The term birth injury is meant to denote avoidable and unavoidable mechanical trauma of the newly born.
(1) Cranial Injuries

Caput Succedaneum

* It is a diffuse edematous swelling of the soft tissue of the scalp, involving the portion presenting during delivery.

* It occurs in prolonged labors and when the membrane is ruptured before full dilatation of the cervix.
It results from collection of exudates under the scalp.

Generalized or localized discoloration may be present.
Moulding:

- Compression on the fetal head during labor causes alteration in its shape.
- It occurs by sliding movement of the scalp bones. It disappears at the 1st week of life.
Moulding
Cephal-hematoma:

- It is sub-periosteal hemorrhage limited to the surface of one cranial bone.
- There is no discoloration of the scalp.
- The swelling is not visible until several hours after birth as hemorrhage is slow.
A big cephal-hematoma may cause hyperbiliruinemia due to breakdown of the red cells in an immature reticulo-endothelial system.

In the majority of these cases, there is an underlying skull fracture which could be felt as a central depression.

It is differentiated from meningocele, which shows pulsation, increased pressure on crying and presence of bony defect shown by x-ray.
Cephal-hematoma
• It begins to calcify at the end of the 2nd week or during the first 6 weeks of life.

• It requires no treatment unless it is complicated by severe hyperbiliruinemia or anemia.
Intra-cranial Hemorrhage

- It includes sub-ependymal, sub-arachnoid, intra-cerebral and intra-ventricular hemorrhages.

- It may result from trauma, anoxia and rarely from a primary hemorrhagic disturbance or congenital vascular anomaly.
**Traumatic hemorrhage occurs when:**

- The fetal head is large in proportion to the size of the pelvic outlet.

- Labor is prolonged as in breech deliveries.

- In unskillful mechanical deliveries.

N.B. Hemorrhage due to anoxia tends to be sub-arachnoid or intra-cerebral.
**Clinical manifestations:**

1. Failure to move normally and diminished or absent moro reflex are the commonest features.

2. Great irregularity of respiration is indicative of severe hemorrhage, manifested with asphyxixia and cyanosis.

3. Failure to suck well, forceful vomiting, high-pitched cry, convulsions or paralysis may be the first symptoms.
4. Eye manifestations such as ocular palsies, unequal size of the pupils and even failure to react to light may follow.

**Treatment:**

- Handling should be as little and gentle as possible.

- Care in the form of good temperature control, continuous observation and administration of oxygen for cyanosis.
- Sodium phenobarbitol is administered intra-muscularly, which should be repeated to control the convulsive movement.

- Blood transfusion may be necessary in case of hemorrhagic disease of the newborn.
(2) Peripheral nerve injuries

**Brachial Palsy:**

**Erb-Duchenne paralysis**

- It is due to stretch of the anterior 5th or 6th cervical root or their complete separation from the spinal cord.
- The infant cannot abduct, externally rotate the arm or supinate the forearm.
- Moro reflex is absent on the affected side.
Left Erb’s Palsy

nmcgroups.blogspot.com /causes-of-abdo/
Treatment:

- Resting the paralyzed muscles & maintaining the arm abducted and externally rotated, with a pad over it.

- Later on, a splint may be used to put the arm in proper position.

- Physiotherapy is started immediately to prevent atrophy of the muscles.
Klumpke's paralysis

- The paralysis is limited to the wrist and hand.
- The grasp reflex is abolished.
- The wrist movements are limited.
**Phrenic nerve:**

- Injury of the brachial plexus may include the phrenic nerves as they originate from the 5th cervical root.
- Paradoxical movement of the diaphragm can be seen and checked.
(3) Visceral problems

- Injury of the internal organs usually occurs from pressure during delivery of the head in breech presentations.

- The liver and spleen are the most susceptible organs, usually in the form of sub-capsular hematomas.
(4) Sterno-cleido-mastoid muscle

- It is a firm mass, 1-2 cm in diameter in the mid-portion of the sterno-cleido-mastoid, appears in the second week of life.

- Some believe that it is a small hematoma from injury in the muscle during delivery, while others claim that it is a fibromatous malformation of the muscle.

- It might cause torticollis.
Any bone could be fractured during delivery if vigorous attempts are made. The clavicle is the most vulnerable bone for fracture, especially in shoulder presentations. Infant fails to move freely. On the affected side, crepitus may be elicited and moro reflex is absent.
- Spasm of the sterno-cleido-mastoid muscle with supra-clavicular depression is observed.

- In green stick fractures, there is no limitation of movement and moro reflex is present.
Treatment:

- Strapping the arm to the chest is the treatment in upper limb fractures.

- Satisfactory results are achieved by splinting in lower limb fractures.

N.B. Dislocation and epiphyseal separations rarely occur.
In the newborn baby, difficulty with breathing may result from pulmonary or central nervous system dysfunction and congenital heart disease.

In distress due to pulmonary lesions, there is a rapid respiratory rate, with an expiratory grunt, intercostal recession and sternal retraction.
On the contrary, when distress is caused by disorder of the CNS, slow grasping respirations, apnea and periodical breathing are the presenting features.
Pulmonary causes

Aspiration during delivery:

- Infants who become anoxic during delivery start respiratory movements before proper cleaning of the mouth and pharynx from amniotic fluid.

- This is common in breech presentation and in immature infants. Respiratory difficulty occurs immediately after birth.

- Aspiration may result in bronchial obstruction with secondary collapse and subsequent infection.
Respiratory distress syndrome
(Hyaline membrane disease)

- Pulmonary surfactant, a substance normally present in the alveolar walls, has the property of lowering the surface tension and enables easy and uniform inflation of all alveoli in inspiration and prevents their collapse during expiration.
Post-partum examination frequently shows the presence of amorphous acidophilic material lining the terminal bronchioles and alveoli.

This condition is commonly seen in premature infants, in off-springs of diabetic mothers and in babies delivered by cesarean section.
There is an increasing respiratory distress 2-12 hours after birth.

After the third day, the baby either recovers completely or dies. X-Ray shows a reticular pattern in some cases or generalized loss of translucency (ground-glass appearance of lungs) due to microatelectasis.
Hyaline membrane disease

www.pathology.washington.edu/.../pediatric/
Ground-glass Appearance

www.biomedcentral.com/X/5/36/figure/F
Management:

- Keep clear air way by frequent suction.
- Administration of oxygen.
- Preservation of body temperature.
- Proper feeding with the use of the feeding tube when necessary.
- Administration of antibiotics to prevent secondary infection.
- Assisted ventilation may be needed in some cases.
**Pneumonia:**

- It is an inflammation of the lungs caused by an infection.

  - **Ante-natal or intra-uterine infection:** Rupture of the membranes for longer than 48 hours may be followed by ascending genital tract infection in the mother.

  - Inhalation of the infected liquid by the infant may cause pneumonia before birth.

  - **Post-natal:** infection or aspiration of milk
Pneumonia

[Image of a comparison between normal alveoli and those affected by pneumonia]

**Atelectasis:**

- The lungs may fail to expand after birth (primary atelectasis).

- Collapse of a part of the lung which has expanded passively is called secondary atelectasis.
Atelectasis

www.nbc11.com/2006/0209/6867661.jpg
**Pneumothorax:**

- This disease often follows vigorous resuscitative measure of an asphyxiated baby or as a result of spontaneous efforts of such an infant.

- Chest X-ray confirms diagnosis.

- Other rare causes as diaphragmatic hernia.
Central nervous system causes

Depression of the CNS with the resultant respiratory difficulty may result from:

- **Drugs:** Maternal sedation and anesthesia shortly before delivery may cause apnea in the newborn.
- **Cerebral birth trauma** which may be due to anoxia, edema or hemorrhage.
- **Apnea of prematurity.**
- **Congenital anomalies of the brain.**
(7) Congenital heart diseases

- They may be present in the neonatal period with an increased respiratory rate.

- The diagnosis should be strongly suspected in an infant with a cardiac murmur or when cyanosis is not relieved immediately by 100% oxygen.

- The commonest cardiac anomalies, manifesting with heart failure, are transposition of the great vessels and anomalies of the pulmonary system.
(8) Acute onset of severe anemia

- This condition causes a raised respiratory rate.

- A strikingly pale dyspnea infant at birth demands hemoglobin estimation, which if is low, immediate blood transfusion is required to prevent death.
Anemias present in the neonatal period:

a. Hemorrhagic: Traumatic or due to hemorrhagic disease of the newborn (hypoprothrombin anemia).

b. Hemolytic: RH or ABO incompatibility and enzymatic deficiency.
THANK YOU