Peer reviewed article

National ethical directives and practical aspects of forgoing life-sustaining treatment in newborn infants in a Swiss intensive care unit

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Summary

Question under study: How do actual aspects of forgoing life supporting therapy (LST) in newborn infants compare with national ethical directives in a Swiss intensive care unit?

Methods: A prospective set of data on deaths after forgoing LST over a three year period in a single intensive care unit is analysed in view of the directives issued by the Swiss Academy for Medical Sciences (SAMS).

Results: Thirty-four newborn infants died after a decision to forgo LST, 21 after withdrawing and 13 after withholding. The decision making process was confined to the caregivers' team. Parents rarely initiated the discussion but participated in all decisions and were considered as willing in 32% and consenting in 68%. Futility was invoked in 79% of cases and poor developmental outcome in 21%. Respiratory support was forgone in 59%, circulatory support in 6% and both in 35%. The mother assisted the child at the time of death in 91%. At that time, 82% of infants were receiving opiates and 18% benzodiazepines, some in a higher than usual dose. Death occurred at a median of 13 (25–75% = 6–25) minutes after withdrawing LST and 70 (27.5–147.5) after withholding ($p < 0.001$) without correlation with the dose of analgesic or sedative administered. None of these observations obviously departed from the Swiss ethical directives.

Conclusions: Practices surrounding forgoing LST in newborn infants in a Swiss intensive care unit match ethical directives. Factors leading to occasional use of unusually high dose of analgesic and sedative drugs remain to be identified.

Key words: end of life; death and dying; newborn infants; ethics; withdrawal; withholding; futility; active indirect euthanasia

Introduction

Forgoing life sustaining therapy (LST) is currently recognised as a leading cause of death of newborn infants in intensive care units [1–4]. Publications of paramount interest have addressed ethical and medical aspects related to this delicate issue [5–8]. Some have focused on how these issues are translated into daily life, in newborns [9–12], children [13–15] or adults [16], but none systematically or prospectively collected data from everyday practise. Although contrary to the laws of most countries, forgoing LST is common practice under the protection of ethical directives or guidelines when intensive therapy is no longer felt in the best interest of the child, either because of futility or poor quality of life and subsequent outcome [17–19].

In Switzerland, such directives are issued by the Central Ethics Committee of the Swiss Academy for Medical Science [20], an independent foundation of scientists, supported by the federal government. In addition, particular guidelines have been established by the Swiss Society of Neonatology [21] regarding the attitude towards newborns at the limit of viability. The aim of this report is to analyse with a prospective data set how practical aspects surrounding deaths of newborns infants in our intensive care unit compare with these national ethical directives.

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Material and methods

For uniform reporting of circumstances of deaths occurring in our unit, we decided in April 2001 to introduce a specifically designed data sheet describing the steps of the decision making process, the therapeutic attitude and the circumstances surrounding the end of life of newborn infants dying in the neonatal and paediatric intensive care unit at the University Hospital of Geneva, Switzerland. The questionnaire had to be completed by the attending physician in charge at time of death (one of the authors). Data collected over a three year period for all deaths following a decision to forgo life support therapy are compared to the directives issued by the SAMS.

Beside established epidemiological terms, the following definitions were agreed by the authors. Extreme prematurity was defined as a gestational age at birth below 28 completed weeks. LST was defined as a medical means specific to intensive care used to sustain ventilatory, cardiovascular or renal function. Maximal LST was considered when such treatments and resuscitation manoeuvres were pursued until death was pronounced. Withdrawal of LST was defined as the removal of any of such treatments when already in use and withholding, the refraining from introducing it when needed [10, 19].

Professional entities potentially in charge to decide for LST were: 1) the caregivers' team (including at least two board certified neonatologists, a nurse and the main consultants involved in the management of the newborn infant), 2) an enlarged medical team, meaning the former team plus external consultants not directly involved in the care of the patient and 3) the institutional clinical ethics committee. Parents were considered as the initiators of the process when they were first to question the outcome of their child. Once the process was initiated, the role of the parents was classified by the attending team into 2 categories: 1) willing = expressing an unambiguous willingness to take a decision themselves after information was given by the medical team, 2) consenting = having accepted the advice to forgo LST by the medical team. Potential disagreement between the two parents was left to the judgement of the attending team. The arguments invoked to justify forgoing LST were classified under 1) futility, ie, death perceived as inevitable despite initiation of additional invasive therapeutic measures or under 2) quality of life or subsequent outcome, ie, intervention felt not justifiable in the best interest of the newborn infant in view of suffering or developmental perspectives. The LST withdrawn or withheld was restricted to specific intensive care procedures comprising respiratory support, (ie, extubation or withholding intubation), circulatory support (discontinuation of inotropic or vasoactive drugs), and/or renal replacement therapy (peritoneal dialysis). The time elapsed from active withdrawal to death, or the time from denying the intervention needed to the time of death of the child was noted; the dose of analgesic and sedative medications administered by the medical team was defined as the highest rate of infusion recorded in the last hour in mcg/Kg/hour. The specific desires of the parents for the last moments of their child, (ie, presence of family, religious ceremony), the presence of the parents at the time of demise, whether the child died in one of his parents' arms or not, were noted by yes or no, as was whether or not the infant appeared calm and/or was gasping.

This prospective data collection was intended as a quality control measure and approval by the Ethics Committee of the Institution and consent of the parents to analyse the data were waived.

Directives of the Central Ethics Committee of the Swiss Academy of Medical Sciences

The Central Ethics Committee of the Swiss Academy for Medical Science distinguishes two situations [20] where life sustaining therapy can be forgone: firstly, when the process of dying is irreversibly engaged and additional interventions are unlikely to produce any significant benefit for the patient; secondly, when extreme cerebral lesions make the future acquisition of relational capabilities and minimal autonomy inconceivable. In both situations, the directives regarding the decision process and the recommended behaviour of doctors and caregivers are basically similar.

To summarise, confidence is granted to the medical team for the assessment of the outcome. Parents have to be informed early, exhaustively and comprehensively of the medical situation of their child. Importantly for children, the first ethical principle, ie, the autonomy of the parent's decision, is not viewed as the highest priority and the directives insist that the burden of the decision should not be imposed solely on the parents but merge from a consensus between parents and caregivers. The cessation of life sustaining therapies is allowed but has to go along with redirection of care to comfort care, including means or medications, analgesic or sedative that may shorten life expectancy. Finally, in high-risk neonates, the recommendation ascribes a duty to the medical team, to periodically reassess the prognosis of the child in continuing to pursue full life support. The recommendations of the Swiss Society of Neonatology apply to the particular issue of limits of viability and attitude in the prenatal period and in the delivery room [21]. Briefly, before the 24th weeks of gestation, comfort care for the neonate is the main recommendation while provisional intensive care on an individual prognosis is recommended around the 25th week.

Statistics

A Prisma 4.0 statistical package (GraphPad software) was used to perform non parametric, Mann-Whitney tests to compare the median of two groups and Kruskal-Wallis and Dunn's test for comparison between medians of 3 groups. Fisher's exact test was used to analyse contingency tables when comparing proportions between 2 groups. A log rank test was used to assess the survival curves. $P < 0.05$ was considered as statistically significant.

Results

A total of 43 newborns died in the intensive care unit over the 3 year study period. Demographic data and primary diagnosis are summarised in table 1. Nine deaths occurred at a lower median postnatal age of 1 day while maximal LST was still undertaken, compared to 34 deaths occurring at a median age of 6.5 days after forgoing LST ($p = 0.005$). In this group, 21 deaths occurred at a median age of 5 days after withdrawal and 13 deaths at a median postnatal age of 10 days after withholding ($p = 0.028$ vs maximal LST). Extreme prematurity was significantly more frequent in the

withdrawal group compared to the withholding group (14/21 vs 3/13), p = 0.0324 and median gestational age and birth weight were significantly lower. The incidence of congenital malformation was more frequent in the withholding group (8/13 vs 0/21, p = 0.0014).

End of life discussions (see table 2) were confined to the caregivers' team (88%) or an enlarged medical team (12%) but the ethics committee was never involved. No active decision to forgo intensive care for a child was taken as long as the parents expressed opposition. A manifest conflict between both parents was never observed. More parents (31% vs 5%, p = 0.05) were viewed as initiators to forgo intensive care in withholding than withdrawing situations. Compared to poor developmental outcome (21%), futility regarding survival was invoked in 79% of the cases with a trend to being more frequently invoked when withdrawing LST (90% vs 62%, p = 0.07).

Twenty-four percent of the parents chose one or more family members to attend shortly before

Table 1

Epidemiological data of all deaths in the ICU from April 2001 to March 2004.

	Maximal LST n = 9	LST Withheld n = 13	LST Withdrawn n = 21
Median gestational age at birth (weeks) (25–75%)	27 (25–36)	36 (28–38)	27* (25–29)
Median birth weight (g) (25–75%)	600 (450–2090)	1910 (1005–2740)	700* (615–1030)
Primary diagnosis:			
Congenital malformations	1	8	0*
Extreme prematurity	5	3	14*
Perinatal disease	3	2	7
Median age at death (d) (25–75%)	1 (0–8.5)	10 § (3.5–53)	5 (2.5–30)

LST = Life sustaining therapy. § p <0.05 vs maximal LST. * p <0.05 vs LST withheld.

Table 2

Practical aspects in infants whose LST was forgone.

Life Sustaining Therapy	Withheld n = 13	Withdrawn n = 21	Total
End of life discussion confined to:			
Caregivers' team	11 (85%)	19 (90%)	30 (88%)
Enlarged commission	2 (15%)	2 (10%)	4 (12%)
Ethics committee	0	0	0
Parents initiating the discussion	4 (31%)	1 (5%)	5 (15%)
Degree of parents involvement:			
Willing	5 (38%)	6 (29%)	11 (32%)
Consenting	8 (62%)	15 (71%)	23 (68%)
Argument invoked for forgoing LST:			
Futility (survival)	8 (62%)	19 (90%) **	27 (79%)
Poor developmental outcome	5 (38%)	2 (10%)	7 (21%)
Support wished by the parents:			
Presence of other family member	3 (23%)	5 (24%)	8 (24%)
Religious ceremony	4 (31%)	8 (38%)	12 (35%)
LST involved:			
Respiratory support alone	10 (77%)	10 (48%)	20 (59%)
Circulatory support alone	2 (15%)	0 (0%)	2 (6%)
Both	1 (8%)	11 (52%)	12 (35%)
Analgesic medication			
Morphine none	3	3	6
1–100 mcg/Kg/hour	5	9	14
101–200 mcg/Kg/hour	3	5	8
>201 mcg/Kg/hour	2	4	6
Sedative medication			
Midazolam none	10	18	28
1–100 mcg/Kg/hour	0	1	1
101–200 mcg/Kg/hour	3	2	5
>201 mcg/Kg/hour	0	0	0
Presence at time of death:			
Mother	12 (92%)	19 (90%)	31 (91%)
Father	11 (85%)	17 (81%)	28 (82%)
Subjective appearance of the child			
Calm	10	20	30
Gasping	3	1	4

* p = 0.0586 and **p = 0.0786 (Fisher's exact test) LST withdrawn vs withheld

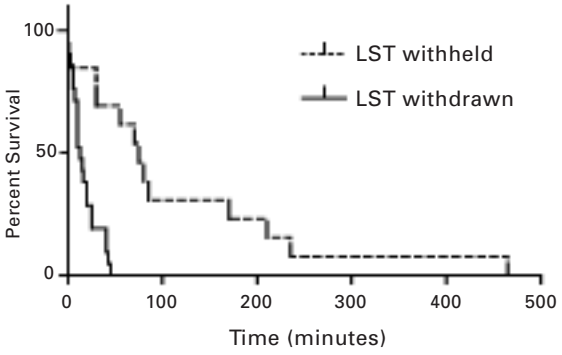

Figure 1

Survival curve of infants measured from the time a life-sustaining treatment was withdrawn (n = 21) or withheld (n = 13). (median survival time: 13 (25–75% = 6–25) minutes vs 70 (25–75% = 27.5–147.5) minutes, ratio 5.76, CI 5.2–6.2, p <0.0001).

death and 35% asked for a religious ceremony to be organised.

Respiratory support or circulatory support alone were involved in 59% and 6% respectively and both in 35% when forgoing LST, 77%, 15% and 8% respectively when withholding and 48%, 0% and 52% respectively when withdrawing. Renal replacement therapy was never involved. Both parents assisted at end of life in 82% of cases, the mother alone in 9% and the infant was held in her arms in 79%. Six newborns, 3 in the withdrawal and 3 in the withholding group received no sedative or analgesic drugs. A continuous morphine infusion at a median dose of 100 mcg/Kg/hour was administered to the others. Fourteen infants received a dose of opiates of more than 100 mcg/Kg/hour of which six a dose of more than 200 mcg/Kg/hour, 2 in the withholding group and 4 in the withdrawing group. Six infants received Midazolam of which 5 at a dose higher than 100 mcg/Kg/hour.

The median time from foregoing LST to death was 50 minutes, with 13 minutes when withdrawing LST and 70 minutes when withholding (ratio = 5.76, CI = 5.2–6.2, p <0.0001) (see figure 1). No significant correlation existed between the dose of analgesics or sedative received and the time elapsed from forgoing LST to death ($R^2 = 0.0005$).

The parents were described as peaceful and the appearance of the child calm except on two occasions where continued gasping was noted.

Discussion

When forgoing LST, doctors take a causal responsibility in the death of their patient [22] but are, in principle, protected from moral or forensic responsibilities by ethical directives (in Switzerland those issued by the SAMS). Our prospective collection of data was used to compare and discuss the essence of these directives and the reality of everyday life in an intensive care unit.

Circumstances

Forgoing LST always corresponded to one of the two situations foreseen by SAMS's directives [20]. The particular situation of prenatal management and attitude of withholding LST in the delivery room, regulated by special guidelines [21] was not the issue of this report addressing death in the ICU. Withdrawing LST only when a major complication had occurred was preferred to withholding LST on the basis of the gestational age alone. Neonates had to be considered irreversibly engaged in a dying process, mainly on the basis of multiple organ failure or exhibiting severe cerebral lesions, mainly parenchymal haemorrhages, with dismal developmental outcome and future relational capabilities. Both conditions imply a prediction that is valid for populations but uncertain for a given individual.

Consequently, the consensus within the medical team and between the medical team and the parents remains, in practice, the fragile validation for such decisions [5, 17]. Withdrawing LST was significantly more frequent than withholding LST [3, 18] which in our minds, implies that major life saving therapeutic efforts had been undertaken before forgoing LST was eventually considered. This fact is further supported by the observation that infants who deceased while receiving maximal support, died at a significantly earlier postnatal age than those following withdrawal or withholding. Finally, withholding was more frequent with congenital malformations showing that the poor outcome had been anticipated. A major limitation of this study is that it addressed only neonates who eventually died and not those with dismal prognosis not dependant on an intensive life sustaining therapy who consequently survived.

Initiation of the discussion

SAMS's guidelines suggest a systematic evaluation to assess the prognosis of the critically ill newborn, thus attributing a unique duty and crucial responsibility to the medical team in the continuous assessment of the outcome of the patient. This seems appropriate because as reported in older children [13], even when they are well informed, few families are first to question the continuation of intensive care measures, except perhaps, as we observed, in the context of congenital malformation. In our unit, a formal evaluation took place only when a major complication occurred and a more systematic reappraisal process should probably be instituted.

Opinion

The advice given to the parents was almost exclusively built within the caregivers team itself, including doctors and nurses. An external neutral medical opinion was sometimes sought within the medical staff of the department but the hospital ethics committee was never involved. Ethics com-

mittees certainly have a more professional approach, but caregivers may have a closer perception of many aspects of the situation and react more rapidly when deterioration is sudden and unexpected. Indeed, this underlines the need, already emphasised [16], that collaborative education on bioethical issues is requisite for all the caregivers involved in intensive care units. SAMS's directives recommend the resort to ethics Committees mainly as a second step when conflicts arise.

Parents information and autonomy of decision

The degree of involvement of the parents in the decision making process varies according to cultural factors [9, 10] and to the structure and functioning of the medical team in charge [16]. Interestingly, SAMS's guidelines modulate the principle of autonomy by precisely asking the medical team to take its responsibility and express a clear position to the parents and not leave them the whole burden of the decision. This seems appropriate according to our data considering that the majority of the parents rather passively, although consciously, consented to a proposition of the medical team. The intention of only few parents was perceived as reflecting an active will to take a decision themselves in these difficult situations.

Comfort care

Redirection to palliative care is essential in the directives, for the comfort of the infant and to allow the parents to choose the way to accompany their child. One fourth sought the support of family members, friends or spiritual community and one third organised small formal religious ceremonies. A much higher proportion of parents than reported with older children in other countries [9] wished or accepted to assist their infant in these last moments and most mothers choose to hold their dying infant in their arms. We might interpret this as an objective index of the confidence reached between parents and the medical team.

Indirect active euthanasia

The time elapsing once LST is forgone up to death is difficult for both the parents and the caregivers [23]. It was, in our series, longer after withholding than withdrawing LST as observed in older children [10]. A long agony may prompt the use of drugs to be sure that the infant is not suffering [24, 25]. Analgesic or even sedative medications with the potential effect of hastening death (indirect active euthanasia), is ethically accepted according to the SAMS's directives, providing that the dose of the medication administered is proportionate to the relief of suffering. While the median dosages of opiates and sedative drugs administered fell in a therapeutic range [26], a few infants received doses higher than usual that may be considered as possibly hastening death as part of alleviating symptoms. Comfort was not scored on an objective scale and the responsibility to prescribe drugs was left to attending, fellows or residents on their subjective perception. However, the absence of correlation between the dose of morphine or sedative drugs administered and the time elapsed from forgoing LST to the time of death clearly attests that hastening a lingering death was not intended when higher doses were prescribed.

The lack of clarity between therapies intended to relieve pain and suffering and those intended to shorten the dying process has been well described in adults [16]. In a future protocol, the reason why unusual doses are used should be more objectively described and indicated by using standardised pain or agitation scales. Finally, although we did not formally exclude paralysis [22], no neuromuscular blocking agent was administered close to the time of forgoing LST. Administration of such agents would be considered as non ethical according to our directives as a direct cause of death bearing no relation to the basic illness and not intended to relieve any of the patient's symptoms.

In conclusion, death after forgoing LST in our intensive care unit occurs through a procedure conforming to national ethical guidelines which in turn seem appropriate for newborn infants. Subjectivity regarding indirect euthanasia seems unavoidable. Systematic teaching of ethics to all intensive care staff and continued review processes of end-of-life situations are necessary to preserve the best interests of the critically ill newborn infant and relieve his family.

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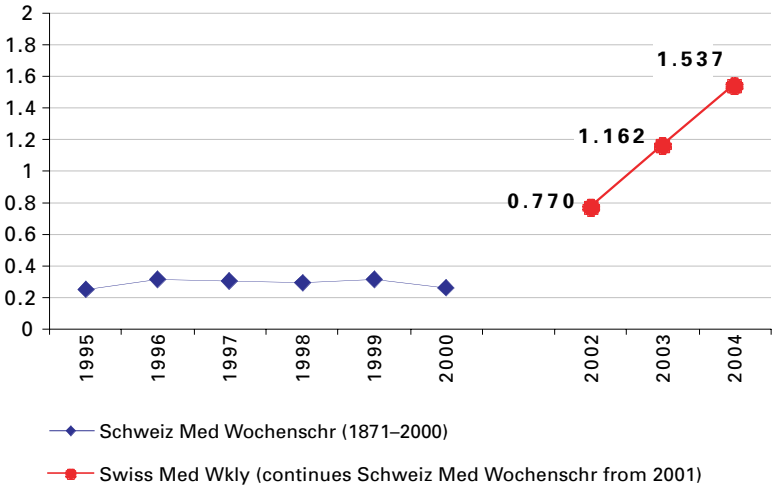

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