RESUSCITATION OF THE SMALL BABY - IS THERE A LIMIT?

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ABSTRACT

Innovations in perinatal care in the last decade, in particular delivery room resuscitations and advanced technologies have probably contributed greatly to improved survival of the small newborns. As a result, progressively smaller and less mature infants are being resuscitated; but some survive with severe neurodevelopmental handicap. There should be guidelines about the lower limits of viability below which no resuscitation should be done.

It is the view of many that resuscitation of critically ill small babies should be initiated at birth. Further management will be decided depending on the baby's progress and response.

Clinicians have to look into the question of withdrawal of life support in small babies who survive with impairment and chronic illnesses.

Keywords: Resuscitation, newborn infants; Babies, low birth weight, premature; Neonatal intensive care, decision making of; viability of foetus, lower limit of

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How small is too small?

Resuscitation of the small baby is a very difficult clinical decision. It has become more difficult because ethical problems and litigation are also involved. It is known that the smaller the baby, the more likely resuscitation will be required. What is the lowest acceptable limit below which resuscitation should not be considered because it will not be beneficial? In other words, how small is too small ? What is the lowest limit of viability?

With better knowledge of the pathophysiology of the premature infants and with advances of medical technology, neonatal intensive care as well as obstetric management, smaller and smaller infants are surviving and the mortality rates are decreasing. However, one has also to examine the long-term outcome of these infants. What is the morbidity following such aggressive management?

Review done in the early 80s showed that the value of intensive care (especially assisted ventilation) had not been proven for the very low birth infant, especially the infants with birth weights of less than 750 gm[1]. Such unsatisfactory outcome could have been due to possibly biased obstetric decisions on the management of the extremely low birth weight babies who are less than 26 weeks in gestation[2]. Retrospective study has its shortcoming and weakness as the conclusions drawn only reflect the standard of care in the earlier years and not the present state of art in management.

Neonatologists are fully aware that better results in terms of mortality are appearing in many parts of the world including Singapore[3]. The improvement in survival is most evident for infants weighing less than 750 gm at birth[4].

It is noted that immediate intubation of the small infants at birth with continued ventilatory support was the major determinant of the increase in survival as experienced by Drew[5]. Hack and Fanaroff had similar experience. During 1982 to 1983, only infants weighing more than 700 gm were intubated and artificially ventilated. Subsequently infants less than 700 gm were intubated and there were survivals[6]. They have observed the impact on the neonatal survival after a change of policy of resuscitating babies.

It is thought that with currently available methods of medical care and technology, the limits of viability have now been reached.

About 15 years ago, the World Health Organisation defined foetuses weighing less than 500 gm as nonviable births. Unfortunately, such definitions still vary from state to state in the USA, some adopting a birthweight of 300 gm, with signs of life as livebirth whilst others consider a gestational age of 20 weeks as the lower limit[7].

Delivery Room Decision

Delivery room decision on whether resuscitation is to be instituted can be difficult. There is no way of knowing, at the outset, whether a particular extremely low birth weight premature infant will survive. Also, it is not possible to predict whether the infant will end up normally should he/she survive. Some neonatal units only resuscitate babies of at least 23-24 weeks' gestation or a birthweight of at least 600 gm or more, who make some respiratory efforts, with no evidence of gross congenital malformations. In Sydney, Australia, the guidelines on the non initiation of life support and withdrawal of treatment have recently been suggested[8]. The mean lower limit was suggested to be 700 gm and 24 weeks' gestation, below which it was acceptable not to treat in most cases. If the decision is based on the biological threshold of extrauterine foetal survival of 23 to 24 weeks' gestation, what about women whose dates are uncertain as quite often gestational age can be unreliable. If the lower limit is based on the birthweight say 500 to 600 gm, what about those babies who have a more mature physiological system possibly due to intrauterine growth retardation which may confer a beneficial effect on survival in some of them, because of its associated stress and accelerated maturity. Quite often information on these is lacking at the crucial moment. Other than obvious conditions such as severe central nervous system disorders including anencephaly or absence of foetal heart beat for more than 15 minutes, it is unfair for the young residents who attend most of the 'high risk' deliveries to make such an important decision on resuscitation within the first few vital seconds.

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Strategies for decision making

Rhoden characterised the strategies for decision-making in neonatal intensive care units in different nations. Many units advocate prompt treatment for all critically ill newborns and leave the decision of continued intensive care or curtailment of aggressive therapy to a later time, depending on the clinical progress and outcome. Such approach was described by Rhoden as the 'individualised prognostic strategy'[9]. This is the British approach of decision-making in neonatal care units.

That is different from the 'wait until certainty strategy' commonly found in the USA where all extremely premature, very low birth weight infants are treated vigorously until it is virtually certain that they are either not being benefitted or are actually being harmed. Only then treatment is stopped. The result: some who would otherwise have died were saved; the survivors were harmed and have long-term sufferings; an enormous amount of money was spent on neonatal intensive care. This is also different from the Swedish approach of 'statistically prognostic strategy' where treatment is withheld from infants with uncertain or grim prognosis and the net effect is that some who might have been saved with vigorous treatment, die. Continuation of assisted ventilatory care of a baby who has no chance of recovery or who has a strong likelihood of being handicapped means financial burden, more stress and anxiety, both to the family and to the attending personnel, and ineffective use of scarce resources. In the 'individualised prognostic strategy', the net results fall between those of the American and the Swedish strategies.

It is observed that once the baby is put onto a ventilator, medical staff are reluctant to discontinue ventilatory assistance in a baby identified as non viable or beyond recovery. The reluctance stems from the fear of possible prosecution or litigation and of compunction.

Nevertheless, it is best to institute resuscitation first, to be followed by a thorough review of the baby's progress, laboratory results, response to intensive care, cranio-ultrasonography and consultation with the family. This will clarify the situation.

Resuscitation of the Impaired Baby

The present day neonatologists are facing another problem ie resuscitation of a chronically and severely ill small baby when the clinical condition deteriorates. They are babies who have not responded to many forms of curative treatment and in whom all hope for intact survival (normal outcome without major disability) and normality (possibility of establishing a meaningful human relationships)[10] appear to dissipate, where death is inevitable and imminent regardless of treatment. The question of withdrawal of life support comes in.

Chiswick has warned of the deceptive signals: staff and parental despair, baby's distasteful appearance, failure of parents' visit and biased impression of prognosis, not based on current scientific knowledge[11]. These should not be used as indications for withdrawal of life support.

There are a few other very important factors which affect the decision of resuscitation of the small baby. These are: the cost of care, availability of financial and physical resources and manpower in the city or country of birth. Also, one must not forget that investing a large sum of money in treating a small baby in the neonatal intensive care nursery should not be at the expense of suboptimal care for heavier and less sick babies. Prevention of the causes of prematurity such as lack of antenatal care, poor nutrition of the pregnant women, poor housing, indulgence in drugs or alcohol should not be overlooked.

Therefore, the limit of viability is unique to each province within a country and will be determined only partially by the birth weight or gestational age of the baby, and is best ascertained not at the time of birth but after the institution of immediate intensive care.

References

1. Schechner S. For the 1980: how small is too small? Clin Perinatol 1980, 7: 135-43.
2. Amon E, Sibai BM, Anderson GD, Mabie WC. Obstetric variables predicting survival of the immature newborn (< 1000gm): a five-year experience at a single perinatal center. Am J Obstet Gynecol 1987; 156: 1380-9.
3. Ho NK. A study of 8 year neonatal deaths (1982-1989) of Toa Payoh Hospital. Singapore Med J 1991; 32 (2): 138-41.
4. Hack M, Fanaroff AA. How small is too small? Considerations in Evaluating the outcome of the tiny infant. Clin Perinatol 1988; 15: 773-88.
5. Drew J. Immediate intubation at birth of the very low-birth-weight infant: effect on survival. Am J Dis Child 1982; 136: 207- 10.
6. Hack M, Fanaroff AA. Changes in the delivery room care of the extremely small infant (< 750 g): effects on morbidity and outcome. N Engl J Med 1986; 314: 660 4.
7. Wilson AL, Fenton LJ, Munson DP. State reporting of livebirths of newborns weighing less than 500 gm: impact on neonatal mortality rates. Pediatrics 1986; 78: 850-4.
8. National Consensus Conference on Neonatal Intensive Care 1989. Guidelines on the non-initiation of life support and withdrawal of treatment. Perinatal Newsletter, Sydney, Australia 1991; 14: 8.
9. Rhoden NK. Treating Baby Doe: the ethics of uncertainty. Hastings Cent Rep 1986; 16: 34-42.
10. McCormick RA, Paris JJ. Saving Defective Infants: option for life or death. America 1983: April 23: 313-7.
11. Chiswick ML. Withdrawal of life support in babies: deceptive signals. Arch Dis Child 1990; 65: 1096-7.