Can we establish a universal lower limit of viability?
Medical and ethical implications

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Abstract
Lower limit of viability, whatever that threshold might be, is not just a medical question it is also an ethical issue to be taken into account at all times. Whether intensive care should be offered to all, regardless of gestational age depends on whether one is prepared to withdraw/withhold treatment, a decision resting with the senior staff, after consultation with everyone envolved, but upon informing the parents.

Key words: gestational age, withdraw/withhold treatment

Biological survival depends on not just the presence of a given organ but on its functional maturation, a sequential evolution often referred to as the ‘developmental windows’. Alveolarisation, essential for survival, is a process that includes anatomical, physiological and biochemical differentiation starting from about 24 weeks’ gestation, progressing until term and continuing throughout the postnatal period and childhood. 'Viability', therefore, would be around 24 weeks. To lower this limit, strategies ranging from antenatal steroids, postnatal surfactant and different ventilatory modes have been attempted with some success, but as an example, after 30 years of clinical practise, antenatal steroids show quite disappointing results at below 24 weeks gestation [1, 2] and they might also delay and alter postnatal alveolarisation [3-5]. Nevertheless, in recent years an increased survival of very immature infants has been reported ranging from 2-35% at 23 weeks and in some perinatal centres these figures approach 50% amongst live-born infants, between 17-58% at 24 weeks and vary from 35-85% at 25 weeks [6-20]. However, in the last decade, survival among live births even at 22 weeks has been reported as being from 14 to 19%, although most centres, including our own, report no survival at this gestational age [21-23]. It is quite obvious that obstetric and neonatal practices, as well as available resources and facilities, are playing a major role in the survival of these very immature infants but, both human and financial resources apart, why should there be such a discrepancy for reported survival rates at the threshold of viability?

There can be several reasons and explanations. Many of the earlier studies referred to birthweight rather than to gestational age and therefore included more immature babies who were growth retarded, although IUGR babies of the same gestational age usually have a poor prognosis [24-28]. Then, again, with some of the earlier reports referring to gestational age, how accurate was dating based on menstrual estimates in the absence of scanning in early pregnancy? Even in recent data, gestational age is often inferred from the first day of the LMP with scanning only prevailing if it differs more than two weeks from the menstrual dates [29-33]. At this “threshold for viability”, a few days or a couple of hundred grams will make all the difference when reporting survival rates. Some studies refer to the outcome of pregnancy from the beginning of labour, including still and live births, others include only live births, whilst others only survival rates for infants admitted to the neonatal intensive care units. This selection bias may overestimate survival rates, by as much as 100% at 23 weeks and even up to 50% at 24 weeks (34). From our own data the great majority of deliveries at 22 weeks are stillbirths, at 23 weeks a large proportion are also fetal deaths and only from 24 weeks onwards do we observe a higher rate of live over still births. Survival rates at discharge, amongst live births, we report a 41.2% between 24 to 25 weeks but from 26 to 27 weeks these figures rise to 95.1%, substantial and very important difference.

Survival, however, is not (and should not be) the only goal in perinatal medicine when attempting to establish a 'lower limit of viability', especially if survival is not to be the only goal. Outcome and quality of life should be a major priority. Although several follow-up studies on these very immature babies have shown that increasing survival has not been mirrored by an increase
in cerebral palsy, the fact is that a proportionally higher number of infants are now survivors of very low gestational age and birthweight. Furthermore, the major neuromotor, psychomotor, neurosensory and cognitive disfunctions are found especially in the most immature infants, below 25 gestational weeks [9-13, 16]. Over and above the immediate and short term sequelae, how are these tiny survivors performing at a later stage? The available long-term evidence – school age and above – generally shows that besides neuromotor and neurosensorial impairments, a high proportion of these children reveal significant learning difficulties and behavioural and educational problems, only adding further to the burden and placing an enormous responsibility upon society as a whole, particularly for the allocation of financial and human resources to provide the necessary collateral help [35-41].

Over the years there has been concerned about the physical, neurosensorial and intelectual sequela, the behavioural problems and learning difficulties of these tiny survivors – and, rightly so. However, it has also been shown that after the delayed weight catch-up of these very preterm infants, [42-46] many of them will grow into overweight adults and, some, truly obese [45-47]. Our own data confirms that almost 50% of these preterm babies, at school entry, are already showing rapid increase in BMI, some as early as two years of age. How many of them will be at risk for the developing of the late metabolic syndrome of obesity, insulin resistance, high blood pressure and cardiovascular disorders, is another reason for the continuous monitoring and follow-up of this population.

From the available evidence it is quite obvious that many of these extremely immature babies are now surviving and therefore the question is not whether there is a threshold for viability and one is supposed to offer them intensive care but whether one is prepared to withdraw or withhold it, should it be the case, in the best interest of the babies, their parents and, even perhaps, society. Lower limit of viability is not just a medical decision it is also an ethical issue to take into consideration at all times.

The ethical questions to practising neonatologists are whether they should accept their own reality of survival and try to improve on quality rather than quantity, or whether they should try to compete with the more advanced countries and aim for the threshold of viability? Who should decide on that? Should it be an individual (local) decision or a matter of national (regional) policy? What are the ethics and moral implications of these decisions? Could it possibly be that in practice new technologies would change matters? What would be the financial resources needed, could they be afforded, and, again, what would be the ethical implications of discrimination on financial grounds?

Futile treatment is currently used in medicine to mean that any treatment beyond a certain point would be unjustifiable. Neonatologists, often young, are frequently faced in the middle of the night with the crucial decision (based very often upon inaccurate information on gestational age) of whether or not to initiate active, aggressive management of the extremely immature infant at the threshold of viability.

In doubt, active resuscitative measures should be started in the labour ward. The decision to further continue intensive care can always be reversed after revaluation and counselling to the parents but this does not imply that decisions to continue or withdraw treatment should rest upon them. Decisions to withdraw or withhold treatment should always be the responsibility of the most senior physician, after discussion with all the staff, including the nurses, and upon informing the parents. The “phantom of the law” is often used as an argument for the continuation of futile intensive care. In fact, in most places what is unlawful is the preservation of life at all costs, against the dignity of the human being. Advanced technologies can often cause procrastination over medical decisions which, when based on a particularly sophisticated tool, may be mistaken for good medical practice. Neuroimaging is often quoted in this context: but how reliable and infallible is neuroimaging for the prediction of function? It might assist but does not replace clinical judgement of when to withdraw or withhold life-supporting therapies – that would be quite unethical and unacceptable.

Most importantly, once the medical decision has been reached to withdraw advanced life-support treatment, the baby should be allowed to die in privacy, with dignity, surrounded by the warmth, care and love of his parents with the full support of the medical and nursing staff.

Fortunately, in most cases, parents accept medical judgements based on sound clinical evidence, knowledge and good faith and are almost always relieved that the decision has been taken out of their hands. Occasionally, medical decisions to withdraw or withhold treatment do not meet with the parents’ agreement or approval because of their particular philosophical, cultural or religious beliefs. Frustrating as this may be, professionals must understand and accept these feelings and must
continue medical treatment until such time as further counselling may reverse the parents’ decision. In the last resort, if consensual agreement cannot be reached in the best interest of human dignity for the baby, the question of treatment withdrawal may be addressed to the courts.

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References


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