

REVIEW IN INTENSIVE CARE  
MANAGEMENT OF SOME CRITICAL  
NEONATAL CASES

A REVIEW

Submitted For Partial Fulfilment of  
The Master Degree (M.Sc.) In  
PEDIATRICS

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### ACKNOWLEDGEMENT

I would like to express my deep gratitude and appreciation to Dr. Fouad Badrawy, Professor of Pediatric, Faculty of Medicine, Ain Shams University, for giving me the privilege of working under his supervision, for his encouragement, and his fruitful guidance throughout the whole work.

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## INTRODUCTION

## INTRODUCTION

Intensive care units (ICUS) are centers for high risk infants regardless of gestational age or birthweight. Neonatal intensive care units often deal with newborns who have risky diseases (Gordon and Avery, 1981).

The most important risky diseases met in the intensive care units are Jaundice, seizures, necrotizing enterocolitis, respiratory and cardiac disorders.

Jaundice is the commonest physical sign in the newborn period, so much so that Jaundice is described as being "physiological" in the majority of the affected infants. As jaundice may be associated with cerebral dysfunction and death it is clearly not always physiological and must be considered as a potentially serious condition.

Term dyspnoea and respiratory distress are applied to the breathing which is difficult, distressed, laboured or rapid, great variety of disorders cause dyspnoea e.g. obstruction of the upper air way, lung parenchymal disease, intrathoracic disorders, disorders of the diaphragm and other miscellaneous disorders e.g.

heart failure. RDS. usually occurs in preterms. So measures which reduce the incidence of preterm delivery are of major importance in management of R.D.S. (Keay and Morgan, 1974).

Seizures during neonatal period are considerable problem, not only because they are symptom of neurological or metabolic disorder, but because there is strong association between seizures and permanent handicap in survivors (Wasterlain, 1979).

Neonatal sepsis is a clinical syndrome characterized by symptomatic systemic illness and bacteremia in the blood (Siegel and McCracken, 1981).

The increased use of prenatal care facilities, the establishment of high risk pregnancy program for delivery of mothers at medical centers, in addition to the intensive care facilities may have significant impact in reducing maternal and neonatal factors predisposing to infection in the newborn infant (McCracken, 1976).

So the field of neonatal intensive care is continuously developing. There is good experimental evidence from randomized controlled clinical trials that intensive care interventions in perinatal period is effective in reducing perinatal/neonatal mortality and Fetal/neonatal mortality (Sinclair, 1982).

THE AIM OF THE WORK

The aim of this work is to throw light on the management of some neonatal critical cases in the intensive care units namely N. Asphyxia, N. Respiratory disorders, cardiac disorders, septicemia, Jaundice, NEC and seijsures.

## NEONATAL ASPHYXIA

### NEONATAL ASPHYXIA

Asphyxia is that state in which pulmonary or placental gas exchange ceases, resulting in progressive anoxemia, hypercapnia and acidosis, (Robert and Vannucci, 1985).

The arbitrary classification of asphyxia as the requirement of greater than one minute of positive pressure resuscitation prior to onset of respiration was chosen as a clinically recognizable definition (Mulligan, 1980).

#### Clinical picture in asphyxia:

The main clinical features of asphyxia are indicated in the following table.

The Apgar score

| Sign                                                                                     | 0           | 1                               | 2                |
|------------------------------------------------------------------------------------------|-------------|---------------------------------|------------------|
| Appearance (colour)                                                                      | blue, pale  | body pink<br>(extremities blue) | Completely pink  |
| pulse (heart rate)                                                                       | absent      | below 100                       | over 100         |
| grimace (reflex, irritability, response to stimulation of sole of foot by glancing slap) | no response | grimace                         | cry              |
| Activity (muscle tone)                                                                   | limp        | some flexion of extremities     | active motion    |
| Respiratory effort                                                                       | absent      | slow, irritability              | good strong cry. |

The range includes, apnea, altered respiratory rate (usually, reduced), irregularity of respiratory pattern, xiphoid retraction, intercostal retraction, expiratory grunting, flaring of the ala nasi, cyanosis, hypotonia, diminished response to stimuli and altered heart rate (usually slowing) (Forfar, 1984).

#### Physiology:

The immediate transition from fetus to newborn at delivery involves fundamental changes in respiratory and circulatory functions. During fetal life, cardiorespiratory function is directed at supporting the placenta's primary role in gas exchange. In contrast, at birth that role is transferred to the newborn's lungs by series of alterations in lung inflation and perfusion. There are two major cardiorespiratory differences between the fetus and the newborn. First, the fetal lungs are filled with fluid and do not function as organs of gas exchange. Second, the fetal circulation is arranged so that most blood bypasses the nonventilated lungs to travel more directly to and from the placenta for gas exchange and delivery of oxygenated blood to fetal tissues. The bypasses are two right-to-left shunts, one through the ductus arteriosus and the other through the foramen ovale, (Avery and Taeusch, 1984).

Pathophysiology:

Asphyxia occurs when the organs of gas exchange fails. When this occurs,  $\text{paCO}_2$  rises and pH falls. However, tissues continue to consume  $\text{O}_2$  from blood until  $\text{paO}_2$  reaches a very low level. Tissue hypoxia then occurs, and anaerobic metabolism produces large quantities of metabolic acids. These are buffered by the bicarbonate in the blood.

In practice, asphyxia is evaluated by measuring arterial blood to detect high  $\text{pCO}_2$ , low  $\text{pO}_2$ , low bicarbonate, and a large calculated base deficit. Arterial blood changes sometimes fail to reflect the full extent of the changes in tissues. This is particularly the case when blood flow to some tissues is markedly reduced. Such ischemia not only contributes to the asphyxial process, but also, leaves  $\text{CO}_2$  and metabolic acid pooled in the vasculature of asphyctic tissues, rather than returning them to the central circulation where they can be detected, (Avery et al., 1981).

There are 4 basic mechanisms for asphyxia:

1. Fetal asphyxia from interruption of umbilical blood flow, such as occurs with cord compression during labour.

2. Fetal asphyxia from failure of exchange across the placenta because of placental separation.
3. Fetal asphyxia from inadequate perfusion of the ~~maternal~~ side of the placenta (e.g. with severe maternal hypotension).
4. Neonatal asphyxia from failure to inflate the lungs and complete the changes, (Roderie, 1981).

### Assessment

Immediate assesement of the infant by experienced personnel is of utmost importance. The Apgar score has been used to assess the infant at 1 and 5 minutes after delivery and has been useful in providing clinicians a numerical value with which to assess the degree of asphyxia or response to treatment, and less often to predict survival and the extent of neurologic sequelae, (William and Philip, 1985).

The 1-minute score correlates closely with the pH of umbilical cord and arterial blood while the 5-minute score may most closely correlate with later neurologic outcome (Macdonald et al., 1980).

If the score is 8 to 10 at 1 or 5 minutes of age, the infant usually does not require active resuscitation, if he has score of 2 or less at 1 minute or less than 5 at 5 minutes of age, he requires resuscitation.

One of the most ominous signs is a 5-minutes Apgar score that is much lower than the 1-minute score, (Roderie, 1981).

Resuscitation:

Medical management of asphyxiated newborns is directed toward maintaining systemic homeostasis as well as optimal central nervous system function, (Robert and Vannucci, 1985).

Equipment and drugs needed in the delivery room:

Every delivery room should have an area set aside to be used for initial care of the newborn, the "resuscitation island" should be completely equipped so that resuscitative and other maneuvers can be carried out under optimal conditions of light for the physician and warmth for the infant. Oxygen, compressed air, and vacuum outlets should be available. The table on which the infant is placed for immediate care should have sufficient height to allow intubation of an infant without unnecessary discomfort. An overhead radiant heating device is essential.

The following is equipment to be used for resuscitation: