

# NEONATAL INTENSIVE CARE

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## OPSOMMING

Die siek pasgeborene het spesiale versorgingsbehoefte wat aanleiding gegee het tot die ontwikkeling van neonatale intensiewe-sorg. Hierdie gespesialiseerde sorg, waarin 'n spanbenadering gevolg word, kan die neonatale-sterftesyfer betekenisvol verminder.

Die vervoer van die hoë-risiko baba, deur 'n professionele span, na die eenheid verg spesiale aandag. Die ondersteuning van die ouers, wat 'n krisis beleef, om veral die ouer-kind verhouding te versterk is ook belangrik.

## INTRODUCTION

**T**HE events of the third trimester of pregnancy — labour, delivery and the newborn period — undoubtedly influence the whole of one's life. Old age excluded, the highest mortality rate occurs in the perinatal period.

Advances in diagnostic and therapeutic techniques during the past decade have resulted in the evolution of a new type of facility for the care of ill neonates. Prior to the 1960's infants were admitted either to full term of premature nurseries. Infected babies were isolated in separate, irregularly staffed nurseries that were reserved solely for infectious cases. Non-infective sick infants were treated in the premature or full term nursery to which they were originally admitted. The very small preterm infant might have been left unattended and only be given treatment a few hours after birth, if he continued to show signs of survival. To commence treatment at this stage is too late! His chance for normal development might have been impaired during this period of neglect. Post-operative neonates were treated in surgical wards with children of all ages.

The contemporary special care facility arose in response to an awareness of the singular characteristics of

perinatal disorders. A newly acquired understanding of the pathophysiological phenomena during this period of life, and the capacity to apply this knowledge clinically, required an appropriate setting in which the severely ill baby could be treated. These developments occurred simultaneously with advances in electronics and biochemistry. Practical methods for the evaluation of numerous crucial parameters of foetal and neonatal illness were thus made available — continuous monitoring of cardio-respiratory function became a reality. The performance of multiple biochemical determinations on minute quantities of blood was facilitated by new micro-techniques. Conservation of body heat became feasible with the availability of radiant heaters and 'Servo-Controlled'<sup>3</sup> incubators. With improved methods for the control of infection, a direct impetus was provided for housing all medically and surgically ill infants in a common ward, whether they were premature or mature, infected or non-infected.

This new approach revolutionised requirements for nursery architecture, fixtures and equipment. More important, a need was created for specially trained personnel who have to function cohesively if lives are to be saved.

The key to not only survival, but survival without permanent disability, lies in the institution of optimal care for the infants who need such care. This can best be done in a neonatal intensive care unit.

We must however remember that neonatal intensive care is only a small fraction of the care given to neonates during this crucial stage of life. Only 3—5% of all newborns will require neonatal intensive care.<sup>4</sup>

## STRUCTURAL COMPONENTS AND EQUIPMENT

It is beyond the scope of this article to discuss the structural components or the equipment needed for a neonatal intensive care unit, except to mention that they are important aspects of the overall picture of neonatal intensive care.

## INFANTS IN NEED OF SPECIAL CARE

Certain factors have been identified which are threatening to the life of the newborn, for example:

— the well known 'H' syndrome, namely:

Hypoxia,  
Hypoglycaemia,  
Hyperbilirubinaemia,  
Hypothermia;  
the majority of infants presenting

## IDENTIFICATION OF THE HIGH RISK INFANT AND RELATED FACTORS

	Hypoxaemia	Hypoglycaemia	Hyperbilirubinaemia	Hypothermia	Infection	Major Congenital Abnormalities	Drugs
<b>Antenatal</b>	Foetal distress	Preterm labour	Rh-sensitisation		Prolonged rupture of membranes		
	Oversedation	Drugs e.g. oral diabetic agents					
<b>Post Natal</b>	Respiratory distress e.g. hyaline membrane disease, meconium aspiration, recurrent apnoea	Prematurity Small for gestational age Infant of a diabetic mother Respiratory distress Rh-disease	Haemolytic disease of the newborn Prematurity	Prematurity Hypoglycaemia Infection	Amniotic infection syndrome Procedures e.g. intubation, umbilical arterial catheterisation. Personnel e.g. excessive handling Equipment e.g. incubators and respirators	Diaphragmatic hernia Tracheo-oesophageal fistula Atresias Congenital heart anomalies	Pethidine Morphine

- with the above are preterm and suffer from respiratory distress;
- infections such as necrotizing enterocolitis;
- major congenital abnormalities — for example tracheo-oesophageal fistula, diaphragmatic hernia, the atresias or congenital heart anomalies;
- drug depression due to medication administered to the mother during labour.<sup>6</sup>

The vulnerable foetus/infant should be identified and immediately transferred for special observation and care.

### TRANSPORTATION OF THE HIGH RISK INFANT

Because of the special needs of the high-risk mother/foetus or newborn, it is not always possible to care for them in the maternity unit. Regionalisation of services has thus become necessary.<sup>4</sup>

Each year an increasing number of neonates are transported in the course of their illness. Transport equipment has become more specialised and there have been major refinements in the construction of the transport incubator which permits the infant to be kept warm and well oxygenated. Helicopters and highly sophisticated mobile intensive care vans are available which allow the physician and nurse to render the necessary care during transit to the referral hospital.

Most experts in perinatal health care would agree that when risk factors can be predicted maternal transport, as the uterus is an ideal 'transport incubator'<sup>2</sup>, is far preferable to transporting the neonate. Delivery of a known high-risk infant

should then occur near the neonatal intensive care unit. This would be the ideal situation.

The transportation of an ill infant is a complex procedure requiring the co-ordinated effort of a number of personnel and two institutions. Although each act is simple, in most cases, a single omission in the intricate chain may be detrimental to the infant's health.<sup>2</sup>

### Links in the chain of transportation of an ill neonate

These links are as follows:

#### *Communication*

Communication and teamwork are the key to a successful transport system.

- The physician in charge of the unit must be consulted in relation to the referral of the sick neonate. He must make the decision of accepting the infant after checking available space.
- There must be communication with the sister in charge of the unit to enable adequate preparation to receive the infant into the unit.
- There must be communication with those responsible for the actual transportation:
  - the ambulance driver;
  - the helicopter pilot;
  - the doctor on call;
  - the accompanying sister or nurse.

#### *The readiness of transport and equipment*

Transport and equipment must always be well maintained and in readiness. There is no point in transporting an ill infant if the ambulance should run out of petrol or if the

transport incubator does not keep the infant sufficiently warm or supply sufficient oxygen.

#### *A skilled transport team*

Such a team consists of the persons already mentioned above. The necessity of a skilled team speaks for itself. Cautious smooth driving is essential not only for the transport of the infant but also for the doctor and nurse treating the infant. Also, not much imagination is needed as to what might happen if the ambulance driver or helicopter pilot were to be accompanied by a porter or clerk, instead of a professional team, to transport an ill neonate.

The transportation of ill neonates by inadequately trained staff with inadequate facilities results in the arrival of cold hypoxic infants followed by increased mortality. This is particularly true for those infants who weigh less than 1 500 grams. By using skilled personnel there is not only a reduction in the mortality and morbidity rate but also a one-third reduction in the duration of hospitalisation of infants who weigh less than 1 500 grams.<sup>2</sup>

#### *Stabilization of the infant's condition before transportation*

Approximately one-third of all infant deaths occur within the first twenty-four hours after birth.<sup>2</sup> It is essential that the ill infant should be in a stable condition for transport. This implies, for example, correction of blood sugar levels; maintaining the infant's temperature; commencing an intravenous infusion and intubation as necessary.

### *Collection of all relevant data*

Collecting all available information concerning the infant before leaving the referring hospital is essential. It ensures optimal treatment for the infant and saves time later.

### *Reception into the neonatal intensive care unit*

With adequate communication initially there will have been proper preparation for the reception of the sick infant into the unit and therefore optimal care.

## **PARENTS AND NEONATAL INTENSIVE CARE**

When an infant is born with some health problem, the crisis that occurs within the family is grave. The process of incorporating a new member into the family, which began during pregnancy, is suddenly interrupted. There is evidence that the maternal-infant relationship is at such a particularly vulnerable point in the period immediately after delivery that even a slight disturbance can cause variation in the pattern of mothering.

In all species of animals there exists an intangible bond of affection between a mother and her offspring. The strength of the bond is important, as the infant depends entirely on its mother for all its physical and emotional needs.

For both animals and humans touch seems to play a very important role in the establishment of the maternal-infant relationship. The human mother first uses touch to become acquainted with her baby, and later she employs it to express her love. She explores his body with her fingertips, gradually using her hands to a greater extent, and finally enfolds it in her arms holding it close to her body. Eye-to-eye contact between human mothers and their infants also seems to play a very important part in eliciting maternal affection. Likewise, the performance of caring activities and the perception of satisfaction from the infant seem necessary preludes to the development of maternal love.<sup>1</sup> Prolonged separation of mother and infant appear to prevent the natural evolution of the mother-infant relationship.

The effects of early physical separation during this crucial period include:

- the inability of the mother to cuddle her infant;
- the mother may be slow to develop the ordinary caring skills;
- increased foster-care is evident;
- evidence of an increase in baby-battering;
- failure of the infant to thrive without any detectable biological grounds.<sup>1</sup>

When the birth of a premature or ill infant occurs parent reactions are altered and there is a need for them to work through certain feelings (psychological tasks) to help them cope with the stress and provide a basis for a closer parent-infant relationship.

These psychological tasks are as follows:

- the parents become prepared for possible loss of their child and experience anticipatory grief whilst at the same time still hoping for the infant's survival;
- the parents attempt to acknowledge their failure to produce a healthy or normal infant — the guilt and grief in this acknowledgment process can however be devastating;
- the parents resume the process of relating to the infant, which was interrupted by the threat of non-survival, (which may continue to be a threat resulting in a slow response of hope for the infant's survival);
- the parents must learn how this infant differs from others and understand its special needs and growth-patterns which are only temporary and will eventually become normal.<sup>5</sup>

### **Parent-nurse (staff) relationship**

What of this relationship — does it exist? It does exist and it must exist!

Much has been written regarding the bond which must be established between the parents and their child. To achieve this successfully the relationship which must also develop between the staff of the neonatal unit and the parents should be kept in mind. This is a relationship of trust and the nurse must use her 'self' therapeutically in relating on a one-to-one basis with the parents. She must remember that each parent is an

individual with different needs and different ways of adapting to a crisis.

There must be communication with the parents at all times, they must be aware of the progress their child is making and everything that is being done for him. With their baby surrounded by electronic monitors, catheters, a respirator and other equipment the following questions by parents are unavoidable: "Does the fluid go into the brain?"; "Does the white wire on the abdomen go into the stomach?"; "Does the monitor make the baby's heart beat?". The worries of parents are easily overcome by simple explanations about all the equipment being used on their baby.

The nurse must allow the parents to talk, to verbalise their feelings and to ask questions. They often distort or forget an explanation of diagnosis given by the doctor. Interpretation and explanation to the parents is therefore a continuous process.

One must not forget that parents pass through a process of grieving. This process must be recognised by the nurse and the parents shown that their feelings and reactions are normal and that there is no shame in crying. Sometimes no more is needed than a tactile response from the nurse — a touch of the hand, or an arm around the shoulder.

When dealing with the parents of an ill child, the nurse's personal feelings and emotions will no doubt be involved. Nurses quite often make an unrealistic attempt to remain emotionally uninvolved in their interactions and to hide emotional reactions from parents and colleagues. Unfortunately one of the most common ways in which the nurse defends herself against anxiety is to withdraw — often when she is needed most, *especially by parents of an ill child.*

## **STAFF OF THE NEONATAL INTENSIVE CARE UNIT**

Due to the number and type of patients referred to the unit, it is obvious that a large staff is required to provide optimal care and that the key to successful treatment is 'teamwork'.

The team consists not only of medical and nursing staff but also of paramedical staff which includes radiographers, physiotherapists, social workers and laboratory technicians.

In most neonatal intensive care units a medical registrar is present 24 hours a day and he is responsible for co-ordinating the care of the infant. In addition there are consultants from various specialities who are available at all times.

### Nursing staff

The role of the nurse is vital in the care of the neonate.

A nursing supervisor (matron) should be in overall charge of the neonatal intensive care unit. The nurse-patient ratio should be 1:1.5 — 1:2, naturally a 1:1 ratio would be ideal.<sup>3</sup> There should be three shifts of eight hours each. Preferably the staff should have undertaken special training in neonatal care. This is not always possible as there are different categories of nurses working in the unit such as student midwives and students on paediatric courses. Of major importance is that the neonatal staff should be relatively permanent and not changed too often. This adds to a feeling of security amongst the staff which is important to help them function adequately. Leave, if possible, should be taken twice a year.

The nurse is expected not only to nurse her patient; in addition she must acquaint herself with all the sophisticated equipment used for monitoring and treating the babies. In caring for the newborn she is a key-person and without her no neonatal unit would function. Despite all the technological advances in electronic devices and other equipment the statement remains true that

*the nurse is in a better position than anyone else to detect the subtle signs that often herald catastrophe.*<sup>3</sup>

In-service and on-going education are of vital importance for the nurse to keep abreast of modern advances in technology.

Regular, e.g. weekly, combined meetings attended by nursing, medical and paramedical staff offer the opportunity of solving problems not only in relation to the infant and it's parents but also in respect of the irritations and frustrations in the working situation.

To quote S.B. Korones: *The care of sick babies cannot be intensive unless personnel perform with intensity, without this ingredient, complex equipment is useless.*<sup>3</sup> The nurse and all the other categories of staff form a team with the above aim in mind.

### THE RESULTS OF NEONATAL INTENSIVE CARE

Intensive care of the neonate is both expensive and time consuming. The cost of equipment increases daily because the equipment becomes more sophisticated and more expensive to make. Secondly the cost of staffing such a unit has to be taken into consideration.

Obviously it is impossible to apply a cost-effectiveness ratio to a neonatal intensive care unit. What is the value of a baby to his family and society? This is incalculable and no currency suits the purpose.

*Do mortality rates decrease when intensive care is applied?* There is excellent evidence that they do: the introduction of special care has resulted in an approximate 50% decrease in neonatal mortality rates for low birthweight babies.<sup>6</sup>

*What are the possible long term results?* The efficiency of a neonatal intensive care unit can only be assessed over a number of years. A strong correlation exists between perinatal complications, particularly hypoxia, and neurological abnormalities. The incidence of such complications can be reduced by good perinatal care. An overall improvement in the neurological and intellectual functions of small babies has occurred and Stewart and Reynolds report a 10% incidence of abnormalities in infants below 1500 grams. Prior to neonatal intensive care the incidence of such abnormalities was in the region of 70%.<sup>7</sup>

In conclusion, a thought must be given to those infants who have suffered from our past inadequacies and to those who will benefit from our newly acquired skills.<sup>3</sup>

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## BOOK REVIEW

## BOEKRESENSIE

### LONG LIFE — EXPECTATIONS FOR OLD AGE

by Magnus Pyke

J.M. Dent and Sons, 1980.

Price: R9,55

I began to read this book with reluctance, thinking it was only one more addition to the huge amount of literature on the care of the elderly, that has been put out over recent years. But this is not simply another book on geriatrics. It is beautifully written and takes a refreshing balanced view of the rewards and unhappiness that all of us can expect as we go through life, regardless of our age. Certainly there are physical, social and psychological disabilities that may affect old people, but there are pleasures and rewards as well.

This is a book born out of a series of meetings of the Committee for Social Concern and Biological Advances of the British Association for the Advancement of Science. Dr. Pyke was Secretary of the British Association at the time this committee was formed and the content of this book is based largely on the material produced by the Committee.

The book is not a sleep-inducing research report; it is a lively and sympathetic account of how the latter part of life is as *available for proper and meaningful activity, as any other phase of life* provided that society and elderly people themselves, share this view of the dignity and worth of all individuals, including the aged.

B.N. Hunt