitis

Dudler Jean1, Braun J, Baraliakos X, Baeten D, Dougados M, Emery P, Deodhar AT, Porter B, Andassen M, Richards H

1Service de rhumatologie, HFR Fribourg, Fribourg, Switzerland; 2Rheumazentrum Ruhegarten, Heine, Germany; 3Academic Medical Center, Amsterdam, The Netherlands; 4Universite Paris Rene Descartes and Hopital Cochin, Paris, France; 5Leeds Musculoskeletal Biomedical Research Unit /Institute of Rheumatic and Musculoskeletal Medicine, University of Leeds, Leeds, UK; 6Oregon Health & Science University, Portland, Oregon, USA; 7Novartis Pharmaceuticals Corporation, NJ, USA; 8Novartis Pharma AG, Basel, Switzerland

Background: Current treatment options for ankylosing spondylitis (AS) patients with intolerance or an inadequate response to tumor necrosis factor alpha inhibitors (anti-TNF) are limited. Secukinumab, a human anti–interleukin-17A monoclonal antibody, significantly improved the signs and symptoms of AS in the phase 3 MEASURE 2 study [1].

Objective: To evaluate the efficacy and safety of secukinumab by anti-TNF history in the MEASURE 2 study.

Methods: 216 subjects with active AS were randomized to receive subcutaneous (s.c.) secukinumab (150 or 75 mg) or PBO at baseline, Wk 1, 2 and 3, and every 4 wks starting at Wk 4. Randomization was stratified according to prior anti-TNF experience: anti-TNF-naive, or inadequate response or intolerance to not more than one anti-TNF biologic agent (anti-TNF-IR). At Wk 16 PBO-treated subjects were re-randomized to secukinumab 150 or 75 mg. Pre-planned subgroup analyses of the primary and secondary endpoints were conducted among anti-TNF-naive and anti-TNF-IR subjects and included: the proportion of subjects achieving an Assessment of Spondyloarthritis International Society (ASAS) 20 response (primary endpoint), ASAS40, high sensitivity C-reactive protein (hsCRP), ASAS 5/6, Bath Ankylosing Spondylitis Disease Activity Index (BASDAI), Short Form-36 (SF-36), Ankylosing Spondylitis Quality of Life (ASQoL), and ASAS partial remission. Analyses at Wk 16 used non-responder imputation. It is possible to predict which patients treated with biologic agents for rheumatic diseases will develop anti-drug antibodies?

Favre dit Jeanfavre Mélanie1, Benaim Charles2, So Alexander3, Perreau Mathieu4, Zufferey Pascal5,6,7

1CHUV/DAL; 2CHUV/DAL; 3Chedecine; 4CHUV/DAL

Introduction: All biologic agents (bDMARDs) currently used in rheumatology can induce anti-drug antibodies (ADAB), which will influence the drug levels and the drug effectiveness. Why only certain patients develop these antibodies is not yet clear, although there is already some literature dealing with anti-drug antibodies and trough drug level in rheumatic diseases. The aim of this study was to look for predictive factors of occurrence of such antibodies.

Methods: Since March 2013, we measure ADABS and trough levels for all anti TNF agent and also for rituximab and tocilizumab. Half of all our patients under biologic treatments have been tested. The method used is a sandwich ELIS A. ADABS, trough and TNF levels can be measured simultaneously. The reproducibility and the cut-offs have been tested among patients exposed and non-exposed to the medication. Clinical predictors of ADABS development were analyzed: gender, age, duration of the disease type of disease, duration of treatment, type of treatment, concomitant medication, previous biologic agent. Biologic predictors were: trough level, TNF level, CRP and ESR. Results: 297 patients had at least one measurement of ADAB and drug trough level up to January 2016. All the patients with ADABS were exposed to the medication, except for 3 patients (specificity: 98%). In patients exposed to bDMARDS, ADABS were found respectively for infliximab in 46/106 (44%) pts, adalimumab: 10/92 (16%) pts, certolizumab: 2/4 (50%) pts, etanercept: 1/20 (5%) pts, golimumab: 4/34 (12%) pts, tocilizumab: 1/75 (1%) pts, rituximab: 4/46 (8%) pts. When ADABS against several bDMARDS were tested, On univariate analysis, several clinical and biological factors were significantly predictive of ADABS. After multivariate analysis only two clinical factors and two laboratory parameters remained independently associated: MAB anti-TNF treatment (OR: 26), previous bDMARD (OR: 5.9) and High TNF trough level (OR: 4.2) and undertetable through level (OR: 34). Conclusion: In this large real world cohort of patients with rheumatological conditions requiring bDMARD therapy, either by anti TNF or other biological agents and tested for ADABS at different time point of their treatments, the best predictors of the presence of ADABs were: previous exposure to another biologic agent, treatment by an MAB anti-TNF agent, undetectable through level of the medication and elevated TNF levels.
Reprints: University of Copenhagen, Denmark; 2Hospital Clinic of Barcelona, Spain; 3Hospital of Medicine, Faculty of Health and Medical Sciences, University of Copenhagen, Denmark; 4University & Skane University Hospital, Malmö, Sweden; 5Université Paris-Sud, Assistance Publique – Hôpitaux de Paris, Hôpitaux Universitaires Paris-Sud, INSERM U1184, Le Kremlin Bicêtre, France; 6RHEUMDATA, Montreal, Canada

Background: With more biological disease modifying antirheumatic drugs (bDMARDs) in rheumatoid arthritis (RA), switching between bDMARDs is becoming more frequent. Patients (Pts) discontinue bDMARDs for various reasons, including inadequate effectiveness (IE) and adverse events (AE). Observational data indicates that the reason for discontinuing a second TNF inhibitor is usually the same that led to the first TNFi discontinuation, suggesting that a change in bDMARD mode of action may be more favourable.

Objectives: To investigate the impact of specific reasons for discontinuing the previous bDMARD on the clinical response to abatacept (ABA), a bDMARD with a different mode of action.

Methods: This is a pooled observational database analysis of 10 prospective cohorts of RA Pts treated with iv ADA. All pts had available information on the reason for discontinuation of the last bDMARD were included. Pts initiating ABA as a first bDMARD were excluded from the analysis. The predictor of interest was the reason for prior bDMARD discontinuation, categorized as IE, AE, or other. The primary endpoint was time to ABA discontinuation, defined as the time between drug initiation to last administration: 1) for any reason, and 2) specifically for AEs or IE. Cox regression was used to estimate hazard ratios (HRs) for drug discontinuation, adjusting for pts demographics, disease and treatment characteristics.

Results: Of the 2001 RA Pts included, 1272 discontinued ABA during the 3639 patient-years of follow-up. 499 pts (24.9%) had stopped their last bDMARD for AEs, 1290 pts (64.5%) for IE, and 212 pts (10.6%) for other reasons. There was no association between reason for discontinuing prior bDMARDs (AE, IE, or other) and overall ABA retention (log-rank p = 0.78). ABA discontinuation for AEs was significantly associated with prior discontinuation of bDMARDs for AEs (log-rank p < 0.001), and ABA discontinuation was significantly associated with prior bDMARD discontinuation for IE (log-rank p = 0.02).

Conclusions: The same reason that led to discontinuing prior bDMARDs is likely to lead to the discontinuation of a new bDMARD with a different mode of action. Overall these results suggest that discontinuation is mostly explained by patient-specific characteristics (selection) and less by particular drug mechanism.

Acknowledgement: Unrestricted research grant from BMS.
Baricitinib versus placebo or adalimumab in patients with active rheumatoid arthritis and an inadequate response to background methotrexate therapy: Results of a phase 3 study

Taylor PC1, Keystone EC2, van der Heijde D3, Tanaka Y4, Ishii T5, Emoto K6, Yang L7, Arora V7, Gaich C8, Rooney T7, Schlichting D9, Macias WL1, de Bono S8, Weinblatt ME1

1Nuffield Department of Orthopaedics, Rheumatology and Musculoskeletal Sciences, Kennedy Institute of Rheumatology, University of Oxford, Oxford, UK; 2The Rebecca MacDonald Centre, Mount Sinai Hospital, University of Toronto, Toronto, Ontario, Canada; 3Leiden University Medical Center, Leiden, The Netherlands; 4School of Medicine, University of Occupational & Environmental Health, Kitakyushu, Japan; 5Eli Lilly & Company, Indianapolis, USA; 6Brigham and Women’s Hospital, Boston, USA

Background: We report a 52-week, global, randomized study of baricitinib in patients with active rheumatoid arthritis (RA) and an inadequate response (IR) to background methotrexate (MTX).

Methods: Patients with active RA (DAS28 >5.1, ≤24 weeks since initial acute treatment) were randomized 1:1:1 to receive: baricitinib 4mg QD, or adalimumab 40mg Q2W. At Wk24, placebo patients switched to baricitinib. Primary endpoint was Wk12 ACR20 response (baricitinib vs placebo). Secondary endpoints included comparing baricitinib vs adalimumab for ACR20 and DAS28-CRP improvement at Wk12 and baricitinib vs placebo for mTSS at Wk24.

Results: Of 1305 randomized patients, 83%, 86% and 87% completed Wk24 in placebo, baricitinib and adalimumab groups. Wk12 ACR20 response was higher for baricitinib vs placebo (0.70/0.40 vs p≤.001). At Wks 12/24, improvements in response rates, and low disease activity remission rates, were significant for baricitinib vs placebo, as early as Wk1. Baricitinib was superior to adalimumab for measures including Wk12 ACR20 response and DAS28- CRP improvement. Wk24 mTSS change was lower for baricitinib vs placebo (0.41 vs 0.90; p≤.001). Patient-reported outcomes improved significantly in patients receiving baricitinib vs placebo, as early as Wk1. TEAE rates, including infections, were higher for baricitinib and adalimumab vs placebo. SAE rates were similar for baricitinib and lower for adalimumab vs placebo; serious infection rates were similar across groups.

Conclusions: Baricitinib produced significant clinical improvements vs placebo and adalimumab, with acceptable safety/tolerability profiles.

Differences in the course of Italian- and German-speaking patients’ outcome after interdisciplinary pain program

Benz Thomas1,2, Lehmann Susanne1, Biroschi Roberto2, Effering Achim1, Aeschlimann André1, Angst Felix3

1Research Department and Pain Center, RehaClinic Bad Zurzach; 2Institute of Psychology, University of Bern, Bern

Background: The aim of this study was to quantify state and changes of mental health state and quality of life of native Italian-speaking patients with fibromyalgia or chronic pain and compare these with native German-speaking patients. The prospective cohort study with 62 Italian-speaking and 63 German-speaking patients measured health-related quality of life, pain, fear and depression comparing at baseline, after 4 weeks of pain program and at 1 year follow-up. Differences between the two groups were tested on significance by generalized estimation equations (GEE). This method modeled changes of health by multivariate logistic regression adjusting for sex, education, number of comorbidities and the baseline score over both follow-ups for each scale.

Results: Italian-speaking patients (n = 62) showed higher proportions of males, lower educated and less burdened by comorbidities than German-speaking patients (n = 63). At baseline, physical and psychosocial health, depression and fear of the Italian-speaking patients were worse than German-speaking patients, with the exception of less pain in the Italian-speaking patients on the SF-36. Changes of health showed more improvement in German- than in Italian-speaking patients on all scales and at both follow-ups. In GEE, the highest differences were observed in SF-36 physical functioning (p = 0.036), HADS anxiety (p = 0.031) and HADS depression (p = 0.017). On SF-36 bodily pain the difference was not significant (p = 0.142).

Conclusions: This study detected that short- and midterm outcome of Italian-speaking patients was worse than that of German-speaking patients, even after adjustments for baseline differences. The reasons for that are unclear and may have consequences for future management of Italian-speaking patients in interdisciplinary pain management programs. This supports the hypothesis that patients with migration background may have special needs in therapeutic management.

To investigate the effectiveness of different conservative interventions for pain, shoulder function and active range of motion in adults with shoulder impingement

Steuri R1, Hilliker R1, Taeymans F2, Tal A3, Eliag-Heynen S1, Kolly C1, Sattelmayer M1

1School of Health Science, HES-SO Valais – Wallis, University of Applied Science and Arts Western Switzerland, Leukerbad, Switzerland; 2Bern University of Applied Sciences, Health, Bern, Switzerland; 3Vrije Universiteit Brussel, Faculty of Sport and Rehabilitation Science, Brussel, Belgium

Objective: To investigate the effectiveness of different conservative interventions for pain, shoulder function and active range of motion in adults with shoulder impingement.

Design: Systematic review and meta-analysis of randomized controlled trials.

Data sources: Systematic searches in Medline, CENTRAL, CINAHL, Embase, and PEDro up to November 2015 and hand searches of reference lists and forward citation tracking of included trials.
The BAI-Reha is effective for patients with chronic ≥.59, ≥28.37, p≥.20). Mixed-model analyses revealed significant time effects over two years with daily life task performance [CI 6.98, 13.24], self-rated and observed quality of and satisfaction [CI 8.94, 30.39], pain intensity [CI 3.57,6.08], quality of life [CI 58, 79], 50.05, 65.13], burden of suffering [CI 6.98, 13.24], self-rated and observed quality of and satisfaction with daily life task performance [CI 5.23, 5.43]. The intervention effects remained stable or increased among means at post-intervention, 1-year-follow-up and 2-year-follow-up evaluations, except quality of life. Effect sizes were moderate to large (d = .53–1.85) among evaluation times except quality of life index and pain intensity. Mixed-model analyses revealed significant time effects over two years for work proportion (F = 5.06, df = 43,103, p < .01) and non-significant for work proportion (F = 5.06, df = 148, p = .27) compared to no treatment, while ultrasound guided injections were better than non-guided (95% CI −1.21 to −0.10). For NSAIDS, a small to moderate SMD of −0.29 (95% CI −1.03 to −0.05) was found. Manual therapy was better than placebo (SMD = .46 (95% CI from −0.88 to −0.08)) and manual therapy plus exercise was non-significantly better than exercise alone (95% CI −0.16 to 0.12). Laser had a large SMD of −0.88 (95% CI −1.74 to −0.02) compared to exercise and −0.65 (95% CI −1.24 to −0.06) compared to sham laser. Extracorporeal shockwave therapy was better than sham therapy with a small to moderate SMD of −0.39 (95% CI −0.78 to −0.01). Tape plus exercise was better than physiotherapy (SMD = −0.45 (95% CI −0.80 to −0.09)).

Conclusion: Although there was only very low quality evidence, general and specific exercises should be prescribed for patients with shoulder impingement symptoms. Tape, laser or manual therapy might be added to exercise. NSAIDS can be recommended if necessary. Corticosteroid injections might only be recommended when exercise or other modalities are not possible. If corticosteroid injections are applied, they should be provided under ultrasound guidance.
Immediate and long term efficacy of Kineret in acute shoulder syndrome due to hydroxyapatite calcification of the rotator-cuff: real-life experience of 10 cases

Valcro R.1, SO Alexander2, Zufferey Pascal1

1Departrment of Rheumatology, CHUV

Background: Acute shoulder syndrome is due to acute inflammation linked to the dissolution of hydroxyapatite calcification in the tendon or the bursa of the shoulder. Usually self- limited, can last up to two weeks with very intense pain and limitation of the function. Steroid and tritation have been proposed to shorten the duration of the flare. We have published a pilot study of the benefits of Kineret in the situation showing a rapid solution of pain within a day and recovery of mobility after 3 days, without evaluation of long time effect on pain and relapses.

Aim of the study: Evaluation of the immediate and long time effect of 3 injections of Kineret in real life condition.

Methods: A retrospective study of all 10 patients who have received Kineret in the last five years for acute shoulder syndrome due to calcific periarthritis because of no response to NSAIDs. Immediate evolution based on clinical data of charts: pain on day 0 and day 3 after Kineret, x-ray, ultrasound and inflammatory parameters day 0 and within one week after Kineret. The long time evolution based on clinical data on charts and phone calls to the patients: new relapses, residual pain, US and X-ray evolution and other manifestations of apatits arthropathies.

Results: In 8 patients of 10 included, the flare was very acute and not preceded by chronic shoulder pain or previous self limited flare. In two patients, the flare was preceded by chronic pain and at least one previous flare. The immediate benefit of kineret was spectacular for pain, function and inflammatory parameters in all patients(table 1). In none of the patients, calcification disappeared completely after the treatment (within 4 W).

Table 1: Clinical and demographic characteristics of the 10 patients.

<table>
<thead>
<tr>
<th>Age</th>
<th>VAS median</th>
<th>VAS day 3</th>
<th>CRP initial</th>
<th>CRP day 3</th>
<th>VS initial</th>
<th>VS day 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>57 y</td>
<td>8.8/10</td>
<td>2/10</td>
<td>3.5/10</td>
<td>35 mg/l</td>
<td>12 mg/l</td>
<td>41 mm/h</td>
</tr>
</tbody>
</table>

The mean follow-up was 32 months. 4 acute relapses were reported only by 2 patients who have already chronic shoulder pain and previous flares. Mild chronic pain are present in 4 patients more in relation with some other coexisting joint pathology. Other manifestations of apatits arthropathy occurred in 1 of relapsing patients.

Conclusions: Kineret is an interesting therapeutic approach in acute calcific periarthritis in patients non responding to NSAIDs. The effect on pain is strong and occurs within 3 days. Only 2 patients presented relapses.

Patients with osteogenesis imperfecta disease walk with reduced ground reaction force compared to healthy subjects

Aubry-Rozier B1, Schneider P2, Freymond Morisod M3, Jolles-Haebeli B4, Favre J3, Bregou A4

1Rheumatology Unit and Centre of Bone diseases, Lausanne University Hospital; 2Physiotherapy, Lausanne University Hospital; 3Swiss Motion Lab, Lausanne University Hospital; 4Orthopaedic Unit, Lausanne University Hospital

Osteogenesis Imperfecta (OI) is characterized by a decreased osseous density and an increased fracture risk. Hyperplaxity and muscle weakness are also common. Treatment is multidisciplinary, medical (bisphosphonates), surgical and functional. Assessing the physical capacity of OI patients is important to evaluate disease progression and to adapt treatment, specifically rehabilitation protocol. While functional scores, such as the MOS SF-36 or the Oswestry Disability Index are validated and used to assess physical capacity in this population, instrumented gait test could improve the evaluation. Unfortunately, using a full gait lab is too cumbersome for routine practice. Analyzing ground reaction forces (GRF) during walking, which can be done with a single force plate, was shown to be an easy and efficient method to differentiate ambulatory pattern in relation to disease severity for a variety of muscularkeletal pathologies. The objective of this study was to compare GRF during the stance phase of walking between a group of OI patients and a control group. Gait analysis was performed for 6 OI patients (2 males; 27 ± 9 yo) and 12 healthy subjects (7 males; 24 ± 2 yo). Each study participant walked several trials at self-selected normal speed in a lab equipped with floor-mounted forceplates (Kistler, CH). One leg was randomly selected for analysis and standard characteristic peaks in vertical and fore-aft GRF were measured for each step of the selected leg on a forceplate. To allow comparison among participants GRF were normalized to percent bodyweight (%BW). Compared to the controls, OI patients walked significantly reduced vertical GRF during loading response (88 ± 19 vs 114 ± 8 %BW; p <0.001) and during terminal stance (89 ± 14 vs 109 ± 9 %BW; p <0.001). The GRF were different in the horizontal plane, with reduced aft force during loading response (17 ± 6 vs 23 ± 5 %BW; p = 0.03) and reduced fore force during terminal stance (17 ± 3 vs 22 ± 4 %BW; p = 0.01). OI patients walked slower than controls (122 ± 0.14 vs 147 ± 0.20 m/s; p = 0.02). Smaller GRF were hypothesized due to muscle weakness, proprioceptive acuity diminution and fear of falling. These expected results suggest that a simple single force plate can already provide valuable information to characterize the ambulatory function of OI patients. Further study is needed to evaluate specific change in GFR among OI patients with functional treatment.
**Epidemiology of back pain in young Swiss adults: a longitudinal population cohort survey from age 27 to 50 years**

Ansg F1, Angst J1, Adjac Gros V2, Aeschlimann A3, Rössler W4

1Research Department, RehaClinic Zurzach, Bad Zurzach, Switzerland; 2Department of Psychiatry, Psychotherapy and Psychosomatics, Psychiatric Hospital Burghölzi, University of Zurich, Zurich, Switzerland; 3Institute of Psychiatry, Laboratory of Neuroscience (LIM 27), University of Sao Paulo, Sao Paulo, Brazil; 4Collegium Helveticum, Joint Research Institute of the University of Zurich & ETH Zurich, Switzerland

**Background:** Back pain is the most prevalent and most burdening disorder for individual and public health. The aim was to determine prevalences and incidences of lumbar and cervical back pain over a course of 23 years and to quantify associations to concomitant disorders.

**Methods:** Data from the well-known Zurich study collected between 1986 and 2008 about lumbar, cervical back pain, and mental disorders were analyzed. Epidemiologic parameters were back-weighted to obtain representative rates for the canton of Zurich representing 1/6 of the Swiss population. Associations were quantified by odds ratios (OR).

**Results:** Of n = 499 subjects, 68.9% ever experienced lumbar and 66.9% and 54.9% and 23-year incidences of 52.3% and 48.9% for lumbar and cervical. Annual prevalences varied by 28.4–47.2% for lumbar and 18.3–34.7% for cervical back pain; the corresponding annual incidences by 5.8–13.3% and 78–12.6%. Lumbar back pain was significantly associated with cardiovascular diseases (OR = 4.59), obesity (OR = 3.98), asthma spectrum (OR = 5.74), tranzi queron dependence (OR = 5.85), and other comorbidities (OR: 1.47 to 3.27). Significant associations to cervical back pain were observed for specific phobia (OR = 5.10), panic attacks (OR = 4.79), and other comorbidities (OR: 1.61 to 2.62).

**Conclusion:** This study contributes to refine epidemiologic data about lumbar and cervical back pain, representative for the biggest canton of Switzerland. Some associations to treatable concomitant disorders were high. That may offer possibilities for indirect management of lumbar and cervical back pain relief.

Arthritis Care Res 2016;in review.

---

**Is there an optimal TBS lumbar spine vertebrae combination to predict major Osteoporotic Fracture?**

The OsteoLaus Cohort Study

Auby-Rozer B1, Mraihi H2, Lamry O2, Metzger MF2, Pfaffen R2, Soares S2, Stoll D2, Hans D1

1Rheumatology, Lausanne University Hospital; 2Centre of Bone Diseases, Lausanne University Hospital

**Introduction:** The international guidelines recommend to use the average bone mineral density (BMD) over L1 to L4 in the management of osteoporosis and prediction of fracture. Exclusion of certain vertebrae is recommended according to specific rules (ISCD position). The spine Trabecular Bone Score (TBS), a surrogate of bone micro-architecture, has been newly introduced into international guidelines and the FRAX® tool for clinical use in conjunction with BMD and clinical risk factors. The aim of this study is to test several TBS vertebrae combinations in regard to major osteoporotic fracture prediction.

**Methods:** The osteoLaus cohort (Lausanne, Switzerland) included 1520 woman 50 to 80 years old. All women had a detailed questionnaire related to clinical risk factors and treatment known to influence bone metabolism, BMD measurement (hip, spine and whole body), vertebrae back pain, corresponding to 23-year prevalences of 66.9% and 54.9% and 23-year incidences of 52.3% and 48.9% for lumbar and cervical. Annual prevalences varied by 28.4–47.2% for lumbar and 18.3–34.7% for cervical back pain; the corresponding annual incidences by 5.8–13.3% and 78–12.6%. Lumbar back pain was significantly associated with cardiovascular diseases (OR = 4.59), obesity (OR = 3.98), asthma spectrum (OR = 5.74), tranzi queron dependence (OR = 5.85), and other comorbidities (OR: 1.47 to 3.27). Significant associations to cervical back pain were observed for specific phobia (OR = 5.10), panic attacks (OR = 4.79), and other comorbidities (OR: 1.61 to 2.62).

**Conclusion:** This study contributes to refine epidemiologic data about lumbar and cervical back pain, representative for the biggest canton of Switzerland. Some associations to treatable concomitant disorders were high. That may offer possibilities for indirect management of lumbar and cervical back pain relief.

Arthritis Care Res 2016;in review.

---

**Decrease of bone mineral density and occurrence of new vertebral fractures after stopping Denosumab**

Frey DP1, Koch A2, Blumhardt S1

1Klinik für Rheumatologie, OsteoporoseZentrum, UniversitätSptal Zürich

**Introduction:** Denosumab (Dmab) has been demonstrated in clinical trials to be very effective in improving bone mineral density (BMD) and reducing osteoporotic fractures. Therefore it is increasingly used to treat osteoporotic patients also in clinical practice. However, like in bisphosphonates, cases of atypical femoral fractures (AFF) and osteonecrosis of the jaw (ONJ) were reported under Dmab treatment. Thus, a life-long therapy with Dmab – as in bisphosphonates – might not be appropriate. Moreover, when given as prophylaxis in patients under aromatase inhibitor (AI) therapy, Dmab is only reimbursed for the time of Al-therapy in Switzerland. As Dmab has been introduced into the Swiss market in 2010, it is likely that many patients will stop Dmab in the next years or have already stopped therapy. However, there is an increasing number of cases reported in the literature, where severe new vertebral fractures occurred and BMD decreased dramatically within a few months after stopping Dmab. Given the high number of treated patients who may be taken off the drug in the next few years it is essential to know this possible outcome and to develop strategies against the loss of BMD and occurrence of vertebral fractures after stopping Dmab. We report 6 cases of patients who had received Dmab during the pivotal FREEDOM study for 7 and 10 years, respectively and were taken off Dmab when the study was completed. All of them sustained either a massive decrease in BMD or had new vertebral fractures.

**Patients:** All patients were included in the FREEDOM-trial. One patient received Dmab for a total of 10 years; the other 5 patients were treated for 7 years. In all patients, BMD of the lumbar spine increased between 10.1 and 30.8% during the treatment. One year after having stopped Dmab BMD had decreased between 3.2% and 17.8% at the lumbar spine. Two patients had sustained vertebral fractures (T 10/ 11 and L 4/ 5, resp.).

**Conclusion:** The data of these 6 patients confirm previous reports on a decrease of BMD and occurrence of new vertebral fractures after Denosumab therapy is stopped. Hence, treating physicians should be informed about this issue and a joint strategy is needed to overcome the high risk of new vertebral fractures a few months after stopping Denosumab.

---

**Classification criteria for lumbar radicular pain due to disk herniation**

Genevay S1, Courvoisier D2, Konstantinou K1, Kovacs FM3, Marty M4, Rainville J2, Nordenberg M4, Kaux J-F3, Cha TD2, Katz JA5, Atlas SJ1

1Division of rheumatology, University Hospitals of Geneva, Switzerland; 2Epidemiology Department, University Hospitals of Geneva, Switzerland; 3Arthritis Research UK Primary Care Centre, Keele University, UK; 4Scientific Department; Kovacs Foundation; Palma de Mallorca, Spain; 5Department of Rheumatology, Henri-Mondor Hospital, Créteil, France; 6Physical Medicine and rehabilitation,University hospital of Lausanne, Switzerland; 7Physical Medicine and Sport Traumatology Department, University and University Hospital of Liege, Belgium; 8Department of Orthopaedic Surgery, Massachusetts General Hospital, Boston, MA, USA; 9Department of Orthopaedic Surgery and Division of Rheumatology, Immunology and Allergy, Brigham and Women’s Hospital, Boston MA, USA; 10Division of General Internal Medicine, Massachusetts General Hospital, Boston, MA, USA

**Conclusion:** It seems that excluding L4 tends to improve the fracture risk prediction. TBS is very sensitive to vertebrae positioning (e.g. projection). To compensate for the natural longitudinal trends of the spine, one has to lift the legs of the patient. L4 is often still angled which could explain such results. Further prospective studies are needed to confirm these results.

---

POSTERS

12 S
Background: Imaging evidence of lumbar disc herniations (DH) may not be associated with symptoms, therefore classification criteria based upon patient symptoms and physical examination findings are required. This study sought to develop a set of criteria identifying patients with radicular pain (RP) caused by DH and patients with neurogenic claudication (NC) caused by LSS. Results concerning RP caused by DH are reported.

Methods Phase 1: 17 spine specialists from 8 countries participated in a Delphi process, using an internet program, to rank symptoms and signs which suggest LDH as the cause of RP or LSS as the cause of NC. Phase 2: 18 different spine specialists recruited patients and classified them with a high degree of confidence as having either: 1) RP due to LDH, 2) neurogenic claudication (NC) due to LSS, or 3) non-specific low back pain (NSLBP) with non-specific leg pain radiation. Patients completed survey items and specialists documented examination signs. Signs and symptoms present in ≥ 10 patients were analyzed by using Generalized Estimating Equations (GEE). Patients with NC due to LSS or NSLBP served as controls. Items with p <0.1 in univariate analysis were entered in the multivariate analysis. A score to predict RP due to DH was developed based on the coefficient of the GEE, and used to obtain a ROC curve and the associated area under the curve (AUC).

Results: A list of 46 clinical signs and 28 patient-reported symptoms were selected by the group of spine specialists during the 1st phase. For the 2nd phase, 209 patients with high confidence in the diagnosis were included, 89 RP due to DH, 63 NC, and 57 NSLBP with non-specific leg pain radiation. Items which predicted RP with a p-value <0.1 included monoradicular pain, leg pain not decreased when sitting, positive straight leg raising test <60°, unilateral motor weakness and asymmetric ankle reflex. The score had an AUC of 0.92, and the cutoff to obtain a specificity of >90% resulted in a sensitivity of 70.4%.

Conclusion: An international collaboration of surgeon and non-surgeon spine specialists produced a set of diagnostic criteria with high specificity and sensitivity for identifying patients with RP caused by DH. Using this set could improve the quality of basic science and clinical research in this field by improving homogeneity within groups of patients.

Classification criteria for neurogenic claudication caused by lumbar spinal stenosis

Genevay S1, Counoisier D2, Konstantinou K3, Kovacs FM4, Marty M5, Rainville J6, Norberg M7, Kaux J-F8, Cha TD9, Katz JN10, Atlas SJ11

1Division of Rheumatology, University Hospitals Geneva, Switzerland; 2Quality of Care Division, University Hospitals Geneva, Switzerland; 3Arthritis Research UK Primary Care Centre, Research Institute for Primary Care & Health Sciences, Keele University UK; 4Spanish Back Pain Research Network, Kovacs Foundation, Palma de Mallorca, Spain; 5Department of Rheumatology, Henri-Mondor Hospital, Creteil, France; 6Physical Medicine and Rehabilitation, New England Baptist Hospital, Boston, USA; 7Physical Medicine and rehabilitation, University hospital Lausanne, Switzerland; 8Physical Medicine and Sport Traumatology Department, University Hospital of Liège, Belgium; 9Department of Orthopaedic Surgery, MGH, Boston, MA, USA; 10Department of Orthopaedic Surgery and Division of Rheumatology, Immunology and Allergy, Brigham and Women’s Hospital, Boston MA, USA; 11Division of General Internal Medicine, Massachusetts General Hospital, Boston MA, USA

Background: Since imaging evidence of lumbar spinal stenosis (LSS) or lumbar disc herniations (LDH) may not be associated with symptoms, classification criteria based upon patient symptoms and physical examination findings are required. This study sought to develop a set of criteria identifying patients with neurogenic claudication (NC) caused by LSS and patient with radicular pain (RP) caused by LDH. Results concerning NC caused by LSS are reported.

Methods Phase 1: 17 spine specialists from 8 countries participated in a Delphi process, using an internet program, to rank symptoms and signs which suggest LSS as the cause of NC or DH as the cause of RP. Phase 2: 18 different spine specialists (surgeons and non-surgeons) recruited patients during office visits and classify them with a high degree of confidence as having with either: 1) NC caused by LSS 2) RP caused by LDH or 3) non-specific low back pain (NSLBP) with non-specific leg pain radiation. Patients completed survey items and specialists documented examination signs. Signs and symptoms present in ≥10 patients were analyzed by using Generalized Estimating Equations (GEE). Patients with NC caused by LSS or NSLBP served as controls. Items with p <0.1 in univariate analysis were entered in the multivariate analysis. A score to predict NC caused by LSS was developed based on the coefficient of the GEE, and used to obtain a ROC curve and the associated area under the curve (AUC).

Results: A list of 46 clinical signs and 28 patient-reported symptoms were selected by the group of spine specialists during the 1st phase. For the 2nd phase, 209 patients with high confidence in the diagnosis were included 63 NC caused by LSS, 89 RP caused by DH, and 57 NSLBP with non-specific leg pain radiation. Items which predicted NC with a p-value <0.1 included monoradicular pain, leg pain relieved by sitting, negative straight leg raise test. The score had an AUC of 0.91, and the cutoff to obtain a specificity of 92.1% resulted in a sensitivity of 80.0%.

Conclusion: An international collaboration of surgeon and non-surgeon spine specialists produced a set of diagnostic criteria with high specificity and sensitivity for identifying patients with NC caused by LSS. Using this set could improve the quality of basic science and clinical research in this field by improving homogeneity within groups of patients.
The numbers refer to the pages of this supplement.

<table>
<thead>
<tr>
<th>First Author</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alpizar-Rodriguez D</td>
<td>3 S</td>
</tr>
<tr>
<td>Angst F</td>
<td>6 S, 9 S, 12 S</td>
</tr>
<tr>
<td>Aubry-Rozier B</td>
<td>2 S, 11 S, 12 S</td>
</tr>
<tr>
<td>Benz T</td>
<td>9 S, 10 S</td>
</tr>
<tr>
<td>Blumhardt S</td>
<td>5 S</td>
</tr>
<tr>
<td>Dudler J</td>
<td>7 S</td>
</tr>
<tr>
<td>Emery P</td>
<td>3 S</td>
</tr>
<tr>
<td>Favre dit Jeanfavre M</td>
<td>7 S</td>
</tr>
<tr>
<td>Finckh A</td>
<td>8 S</td>
</tr>
<tr>
<td>Fleischmann R</td>
<td>3 S</td>
</tr>
<tr>
<td>Föger F</td>
<td>10 S</td>
</tr>
<tr>
<td>Franz J</td>
<td>4 S, 7 S</td>
</tr>
<tr>
<td>Frey DP</td>
<td>12 S</td>
</tr>
<tr>
<td>Gantschnig BE</td>
<td>10 S</td>
</tr>
<tr>
<td>Genevay S</td>
<td>12 S, 13 S</td>
</tr>
<tr>
<td>Jaeger VK</td>
<td>2 S, 4 S</td>
</tr>
<tr>
<td>Kyburz D</td>
<td>6 S</td>
</tr>
<tr>
<td>Läubli J</td>
<td>5 S</td>
</tr>
<tr>
<td>Maurer B</td>
<td>5 S</td>
</tr>
<tr>
<td>Mease P</td>
<td>6 S</td>
</tr>
<tr>
<td>Melzer R</td>
<td>10 S</td>
</tr>
<tr>
<td>Müller R</td>
<td>8 S</td>
</tr>
<tr>
<td>Ohno S</td>
<td>8 S</td>
</tr>
<tr>
<td>Schniering J</td>
<td>5 S</td>
</tr>
<tr>
<td>Steuri R</td>
<td>9 S</td>
</tr>
<tr>
<td>Taylor PC</td>
<td>9 S</td>
</tr>
<tr>
<td>Valcov R</td>
<td>11 S</td>
</tr>
<tr>
<td>Villiger P</td>
<td>2 S</td>
</tr>
<tr>
<td>Zamani O</td>
<td>3 S</td>
</tr>
</tbody>
</table>