

EDITORIAL

Neonatal mortality: the chance for improvement

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Improvements in neonatal mortality are attributed to better technology, care skills and regionalization of perinatal services. However, the impact is not always uniform among different regions or within the same region. It is important to assess from time to time the influence of neonatal services on neonatal mortality rates (NMRs) and infant mortality rates within regions to better understand the reasons for variance and the potential for changes in approach to management.

Improvement in survival of newborns on the threshold of viability contributes to improved NMRs on an international scale. The diversity of results achieved in various regions and countries supports this assertion. One example is the recent results of the European program MOSAIC (Models for Organizing Access to Intensive Care for Very Preterm Babies in Europe).^{1,2} MOSAIC is a prospective cohort study of all preterm babies delivered between 22 and 31 weeks of gestation in 10 regions of nine European countries during 2003. All countries aim to transfer pregnant woman at high risk of very preterm delivery or their premature newborn to perinatal centers to improve survival chances. Access to intensive care is one of the major determinants of survival and quality of life. The results show that there are important differences in the approaches to the organization of perinatal care and a wide variation in neonatal survival; babies between 24 and 31 weeks alive at onset of labor have survival rates ranging from 92 to 75%, and between 24 and 27 weeks gestational age from 42 to 82%.³ A decrease in mortality of very premature newborns in several European regions to the level of the average seen in this cohort translates into a significant increase in the number of newborns who survive. Newborns in less developed countries have even more potential for survival.

From the international perspective of a neonatologist who works outside of North America, the article published in this issue of the *Journal of Perinatology* by Kamath *et al.* is both informative and challenging.

The article presents a retrospective analysis of neonatal mortality patterns by evaluating all live births in Colorado from 1991 to 2003 and by comparing time periods 1991–1996 versus 1997–2003.⁴ Between these time periods, the overall NMR in the State of Colorado remained unchanged and infants at the threshold of viability continued to have a large impact on the Colorado NMR. They show further that the risk of mortality was significantly reduced for infants <750 g born in a level III center and that the

practice of regionalization had not changed between the two periods. The authors conclude that improved efforts to standardize referral practices could potentially reduce the impact of these infants on the NMR. One important finding is that while the overall NMR did not change in this state between the two periods studied, the NMR for infants >600 g significantly decreased, suggesting that further improvements could be achieved and that the boundary for delineating the threshold of viability needs reevaluation.

In relation to comments regarding lack of effective regionalization, one should understand that the most extreme preterm deliveries are unexpected and unplanned leaving no room for early transfer.

Another question is whether there were more multiple births during the second period, which would explain higher deaths.

As Kamath *et al.* delineated in spite of lack of difference in NMR between the periods, there was increased survival above 600-g group. That can be ascribed to several factors, including antenatal steroids. The fact that it did not change NMR suggests that numbers are too few.

It is helpful to emphasize how results of one subgroup (infants with birth weight less than 600 g) can impact of the global statistic of the NMR, and how necessary it is if one chooses to treat the infants born at threshold of viability, one must invest in providing standardized intensive care for these truly high risk infants. Lip service to this policy is not enough if we want to continue to improve neonatal mortality worldwide.

The conclusion, which indicates that a further improvement in survival of these newborns is attainable even in regions that already are at the highest level of economic and medical development, 'simply' by administrative and organizational policies, combined with results from the MOSAIC study showing marked differences between regions of a similar socioeconomic status, strongly suggests that better regionalization of perinatal care is one way to improve neonatal mortality on an international scale.^{3,5–9}

Important points to be considered are the impact on postneonatal mortality and infant mortality rate. Further evaluation of neurodevelopmental outcome of infants of extremely low birth weight would be critical.

I would like to note that the critical comparison between countries of the NMR and the contribution of newborns at the threshold of viability to neonatal mortality is difficult. For instance, between countries, there are large differences in legislation and practices related to terminations of pregnancy.^{10,11} This leads to differences in the occurrence of congenital anomalies, which further

influences morbidity and mortality.^{12,13} This issue has also been studied in MOSAIC, which found large differences in the proportion of very preterm stillbirths resulting from terminations of pregnancy in European regions, and which found high rates of neonatal deaths due to congenital anomalies in Poland, a country with restrictive termination policies.¹⁴ There also are discrepancies in how stillbirths and live births are classified despite the well-known and commonly accepted definitions of the World Health Organization.¹⁵

Clinical practices differ as well, ranging from continuation or discontinuation of treatment up to extreme approaches such as the 'Groningen Regulation' allowing euthanasia on children whose condition does not promise proper development.⁶

These practices are strictly related to religious and ethical dilemmas. They extend from the dogma of the 'sanctity' to 'productivity of life', which clearly determines the approach to how these newborns are treated. The MOSAIC project documented the variation in Europe from extreme approaches, such as Poland, where despite financial and organizational difficulties, the treatment of all babies at the limit of viability is undertaken, to the Netherlands, where active intensive care treatment of newborns born before 25th week of gestation is not routinely offered.³

We need to bear in mind that decades ago in developed countries and now in the majority of regions of the world, similar dilemmas apply to newborns with a significantly higher maturity and birth weight. The necessity of treating these newborns is not questioned. Nevertheless, besides the existing religious, ethical and legal norms, as well as guidelines on various clinical cases, neonatologists face an unavoidable moral risk.^{16–20}

Hence, papers discussing progress achieved over time in various centers, regions and countries are crucial. Obviously, further activities are also needed related to survival without impairment and long-lasting hospitalizations, as well as the complex assistance provided to many of these children and their parents.

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