

## Perinatal Asphyxia

### Objectives

By the end of this lecture, you should be able to answer the following questions:

What is Birth Asphyxia?

Which baby is at risk for birth asphyxia?

How can I diagnose it?

How can I treat the baby?

What is the outcome?

### Definitions

Anoxia is a term used to indicate the consequences of complete lack of oxygen as a result of a number of primary causes.

Hypoxemia refers to decreased arterial concentration of oxygen.

Hypoxia refers to a decreased oxygenation to cells or organs.

Ischemia refers to blood flow to cells or organs that is insufficient to maintain their normal function

Hypoxic–ischemic encephalopathy (HIE)

is an important cause of permanent damage to CNS tissues that may result in neonatal death or manifest later as cerebral palsy or developmental delay.

### Case 1

A 42-year-old mother, in her third pregnancy, gave birth to a male term baby weighing 2615 After birth, his overall condition was very poor, his heart was not beating, and he was not breathing. He had respiratory depression and the Apgar score was 0 at the first min and 2 at the fifth min. Cornea was dull and pupillary light reflex was weak. Following resuscitation and intubation, he was referred to the intensive care unit with the diagnosis of?

### Case 2

27 years old mother was admitted to the hospital for induction of labour due to 10 d post date then was transferred to the labour ward for artificial rupture of the membranes (AROM). Syntocinon infusion was commenced, After a while, the cardiotocograph (CTG) - began to show suspicious signs. The Syntocinon infusion was not discontinued for a number of hours.

The CTG traces became gradually more and more abnormal, although no action was taken. A Ventouse delivery was eventually carried out and baby was delivered but didn't cry. What is precipitating factor for his condition?

### **Significance of Asphyxia**

Nearly one half of newborn deaths (many of which involve extremely premature infants) occur during the first 24 hours after birth. Many of these early deaths also have a component of asphyxia or respiratory depression as an etiology.

For the surviving infants, effective management of asphyxia in the first few minutes of life may influence long-term outcome.

All personnel involved in delivery room care of the newborn should be trained adequately in all aspects of neonatal resuscitation.

### **Risk Factors:**

90% ante- and intra-partum (uteroplacental insufficiency).

10% post-partum (neonatal cardiac, pulmonary, neurologic abnormalities).

### **Etiology of asphyxia:**

Causes before birth:

Low maternal blood pressure

Inadequate relaxation of the uterus (excessive administration of oxytocin)

Premature separation of the placenta

Compression of the cord

Placental insufficiency (PET, toxemia, maternal chronic illnesses & post-maturity)

Causes after birth

1. Anemia (severe hemorrhage, hemolytic disease)
2. Shock (massive blood loss, overwhelming infection)

### **Diagnosis:**

Is made on the basis of the clinical history & obstetric monitoring.

Investigations for therapeutic intervention:

CT scan & EEG to identify subdural hemorrhage & subclinical convulsions

### **Perinatal Assessment and Management:**

US.

Electronic fetal monitoring.

Fetal scalp PH.

Meconium.

### **Delivery Room Assessment:**

Significance of Apgar score.

Extended Apgar (at 10- 15- 20 min).

### **Treatment:**

Diagnosis during intrapartum period

Resuscitation of the newborn baby

General support of the infant

Brain orientated management

Intrapartum care:

-Recognition of the high-risk fetus together with careful monitoring & early delivery if fetal distress is suspected

Resuscitation:

Neonatal resuscitation is a procedure applied to neonates who fail to spontaneously establish respiration.

General support:

Nurse in thermo neutral environment

Avoid hypo- and hyperglycemia

Measure blood gas: treat hypoxia with oxygen

Treat hypercarbia with PPV

Review infection risk & treat with antibiotics

Adequate hydration

Treat hyperbilirubinemia

Brain orientated management:

Cerebral perfusion: monitor bd pr.

Seizures:

-initial seizure----- phenobarbital      -if persistent seizure consider      \*phenytoin  
\*clonazepam

Intracranial hypertension:

-give 20% less than fluid need

-if full fontanel and seizure, give manitol 20% (1g/ kg), avoid if the baby is oliguric

Hypoxic Ischemic Encephalopathy (HIE)

Criteria for prediction of post-asphyxial encephalopathy:

Severe metabolic/ mixed umbilical artery acidosis.

Persistent 0- 3 APGAR > 5min.

Neonatal neurological manifestations (coma, seizures,...).

Multi organ system dysfunction (renal, CVS, pulmonary,...)

**Differential Diagnosis:**

Sedation/ analgesia.

Sepsis/ meningitis.

Congenital malformations.

Neuromuscular disease.

Intracranial hemorrhage.

Shock antepartum or intrapartum hemorrhage.

outcome

Approximately 20-30% of infants with HIE die in the neonatal period

≈33-50% of survivors are left with permanent neurodevelopmental abnormalities (cerebral palsy, mental retardation).

The greatest risk of adverse outcome is seen in infants with severe fetal acidosis (pH <6.7) (90% death/impairment) and a base deficit >25 mmol/L (72% mortality).

Multiorgan failure and insult can occur