PREPLADDER

NEET-SS

PEDIA

VOLUME -3

INDAEX

1 FETAL ASSESSMENT

What all needs to be assessed?

- Fetal gestational age
- Prenatal diagnosis- Neural tube defects, Aneuploidies
- Fetal growth and maturity
- Fetal well being

Gestational Age Assessment 00:03:15

- **Clinical estimations:** Based upon the last menstrual period (LMP).
  - Expected date of delivery (EOD)- Add 280 days to the first day of LMP.

Important Information

- If pregnancy is via ART, then EDD- Add 266 days to conception date.

- **Ultrasound**
  - Most accurate for GA estimation.
  - First trimester USG is more accurate and superior to the later age USGs.
  - 1st trimester- Crown-rump length estimation is superior.
    → When gestational age is calculated from this method, the accuracy is within 5-7 days of the actual gestational age.
  - 2nd trimester- BPD, HC, AC, FL if done later are more accurate.
    → When gestational age is calculated from this method, the accuracy is within 10-14 days of the actual gestational age.
  - 3rd trimester- BPD, HC, AC, FL
    → The accuracy of gestational age is within 21-30 days of actual gestational age.

Timing when USG is done	Accuracy Range (compare to true GA)
< 8 weeks GA	Within 5 days
9-15 weeks GA	Within 7 days
16-21 weeks GA	Within 10 days
22-27 weeks GA	Within 14 days
≥ 28 weeks GA	Within 21 days

Prenatal Diagnosis of Fetal Diseases 00:09:52

- Investigations can be divided into two parts:
  - Screening: Non-invasive
    → Example- MSAFP (Maternal Serum Alpha-fetoprotein)
  - Diagnostic: Invasive
    → Example- CVS (Chorionic Villus Sampling)

Screening for open Neural tube defects (NTDs): 00:10:55

- Done via
  - USG - Operator dependent.
  - MSAFP (Maternal Serum Alpha Fetoprotein).
    → Time to check for neural tube defects– 15-22 weeks of gestation.
    → Interpretation of MSAFP–
    - Significant elevation- elevated >2.5 MOM (Multiples of the Median) for gestational age
    - MSAFP is significantly elevated in 95% cases of Anencephaly and elevated in 70-85% cases of Open NTDs. (Neural tube defects).

    → Closed NTDs like Spina bifida occulta- elevation might not be significant and can miss many of the non-open NTDs
    → False elevation in MSAFP:
    - It means there are no NTDs, but we're findings of MSAFP to be >2.5 MOM (significantly elevated).
    - The commonest reason for this is the wrong gestational age assessment.
    - Suspecting false elevation in MSAFP- USG is done followed by gestational age assessment and look for the other signs of NTDs (Lemon sign, Banana sign).

Screening for aneuploidies

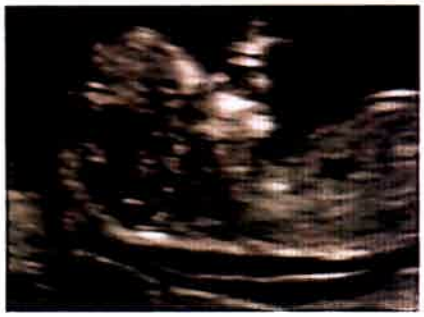
- **1st Trimester**, there are four ways
  - **Maternal age**
    → Increased risk of aneuploidies (especially trisomy 21) is found to be associated with increased maternal age.
    → It is not very accurate. It is not done as a standalone investigation.
  - **Ultrasonography:**
    → Particular marker checked is – nuchal translucency/ NT (at the back of the neck of the fetus, check for thickness of the nuchal fold).
    → Presence of edema in the nuchal fold or nuchal translucency is a significant marker.
    → **Conditions with increased NT**
    - Aneuploidies (70-80 % detection rate)
    - Congenital Heart Diseases
    - Congenital Diaphragmatic Hernia
    - Fetal infections
    - Exophthalmos

- **β-HCG level:**
  - → Elevated in Trisomy-21
  - → Decreased in Trisomy-18, 13
- **PAPP-A (Pregnancy Associated Plasma Protein-A):**
  - → Decreased in all the trisomies.

According to NNF (National neonatology forum)

	Beta-HCG (MoM)	PAPP-A (MoM)
Normal Karyotype	1.0	1.0
Trisomy 21	2.0	0.5
Trisomy 18	0.2	0.2
Trisomy 13	0.5	0.3

- Measuring Nuchal Translucency:



  - → Ideal time to check for nuchal translucency - 11 weeks 0 days to 13 weeks 6 days.
  - → CRL (Crown-rump length), when performed, should be 45-84 mm.
  - → Interpretation of NT becomes difficult, 2nd trimester onwards.

Important Information

What is the combined test?

Ans.

- The Combined test is a first-trimester screening test.
- Check for 3 things: NT on USG, β-HCG level, PAPP-A level.
- In Trisomy-21, NT and β-HCG levels are elevated but PAPP-A level is decreased.
- Combined test has about 80 % accuracy or pick-up rate for trisomy-21.

- **Other first trimester screening procedures for aneuploidies:**
  - → USG Markers: Absent nasal bone (seen in about 60% cases of Trisomy-21, 50% cases of Trisomy-18, 40% cases of Trisomy-13).
  - → Absent nasal bone is seen in 1-2% cases in normal pregnancy.
  - → Doppler showing reversal of A-wave flow in ductus venosus.
  - → Doppler showing tricuspid regurgitation at 11-13 weeks (55% positivity for Trisomy-21, 30% cases of Trisomy-18, 30% cases of Trisomy-13)

- **2nd Trimester Screening:** 00:23:44
  - **Triple Test:**
    - → Combination of 3 tests
      - MSAFP
      - β-HCG level
      - Unconjugated Estriol (Ue_3)
    - → Used to check for Trisomy-21.
      - MSAFP levels are decreased
      - β-HCG levels are increased
      - Unconjugated Estriol (UE_3) levels are decreased.
  - **Quadruple Test:**
    - → Done between 15-22 weeks, but it is best done between 16-18 weeks.
    - → Triple Test + Inhibin-A levels (increased in Trisomy-21).
    - → More frequently done test.
  - **Integrated Test:**
    - → 1st trimester Combined test (minus β-HCG) + second-trimester Quadruple test.
    - → Ideally the β-HCG test is done only once.

What Is Sequential Screening? 00:27:51

Sequential screening is of two types:

- **Stepwise:**
  - First-trimester-Check for NT and PAPP-A levels.
  - Risk assessment.
    - → Positive (high risk)
    - → Negative (medium to low risk).
  - For High risk → Do invasive test.
  - Medium-low risk → All children pregnancies will undergo the 2nd trimester Quadruple test (non-invasive test).
  - 95% sensitivity in picking up aneuploidies.
- **Contingent:**
  - 1st trimester-Check for NT and PAPP-A levels.
  - Risk assessment.
    - → Positive (high risk)
    - → Negative (medium to low risk).
  - High risk → invasive test.
  - Medium risk → Quadruple testing needs to be done.
  - Low risk → No further testing needs to be done.
  - 93% sensitivity in picking up aneuploidies.

Non-Invasive Prenatal Testing (NIPT) 00:32:53

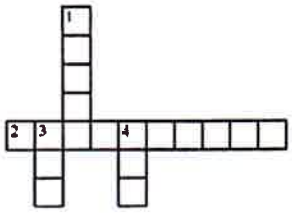
- It is also called as cell free fetal DNA estimation.
- A non-invasive screening test (not diagnostic as per Cloherty, can be diagnostic as per Nelson)
- Done via analysis of cell-free fetal DNA (cfDNA) in maternal blood, using next-generation DNA sequencing.
- Performed in:
  - >10-week GA, especially in women >35-year
  - History of aneuploid fetus
  - A positive or intermediate risk 1st trimester test
  - Carriers of balance translocation.
- If positive/high risk– perform invasive testing for confirmation.
- Very high detection rate for
  - Trisomy 21 (>99% sensitivity and specificity)
  - Trisomy 18 (sensitivity 97.4% and specificity 99.8%)
  - Trisomy 13 (sensitivity 91%, specificity 99.6%)
- False-positive rate of 0.1-0.2%.
- Can also reliably detect microdeletion syndromes (Williams, DiGeorge syndromes, etc.)
- Can miss mosaics.

Detection Rates – As Per NNF & Nelson

Screening Method	Gestational Age	Detection Rate	Fals-Positive Rate
Maternal Age		30%	5%
NT Alone	11-13 weeks	77%	4.7%
Combined Test	11-13 weeks	85-90%	5%
Triple Test	15-22 weeks	69-70%	5%
Quadruple Test	15-22 weeks	80-85%	5%
Integrated Test	11-13 weeks, Then 15-22 weeks	85-95%	1.2%

CROSS WORD PUZZLES

Crossword Puzzle 1



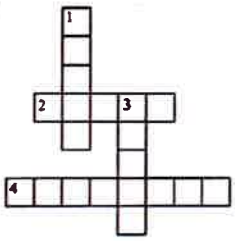
Across:

2. Most accurate test for gestational age assessment.

Down:

1. For ultrasound in the ____ trimester– the best parameter to check for is CRL.
3. Clinical Estimation in GA Assessment is based upon ___ (in abbreviated form).
4. If pregnancy via _____ (in abbreviated form), then EDD will be calculated by adding 260 days to conception date.

Crossword Puzzle 2



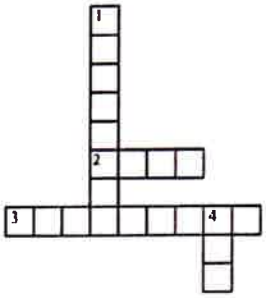
Across:

2. Example of non-invasive screening test for prenatal diagnosis of fetal diseases.
4. In prenatal diagnosis of fetal diseases, are diagnostic tests invasive or non-invasive?

Down:

1. Wrong gestational age assessment most commonly leads to _____ elevation of MSAFP.
3. _____ trimester ultrasound is always superior and more accurate.

Crossword Puzzle 3



Across:

2. ____ is a non-invasive screening test, done via Analysis of cell-free fetal DNA (cfDNA) in maternal blood, using next-generation DNA sequencing.
3. _____ test = Triple Test + Inhibin- A levels. It is a more commonly/ frequently done test.

Down:

1. _____ test is a first trimester screening test, in which we check for 3 things: NT on USG, beta-HCG level, PAPP- A level.
4. In case of ____ risk in contingent screening, no further testing needs to be done.

2 BIRTH INJURIES IN NEONATES

Birth Injuries 00:00:50

- Defined as "an impairment of the infant's body function or structure due to adverse influences that occurred at birth."
- Incidence: 1.7 to 1.9 per 1000 live births.
- All suspected neonates and those with risk factors will need a detailed neurological evaluation soon after birth.
- For most of these children, the long-term sequel will lead to neurological problems.

Risk Factors for Neonatal Birth Injuries 00:01:56

- Primiparity, small maternal stature, maternal obesity (BMI >40)
- Oligohydramnios
  - Due to maternal, fetal, or placental causes, it will increase the chances of birth injury.
  - Amniotic fluid is involved in the shock-absorbing mechanism, it also avoids fetal compression.
  - When there is oligohydramnios, there is a chance of fetal compression, and trivial injuries to the mother during pregnancy can be transferred to the baby.
- Maternal pelvic anomalies:
  - Cephalopelvic disproportion and a vaginal delivery is planned, there will be some injury to the child.
- Prolonged labor or unusually rapid labor
  - Maneuvers like the internal podalic version or the external cephalic version for malpresentations and malrotations, etc., can predisposes newborns to birth injuries.
- Fetal malpresentation

Important Information

Q: Which fetal malpresentation was associated with the highest risk of neonatal birth injury?

Ans:

- Breech birth has the highest risk of birth injuries for the newborn.
- Presence of a breach predisposes the child to getting stuck and using instrumentation, which itself can cause birth injuries.
- When it is present, obstetricians try a lot of maneuvers so that the breech presentation is turned into a vortex or a more favorable presentation is obtained.

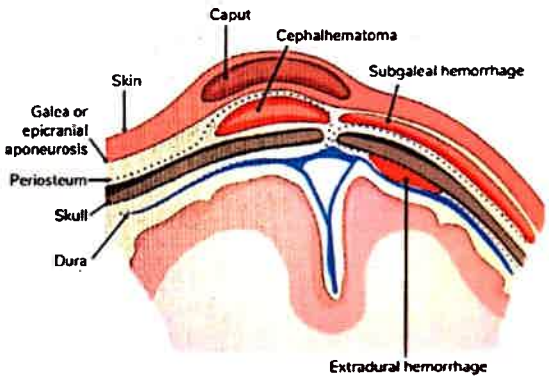
- Instrument use like forceps or ventouse
- Fetal anomalies, especially fetal hydrocephalus
- Macrocosmic fetuses, VLBW fetuses, or fetuses with extreme prematurity

Types of Birth Injuries 00:04:51

- Depending on the affected part of the body, birth injuries are divided into various parts.
  - Head and neck injuries:
    → Head and neck injuries are very common.
  - Nerve injuries:
    → Nerve injuries include peripheral nerve injuries as well as spinal cord injuries.
  - Bone injuries:
    → Bone injuries, especially fractured clavicle bones.
  - Intra-abdominal injuries
  - Soft tissue injuries

Extracranial Injuries 00:05:25

- Superficial aberrations or lacerations on the scalp.
  - They are very common in nature.
  - Increased chances of these aberrations or lacerations are seen on using instrument delivery.
  - Increased while using fetal scalp electrode placement.
  - For isolated superficial abrasions and lacerations on the scalp, then no therapy is indicated.
- Extracranial injuries that are associated with the visible swelling on the scalp/skull.
  - Caput succedaneum
  - Cephalohematoma
  - Subgaleal hemorrhage



Caput succedaneum:

- Caput succedaneum will occur in the soft tissue area, which is in the scalp region.
- The layers of the skull include skin and subcutaneous tissue.
- Below the skin, there is subcutaneous tissue in the scalp region. If there is swelling of soft tissue or fluid accumulation, it can be bloody or non bloody.
- Any swelling in the scalp region or soft tissue region is called Caput succedaneum.

Cephalohematoma

- A cephalohematoma is a type of subperiosteal swelling in the skull.
- The image shows the periosteum, and the dotted line indicates the periosteum lining. Below that periosteum, the accumulation of blood will occur.
- A cephalohematoma is a true subperiosteal swelling.

Subgaleal hemorrhage:

- The subgaleal hemorrhage occurs below the galea aponeurosis.
- When the fetus is born in the first few hours of its life, it may have swelling on the scalp, head, or skull, which can happen interchangeably.
- If there is swelling, it could be due to three possibilities:

1. Swelling in the soft tissue. This swelling in the soft tissue will be very superficial, crossing the suture lines, and it will be soft in nature. It is called caput succedaneum.
2. A second type of swelling can be present, which will be a localized swelling. It will not be a soft tissue swelling. It will be an accumulation of blood because it is in a localized space with a well-defined margin line. It will be a tense swelling.
   - The cephalohematoma will be a tense swelling, which will be due to true subperiosteal hampering.
   - There will be hemorrhage that will occur in the subperiosteal with a localized, swelling, well-defined margin.
   - It will not cross the suture line and the extravasated blood. If it is large, it can take a few weeks to disappear.
   - It can also cause neonatal jaundice and hyperbilirubinemia. It will cause cephalohematoma.
3. A third type of swelling can occur due to subgaleal hematoma.
   - Subgaleal space: Gallium aponeurosis is an aponeurosis into which the occipitofrontalis muscle is inserted.
   - Below that, there is a potential space; this space starts on both sides of the calvarium.
   - It starts from below the orbit, passes all the way in front of the ears, goes at the back of the skull, and reaches till the nape of the neck, and it is a continuous space.
   - If there is some bleeding happening in this space.
     → It mostly happens clinically with severe injury due to instrumentation like forceps or ventouse application, or it occurs in children who already have an inherited severe coagulation disorder.
   - But if bleeding occurs there, it is a large space, and no splinting action of surrounding structures will be there, so the child will continue to bleed.
   - There will be visible swelling on the affected side of the head. This will be a fluctuant swelling and the amount of blood will be disproportionately more compared to the size of the swelling.
   - And these children will rapidly go into shock, consumption coagulopathy, and they will require a blood transfusion as well.

Important Information

Q. Which is the most benign to life-threatening swelling?
Ans. Caput succedaneum is the most benign, followed by cephalohematoma and subgaleal hematoma, which can be life-threatening in many patients.

Caput Succedaneum

- **Frequency**- Most common visible skull swelling and often mild

- **Site:**
  - It is a superficial, subcutaneous soft tissue swelling in the scalp, and it lies extra periosteum.

- **Features of swelling:**
  - Soft in nature and consistent.
  - Diffuse swelling.
  - Poorly defined margins
  - Crosses the suture lines.
  - Maximum size at birth and then reduces in size.
- If there is true bleeding, then there is increase in the size of the swelling or edema.
- It is likely to be a soft tissue swelling, not a bleeding-related swelling.
- Associations with caput succedaneum
  - Molding and overriding of the skull bones (especially parietal bones)
  - Vertex presentation in Primigravida mother.

- **Complications**
  - Complications are rare.
  - Skull fractures because it is a superficial swelling.
  - Overlying skin may be ecchymotic.
  - Risk of hyperbilirubinemia is rare (unless there are extensive ecchymoses)
- Sometimes there can be a risk of scalp necrosis and scarring. It is a rare complication associated with caput succedaneum.

- **Treatment:**
  - Treatment is not needed for caput succedaneum.
  - Without any therapy, it will resolve itself within 48-72 hours.

Cephalohematoma

- **Frequency**- Less common than caput succedaneum but more common than subgaleal hemorrhage.
  - Comprises about 1-2% of all live births.

- Risk is increased in the case of instrument delivery.
- Forceps and ventouse can cause injury and produce bleeding in the subperiosteal region.

- **Site**
  - Develops in the subperiosteal region due to damage to the superficial veins of the scalp.
  - Common in the parietal bone, but it will be asymmetric

- **Features of swelling:**
  - Localized swelling
  - Consistency - firm, tense swelling.
  - Well-defined margins.
  - Continue to increase in size after birth, reach a maximum size at 12–24 hours, and then decrease in size.
  - Does not cross the suture line.

- **Associations:**
  - According to Nelson, 10–25% of the patients are associated with a linear skull fracture.
  - Large cephalohematoma has a lot of extravasated blood.
    → The extravasated blood can lead to more bilirubin and aggravate neonatal jaundice in the patients.

- **Complications:**
  - Rarely associated with the infection
  - Sometimes shock can also occur if there is large swelling.
  - But infection and shock are usually rare in term neonates but it can present in preterm or predisposed individual.
  - Cephalohematomas can calcify and persist for many months, and can later lead to widening of the diploic spaces.
  - Long-term complications, or sequelae, are seen in cephalohematoma swelling.

- **Treatment:**
  - Treatment is not indicated.
  - Resolution time is different in different parts.
    → Resolve or disappear in 2 weeks to 3 months, according to Nelson.
    → According to Cloherty, they will resolve in less than 8 weeks.
    → Indian textbooks mentioned that it would disappear in 3–6 weeks.
  - According to Cloherty, aspiration of cephalohematoma as well as incision and drainage are absolutely contraindicated and can increase the chances of scarring and infection.
  - Blood transfusions will be given if there are any complications or shock, for neonatal jaundice, phototherapy exchange transfusion should be given.

Subgaleal Hemorrhage 00:28:05

- **Frequency**- Rare.
- **Risk factors**
  - Instrument delivery, especially vacuum delivery
  - Inherited coagulopathy
  - Hemophilia

- **Site:**
  - Subgaleal space.
  - Subgaleal space is a large space below the galeal aponeurosis, which extends from the orbit to the ears to the nape of the neck.
    → The galea aponeurosis is the site where the occipitalis frontalis bone is inserted.

- **Features of the swelling:**
  - Fluctuant swelling or mass, is present near these suture lines or near the anterior fontanel.
  - This fluctuating swelling is also associated with pallor and hypotonia in patients.
  - This swelling can continues to increase as time passes.
  - In significant subgaleal hemorrhage, there can be associated periorbital swelling, anterior displacement of pinna and ecchymosis present on the scalp overlying the swelling.

- **Complications:**
  - Severe neonatal jaundice
  - Hypovolemic shock
  - Coagulopathy, which can be life-threatening as well.
  - The mortality rate is between 12 and 14%.

- **Treatment:**
  - Mostly conservative therapy is followed.
  - Most of them resolve in 2 to 3 weeks.
  - Need close monitoring for vitals, total serum bilirubin (TSB), and coagulation profile markers, and these need to be aggressively managed.
  - Shock and neonatal jaundice need to be aggressively managed.
  - If the coagulation profile is severely deranged.
    → Fresh frozen plasma transfusion is done
    → Vitamin K may need to be given in addition.
  - Chances of mortality are significantly higher.
  - In all three types of swelling, incision and drainage is not done in most of these patients.
    → If it continues for a long time, in about 1 to 5% of cases, they may require surgery
    → If it is a large swelling that is not resolved with conservative measures. Sometimes exploration and a surgical opinion may be needed.

One-Liners and Additional Points 00:33:47

- If caput succedaneum increases in size more than 24 hours or does not disappear by 72 hours and is associated with neurologic deficit or hemodynamic instability, one differential to consider is encephalocele according to NNF protocols.
- Cephalohematoma is usually unilateral but can be bilateral in some cases.
- Palpable modules due to calcified cephalohematomas can persist until 3–4 months of age.
- Source of bleeding in subgaleal space is emissary veins.
- The bleeding comes from the emissary veins; these veins join the superficial scalp veins as well as the internal deep-seated dural veins of the CNS.
- For every 1 cm increase in OFC due to subgaleal bleeding, there is a corresponding blood loss of 40 ml
- The maximum capacity of subgaleal spaces is 260 ml.
- Subgaleal space can accommodate up to 40% of total blood volume (According to NNF clinical protocols in perinatology).

Skull Fractures 00:37:16

- **Risk factors:**
  - CPD, i.e., cephalopelvic disproportion.
  - Instrument deliveries, especially forceps and ventouse.
  - Inadvertent fall from bed or from the cot of the child and the head hits the hard surface,

- **Types of skull fractures**
  - Linear skull fracture
    - → Most common type.
    - → A linear skull fracture will be a linear line.
    - → Most commonly, they will involve the parietal bone.
    - → In more than 95% of cases, they are found to be asymptomatic.
    - → They can be seen on a plain X-ray.
    - → If they are asymptomatic, no therapy would be indicated.
    - → Many of the linear skull fractures can be associated with the tear in the dural membrane, which can lead to hemorrhage of the CSF, meninges, and brain and lead to leptomeningeal cysts.
    - → They need follow-up because there is a risk of leptomeningeal cyst formation.
  - Depressed skull fractures.

Depressed Skull Fractures 00:40:07

- Can involve the parietal bone as well as the frontal bone.
- Produces a "ping-pong ball" indentation.
- Mostly asymptomatic. But if the indentation is more than 1 cm, it is strongly associated with intracranial injury or hemorrhage having CNS symptoms.
- Most depressed skull fractures need therapy only if:
  - There is raised intracranial pressure
  - A CT scan shows the development of CSF in the subgaleal space or
  - If the depressed skull fracture depression is more than one centimeter or
  - If there is suspected CNS bleeding
- Otherwise, if they are asymptomatic for the depressed skull fracture, no therapy is indicated.
- Just like a linear skull fracture, a depressed skull fracture also needs follow-up between 8 and 12 weeks to watch for any leptomeningeal cyst formation.

Occipital Osteodiastasis 00:43:09

- Rare but a lethal complication seen in breech deliveries
- Refers to the separation of the basal or lateral part from squamous part of the occipital bone.
- It causes contusion to the cerebellum, damage to the vessels and serious intracranial haemorrhage.

MCQ 00:44:59

Q.1. What is the strongest risk factor for skull fractures (especially depressed skull fracture)?

Ans. Forceps delivery followed by fetal compression.

Q.2. What are the indications for doing CT or MRI in skull fractures?

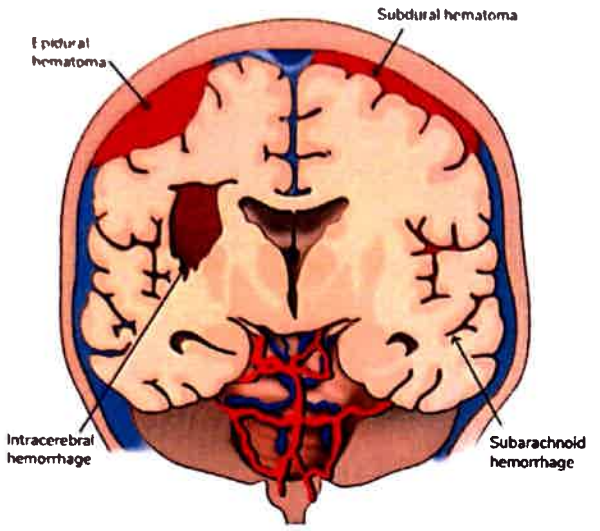
Ans. The indications include:

- Symptoms of intracranial hemorrhage or compression, then a CT or MRI should be done.
- Serious skull fracture,
  - For example, if there is a suspected depressed skull fracture of more than 1 centimeter, confirmation will only happen on a CT scan.
- Thirdly, if the patient has an underlying suspected coagulation disorder, there is a possibility that the skull fracture is small. Still, the underlying hemorrhage is significant.

Traumatic Intracranial Hemorrhage 00:46:42

- In traumatic childbirth, the most common type of intracranial hemorrahge is a subdural hematoma or subdural hemorrhage in case of term babies
- In preterm babies- Intraventricular/ Intracerebral haemorrahge

- Types:
  - Subdural hemorrhage - Most common
  - Extradural hemorrhage - Rare
  - Subarachnoid hemorrhage - Rare



- **When to suspect traumatic intracranial haemorrhage in the neonate?**
  - **Acute deterioration:** If the child shows acute deterioration in the first 72 hours. Acute deteriorations includes irritability, altered sensorium, bradycardia, absent doll eye movements, hypotonia, or posturing, abnormal respiration, and acute deterioration on the ventilator.
  - Seizures
  - Apnea.
  - Bulging fontanelles with loss of pulsatility.
  - Bloody CSF tap (SAH or IVH).

- **Risk factors**
  - CPD
  - Prolonged labor
  - Breech presentation
  - Precipitous delivery
  - Use of instruments

Subdural Hemorrhage (SDH)

- Most common type of intracranial haemorrhage in term neonates- SDH
- Most common type of intracranial haemorrhage in preterm newborns- IVH.
- Most common site of SDH in neonates- posterior fossa (Infratentorial SDH).
  - The source of the bleeding is from tears of tentorium cerebelli.
  - Venous source mostly arises from the bridging veins (Veins connecting dural space with subarachnoid space).
  - Sometimes bleeding can happen from large sinuses e.g., straight sinus, inferior petrosal sinus, Vein of Galen (life threatening).

- **Subtypes of SDH based on severity and location:**
  - **Parturitional SDH**
    → Very common, asymptomatic, and are always multiple in nature.
    → Can occur during normal delivery and can happen even in the absence of any risk factors.
    → Mostly occur in the posterior fossa.
    → No therapy is needed.
  - **Supratentorial SDH**
    → Arises from bridging veins along the cerebral convexities.
    → If small then it is asymptomatic and large can cause seizures.
  - **Infratentorial (Posterior fossa SDH)**
    → Tears occur most commonly in tentorium cerebelli, sometimes in falx cerebelli.
    → If large, they can cause an increase in intracranial pressure, shock, posturing, and death.
  - **Chronic SDH**
    → Bleeding occurs from small veins, but it is intermittent slow bleeding.
    → Initially asymptomatic, as fluid increases chronically, this fluid accumulation starts producing pressure symptoms and hence macrocephaly will be produced.
    → The child will develop bossing, bulging, anaemia, and sometimes seizures.

- Cloherty says in most large SDH, a small co-existing SAH will be found.

- **Investigation**
  - USG cranium is not adequate for SDH.
  - Lumbar puncture for CSF is avoided till the child is hemodynamically stable or there is suspected posterior fossa SDH.
  - The initial investigation is a CT scan brain (Plain CT/NCCT).
  - MRI brain is the most sensitive investigation.

- **Treatment of SDH**
  - If SDH is asymptomatic, no therapy is needed.
  - In symptomatic SDH manage the symptoms, put the child on IV fluids, and give blood transfusion if low PCV is there, neurosurgery consultation is needed.
  - All SDH patients are watched for hydrocephalus.
  - Most SDH resolve by 4 weeks of age, if found more than 4 weeks or fresh SDH is there then rule out child abuse.

Epidural Hemorrhage (EDH)

- Rare in neonates because of tight adherence between the skull and dura in neonates (especially at sutures).
- The source is an arterial source and often it arises from the middle meningeal artery.
  - It is common if forceps is applied or with coagulopathy.
- More than fifty per cent of cases are associated with cephalohematoma and skull fracture..

- **Treatment:**
  - If it is asymptomatic and the size is <1 cm then no therapy is needed.
  - If it is symptomatic or the size is > 1 cm or increasing size is there, surgery may be needed.

Subarachnoid Hemorrhage (SAH)

- It is rare in neonates
- Source of bleeding is venous (bridging veins) in neonates.
- In adults, there is an arterial source of SAH.
- Rarely if arterial SAH is found in neonates, it will occur from the penetrating leptomeningeal arteries.
- Mostly SAH is asymptomatic, sometimes seizures occur on day 2, day 3 or day 4 of life.
- Lumbar puncture - Bloody tap.
- Most sensitive investigation is the MRI brain.
- Treatment in most cases is conservative and follow up is done in all these patients for hydrocephalus.
- Subpial hematoma is a rare subtype of SAH in term neonates.

Facial and Mandibular Fractures 01:13:18

- In facial trauma three fractures are common, i.e., fracture involving maxilla, mandible, and lacrimal.
- These fractures will be more common in instrument use, particularly in face presentation.

- **Features of fractures:**
  - Facial asymmetry, there will be swelling on one side of the face
  - Oedema
  - Ecchymoses
  - Crepitus
  - Difficulty in feeding
  - Respiratory distress

- **Intervention:** X-ray is needed
- If prompt therapy is given and, they usually has a good prognosis. In prompt therapy, surgical intervention is needed.
- If there is delayed intervention, then there would be permanent asymmetry or many of them can develop progressive respiratory distress.
- If surgery is needed, do it in the first week itself.
- Maxilla, lacrimal shows evidence of healing in 7 to 10 days. The mandible starts healing within 10 to 14 days. So, plan surgery within one week of the injury.

Nasal Injuries 01:17:43

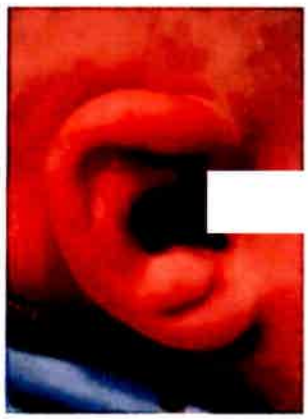
- Most common nasal injury is nasal cartilage dislocation.
- If it is mild, it can be asymptomatic, and if it is severe, it can cause respiratory distress.
- Plan surgery immediately.
- **Misshapen nose v/s dislocation**
  - Compress the nasal tip, in case there is no nasal deviation- it is misshapen nose. If there is a nasal deviation which increases, and/or there is collapse of the external nares then the child is having dislocation.
  - Child with dislocation requires early surgery.

Ocular Injuries 01:20:30

- Two types of ocular injuries are common, i.e.,
  - Subconjunctival haemorrhage
  - Retinal haemorrhage.
- Cause of ocular injury is an increase in intrathoracic pressure during normal vaginal delivery and/or venous congestion.
- In most cases, no therapy is needed, and they resolve within 2 weeks.
- Retinal haemorrhage resolves in 1 to 5 days whereas subconjunctival haemorrhage tends to resolve in 7 to 14 days.
- If subconjunctival hemorrhage is isolated, nothing needs to be done but if it part of bleeding from other sites also then it can indicate platelet or coagulation disorder.

Ear Injuries 01:24:18

- They are particularly seen in forceps delivery.
- If there are abrasions, they heal spontaneously and no therapy is needed.
- If there are hematomas found in the pinna, they can organize, and can lead to anomalies known as cauliflower ears, drain them fast to prevent it.



- Laceration of pinna can lead to perichondritis as a complication (10% cases).
- **Treatment:** ENT consultation along with surgery is needed, start treatment with antibiotics.

Sternocleidomastoid Injury 01:25:49

- Produces a state called congenital/muscular torticollis. Also called Congenital Wry neck.
- **Mechanism of injury:**
  - Faulty intrauterine positioning causes fetal compression and the child develops compartment syndrome involving the sternocleidomastoid muscle.
  - Sometimes it also occurs due to stretching of the sternocleidomastoid muscle during childbirth. That will lead to rupture and hematoma formation.
- **Clinical features:**
  - Some children may show it in the first 48 hours or the usual time is 1 to 4 weeks.
  - Children are present with a palpable mass (1-2 cm) in the sternocleidomastoid muscle on one side.
  - There will be a head tilt to the same side, some children can have facial asymmetry as well (hemihypoplasia of face on I/L side).

- **Treatment:**
  - Conservative management, physiotherapy (stretching of the affected muscle).
  - 80% of children will recover in 3 to 4 months.
  - If it persists for more than six months then surgery is recommended.
  - 10% of cases of SCM injuries also have developmental dysplasia of the hip joint.

Pharyngeal Injury 01:31:24

- Mild submucosal injury which may not require any therapy, occurs due to suctioning.
- Serious pharyngeal injury,
  - Can be in the form of perforation of the pharynx into either the mediastinum or pleura.
  - It will occur due to nasogastric tube insertion or endotracheal tube placement.
  - These patients develop copious oral secretion and difficulty in swallowing.
  - These patients require surgery.
- Sometimes, children can have retropharyngeal tears. First, do a water-soluble contrast study. After confirmation, take a surgical opinion. Along with that, start IV antibiotics plus stop oral feeds for about two weeks.

3 WHO RECOMMENDATIONS FOR CARE OF THE PRETERM OR LBW INFANTS

- Recommendations have been updated in the year 2022, containing 25 recommendations (11 new, 14 updated) and 1 good practice statement (data is lacking but the benefit is high).
- 11 are strong recommendations and 14 are conditional. Strong recommendations apply to all preterm or LBW cases. Conditional recommendations apply to selected preterm and low birth weight.
- These all pertain to the care of preterm and low birth weight neonates.
- Cover three domains: Preventive and promotive care, care for complications and family involvement & support.

A. Preventive and Promotive Care 00:03:15

A1. Related to Kangaroo Mother Care (KMC)

- KMC is recommended as routine care for all preterm or low birth weight infants.
- Should be initiated in the health care facility or at home and should be given for 8-24 hours per day (as many hours as possible).
- Strong recommendation,high -certainty evidence.

A1b : New recommendation

- KMC for preterm or LBW infants should be started as soon as possible after birth if there are no danger signs. It is a strong recommendation and high certainty evidence.

A2. Mother's Own Milk

- Mother's milk is recommended for feeding preterm or LBW infants, including very preterm (<1.5 kg) infants. It is a strong recommendation, low certainty evidence.

A3. Donor Human Milk

- When the mother's milk is not available, donor human milk may be considered for feeding preterm or LBW infants, including very preterm (<32 weeks gestation) or very LBW (<1.5 kg) infants. These are conditional recommendations and moderate certainty evidence.

A4. Multicomponent Fortification of Human Milk

- Multicomponent fortification of human milk is not routinely recommended for all preterm or LBW infants but may be considered for very preterm (<32 weeks gestation) or very LBW (<1.5 kg) infants who are fed mother's milk or donor human milk. It is a conditional recommendation with low to moderate certainty evidence.

A5. Preterm Formula Milk

- When mother's milk and donor human milk are not available, the nutrient-enriched preterm formula may be considered for very preterm (<32 weeks gestation) or very low birth weight (<1.5 kg) infants. It's a conditional recommendation and low certainty evidence. There is a lack of data for children beyond 32 weeks.

A6. Early Initiation of Enteral Feeding

- Preterm and low birth weight infants, including very preterm (<32 weeks gestation) and very LBW (<1.5 kg) infants, should be fed as early as possible from the first day after birth.
- Infants who can breastfeed should start breastfeeding as soon as possible. Infants who are unable to breastfeed should be given EBM. If the mother's milk is not available, donor milk should be given.
- These are strong recommendations and moderate certainty evidence.

A7. Responsive and Scheduled Feeding

- In healthcare facilities, scheduled feeding (every 2-3 hourly) may be considered rather than responsive feeding for preterm infants who are born before 34 weeks gestation, until the infant is discharged. It is a conditional recommendation and low certainty evidence >32 weeks - paucity of data..

A8. Fast and Slow Advancement of Feeding

- Fast advancement of feeding if increasing the feed daily by 30 to 40 ml/kg/day. Slow advancement of feeding if increasing the feed daily by 15 to 25 ml/kg /day.
- In preterm newborns or LBW infants, including very preterm (<32 weeks gestation) or very LBW (1.5 kg) infants, who need an alternative feeding method to breastfeed (e.g. gastric tube feeding or cup feeding), feed volumes can be increased by up to 30 ml/kg per day.
- Conditional recommendation and moderate -certainty evidence .

A.9 Duration of Exclusive Breastfeeding

- Preterm or low birth weight infants should be exclusively breastfed until 6 months of age. It is a strong recommendation and very low certainty evidence.

A10a. Iron Supplementation

- Enteral iron supplementation is recommended for human milk-fed preterm or low birth-weight infants who are not receiving iron from another source. The recommended dose is 2 to 3 mg/kg/day of elemental iron. It's a strong recommendation and moderate certainty evidence .

A10b. Zinc Supplementation

- Enteral zinc supplementation may be considered for human milk-fed preterm or low birth weight infants who are not receiving zinc from another source. The recommended dose is 1-3 mg/kg/d. It is a conditional recommendation and low certainty evidence.

A10c. Vitamin D Supplementation

- Enteral vitamin D supplementation may be considered for human milk-fed preterm or low birth weight infants who are not receiving vitamin D from another source. The recommended dose is 400-800 IU/day. It is also a conditional recommendation and low certainty evidence.

A10d. Vitamin A Supplementation

- Enteral vitamin A supplementation may be considered for human milk-fed very preterm (<32 weeks gestation) or very low birth weight (<1.5 kg) infants who are not receiving vitamin A from another source. The recommended dose is 1000-5000 IU/day. It is a conditional recommendation and low certainty evidence.

A11. Probiotics

- Probiotics may be considered for human milk- fed very preterm infants (<32 weeks gestation). It is a conditional recommendation and moderate certainty evidence. There is no evidence for preterm babies or >= 32 weeks babies. This is a new recommendation.

A12. Emollients

- Application of topical oil to the body of preterm or LBW infants may be considered. It is a conditional recommendation and low certainty evidence.

B. Care for Complications 00:21:56

B1. CPAP for Respiratory Distress Syndrome

- Continuous positive airway pressure (CPAP) therapy is recommended in preterm infants with clinical signs of respiratory distress syndrome. It is a strong recommendation with moderate certainty evidence.

B2. CPAP Immediately after Birth

- Continuous positive airway pressure (CPAP) therapy may be considered immediately after birth for very preterm infants (<32 weeks gestation) with or without respiratory distress. It is a conditional recommendation and low certainty evidence. This is a new recommendation.

B3. CPAP Pressure Source (Bubble CPAP)

- For preterm infants who need continuous positive airway pressure (CPAP) therapy, bubble CPAP may be considered rather than another pressure source (e.g. ventilator CPAP). It is a conditional recommendation and low-certainty evidence.

B4. Methylxanthines for Treatment of APNEA

- Caffeine is recommended for the treatment of apnea in preterm infants.
- It is a strong recommendation and moderate certainty evidence

B5. Methylxanthines for Extubation

- Caffeine is recommended for extubation of preterm infants born before 34 weeks gestation.
- It's a strong recommendation and moderate certainty evidence.

B6. Methylxanthines for Prevention of APNEA

- Caffeine may be considered for the prevention of apnea in preterm infants born before 34 weeks gestation. It is a conditional recommendation with low-certainty evidence.

C. Family Involvement and Support 00:27:13

C1. Family Involvement

- Family involvement in the routine care of preterm or low birth weight infants in healthcare facilities is recommended. The level of evidence is low to moderate certainty and it's a strong recommendation.

C2. Family Support

- Families of preterm or LBW infants should be given extra support to care for their infants, starting in healthcare facilities from birth and continuing during follow-up post-discharge.
- The support may include education, counselling and discharge preparation from health workers and peer support.
- It is a conditional recommendation and very low certainty evidence.

C3. Home Visits

- Home visits by trained health workers are recommended to support families to care for their preterm or low birth weight infant.
- It's a strong recommendation and moderate certainty evidence.

C4. Parental Leave and Entitlements

- Parental leave and entitlements should address the special needs of mothers, fathers, and other primary caregivers of preterm or low birth weight infants.
- It's a good practice statement (evidence is minimal but benefits are high).

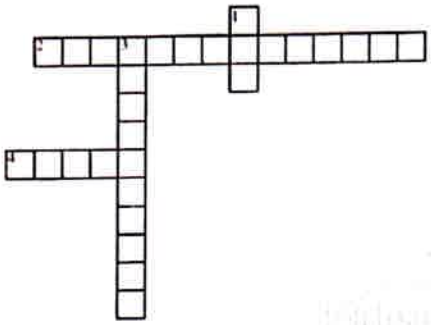
Plain Language Summary 00:30:10

- KMC as soon as possible in all preterm and LBW, duration is 8-24 hr.
- Mother's milk is best, followed by donor human milk, followed by preterm formula milk (in <32 weeks and VLBW neonates).

- Multicomponent fortification of human milk may be considered in less than 32 weeks and VLBW neonates.
- Scheduled feeding is better than responsive feeding in <34 weeks infants.
- Advancement of feeds at the rate of 30 ml/kg/day.
- EBF for 6 months of age.
- Enteral iron supplementation is strongly recommended, but enteral zinc and vit D may be considered.
- Enteral vit A is considered in <32 weeks and VLBW neonates on human milk.
- Probiotics may be considered for <32 weeks infants.
- Emollients may be considered in preterms and LBW neonates.
- CPAP is recommended for RDS and may be considered in < 32 weeks with or without distress. Bubble CPAP is preferred.
- Caffeine is recommended in extubation and treatment of apnea and may be considered in apnea prevention.

CROSS WORD PUZZLES

Crossword Puzzle 1



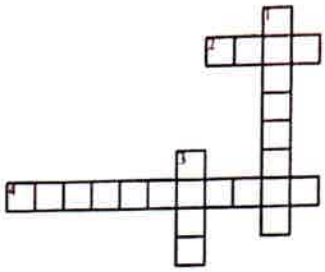
Across

2. _____fortification of human milk is not routinely recommended for all preterm or LBW infants.
4. _____advancement of feeding is there if you are increasing the feed daily by 30 to 40 ml/kg/day

Down

1. _____ is recommended as routine care for all preterm or low birth weight infants.
3. _____recommendations have been updated in WHO recommendations for care of the preterm or LBW infants in 2022.

Crossword Puzzle 2



Across

2. _____ therapy is recommended in preterm infants with clinical signs of respiratory distress syndrome.
4. _____supplementation may be considered for human milk-fed preterm or low birth weight infants who are not receiving zinc from another source.

Down

1. _____is recommended for the treatment of apnea in preterm infants
3. _____advancement of feeding may be there if you are increasing the feed daily by 15 to 25 ml/kg/day.

4 CONGENITAL & PERINATAL INFECTIONS PART-1

Vertically Transmitted Infections 00:01:25

- Infections transmitted from mother to child.
- **Classification**
  - Congenital- Transmitted in utero via placenta,
  - Peripartum- Transmitted during the child birth
  - Postnatal- Vastly transmitted via breast milk or close contact
- Congenital infection is the most significant route for the transmission of infection.
- Causative agents for the transmission of congenital infections- TORCH group of infections
  - Toxoplasma
  - Others (parvo B19, syphilis, HBV, HIV, zika virus)
  - Rubella
  - Cytomegalovirus
  - Herpes simplex virus.
- HSV is a perinatal infection.

General Principles 00:05:49

Congenital infections

- Infections may be mild/ asymptomatic in pregnant females but can have disastrous results in fetus/neonate.
- No role of routine TORCH serology testing since IgG antibodies in the mother may show past infections and can be passively transferred.
- A pathogen -specific fetal IgM indicates infection but has variable sensitivity and specificity (Higher specificity, moderate sensitivity)
- A negative fetal IgM does not rule out congenital infection
- Paired IgG titres in mother and baby are useful in Congenital syphilis.

Congenital CMV 00:08:50

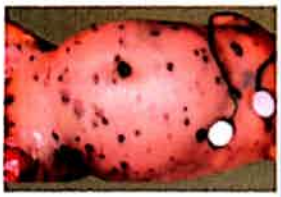
- Causative agent- Cytomegalovirus (CMV)- A dsDNA, an enveloped virus that belongs to the herpes family.
- Highly-species specific and affected cells appear large, with abundant cytoplasm and both intranuclear and cytoplasmic inclusions
- CMV is a virus that is present in all body secretions and is highly transmissible.
- Congenital CMV is overall most common congenital infection
- Congenital CMV is the most common non-hereditary, non-syndromic sensorineural hearing loss in infancy

Epidemiology 00:10:07

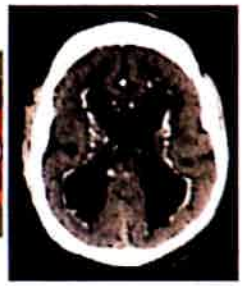
- Maternal infection with CMV during pregnancy
  - **Primary**- First time infection during pregnancy
    → The fetal infection rate is almost 30% in primary infections (Cloherty - 30-40%).
  - **Secondary**- Reactivation or reinfection during pregnancy.
    → Secondary infection is more common in Asia, Africa, and India.
    → The fetal infection rate is almost 1-2% in secondary infections.
- Congenital CMV is more common in HIV-exposed infants, and co-infection produces rapid progression of HIV infection.

Clinical Picture in Congenital CMV

- 90% of patients- Asymptomatic and 10% of patients- Symptomatic
- <5% of symptomatic patients- Multiorgan and before multiorgan severe disease
- The most common symptoms are petechiae and purpurae rash (57-59%)
- Other symptoms
  - Hepatosplenomegaly,
  - Jaundice (increased conjugated bilirubin level in about 50% of patients),
  - Pneumonitis
  - Prematurity (1/3rd of patients)
  - IUGR
  - Chorioretinitis (90% of patients)
  - Blueberry muffin spots (first described in rubella, but now more common in CMV)
  - Microcephaly (⅓ of patients)
- Blueberry muffin spots can be seen in rubella, CMV, toxoplasma, syphilis, etc.
- Blueberry muffin spots is a collection of haematopoietic cells in the dermal region (Indicates extramedullary haematopoiesis)
- Blood investigations:
  - Raised serum ALT level in 71% of patients
  - Low platelet count <100000/mm3
  - Raised serum bilirubin level, including direct fraction
- Neuroimaging findings



Blueberry muffin rash



Periventricular calcification

- The neuroimaging hallmark is bilateral periventricular calcification of the brain.
- Other neuroimaging features include lenticulo-striate vasculopathy with calcification.
- Dilatation of ventricles
- Brain atrophy
- Increased risk of migration disorders like Lissencephaly

Sequala in Congenital CMV

- **SNHL abnormality- Sensorineural hearing loss**
- Most common complication - In 60% of patients of symptomatic congenital CMV and 5% of patients with asymptomatic congenital CMV
- All suspected congenital CMV neonates should be subjected to a neonatal hearing test (Otoacoustic emission Test).
- It is done at the time of birth and then every 6 months until 2 years of age.

CNS abnormality

- Developmental delay and low IQ are present in 90% of patients with abnormal neuroimaging and 30% without abnormal neuroimaging.

Diagnosis of Congenital CMV

- **Serology**- Detection of IgM and IgG antibodies (obsolete)
  - IgM has low specificity and sensitivity
  - IgG is not very accurate for the diagnosis of congenital CMV because there can be transplacental transmission.

- **CMV-PCR test-**
  - IOC for diagnosing congenital CMV infection
  - A sample can be collected from saliva or urine.
  - Saliva is the preferred method of collection and confirmation through testing.
    → Easy to collect.
    → Have high sensitivity and specificity.

- **Isolation of the virus**
  - Spin enhanced or shell vial culture
  - Best sample is urine
  - Gold standard investigation
  - Results are obtained in 24-72 hours.

- **Blood for PP65 antigen assay**- To check for efficacy of therapy.
- **Supportive tests**- CBC test, liver function test in child, USG/MRI/CT, CSF analysis etc.
- Initially, USG is the neuroimaging test; it can detect periventricular calcification, and MRI/CT is the most preferable test for calcification.

Interpretation of the Results 00:12:04

- **Congenital CMV:** If CMV is detected in amniotic fluid or fetal blood/urine/saliva within 3 weeks of birth.
- **Peripartum/Postnatal CMV:** If initially negative, but becomes positive after 4 weeks of birth

Treatment

- No drugs are indicated in asymptomatic congenital CMV
- Symptomatic patients (CNS, hepatitis, pneumonitis, thrombocytopenia)
  - IV Ganciclovir is the DOC given for 6 weeks.
  - Ganciclovir produces bone marrow suppression, mostly neutropenia.
  - Patients may require subcutaneous injections of GM-CSF

- Alternative- Oral Valganciclovir for 6 months
  - Valganciclovir produces mild neutropenia
- Both Ganciclovir and Valganciclovir are renally excreted drugs. So, dose adjustment is to be done for renal insufficiency based on serum creatinine level.

Peripartum / Postnatal CMV 00:36:23

- Infection in neonates occurs via breastmilk or exposure in the maternal genital tract.
- The child will be negative in the first 3-4 weeks, but after that, the child will be positive.
- Usually asymptomatic in infants, it can produce Hepatosplenomegaly, anaemia, thrombocytopenia, and rarely pneumonia in preterm.
- SNHL screening should be done.
- The decision to treat is controversial.
- CMV infection in the mother is not a contraindication to breast milk.

Congenital Rubella 00:38:29

- **Causative agent:** Rubella
  - Single stranded RNA virus, and
  - Member of Togavirus family.
  - Also called German Measles virus or 3-day Measles virus.
  - It is human specific
- It produces a mild febrile illness, with rash in unimmunized pregnant females.
- Rash - non itchy, appears on trunks, spread to face , often associated with retroauricular sub occipital and anterior cervical lymphadenopathy.
- Highest transmission occurs if the mother is infected in the first trimester and highest risk of fetal infection is also in the 1st trimester.
- 90% risk of birth defects if the mother gets infected before 11 weeks. If it is between 11-12 weeks the chances are 33%, whereas 11% at 13-14 weeks, and about 24% if the mother gets infected between 15-16 weeks.
- So, the fetal teratogenicity and transmission is maximum at the first trimester.
- It spares the fetus if the maternal infection occurs beyond 16 weeks.

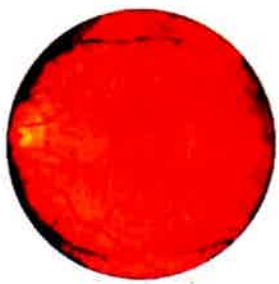
Terminology in Congenital Rubella 00:40:40

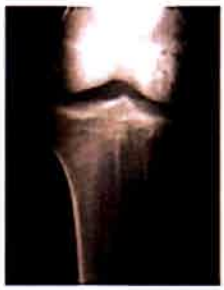
- **CRI vs CRS vs ERS**
- **CRI is Congenital Rubella Infection.**
  - CRI is a broad term that encompasses all aspects of fetal/neonatal infection.
  - It ranges from asymptomatic patients to teratogenicity to stillbirth and abortions.
- **CRS is Congenital Rubella Syndrome.**
  - CRS is a part of CRI.
  - It has specific features, like congenital heart disease, cataract or SNHL seen in patients.
- **ERS is Expanded Rubella Syndrome.**
  - ERS includes the clinical manifestations of Rubella along with delayed presentations. This will appear at more than 1 year of age.
  - It may later lead to defects like Type I diabetes, Thyroid defects, or Renal defects.

Clinical Picture in Congenital Rubella 00:44:14

Manifestation	Rate (%)
Deafness	67
Ocular	71
Cataracts	29
Retinopathy	39
Heart disease	48
Patient ductus arteriosus	78
Right pulmonary artery stenosis	70
Left pulmonary artery stenosis	56
Valvular pulmonic stenosis	40
Low birthweight	60
Psychomotor retardation	45
Neonatal purpura	23
Death	35

- As a group the most common manifestations are ocular manifestations in about 71% of patients.
  - Two types of ocular manifestations
    - → Salt and pepper retinopathy
      - More common than cataract
      - Associated with hypo and hyper pigmentation and usually does not cause vision impairment.
    - → Cataract
- The single most common manifestation is nerve deafness, seen in about 67% of patients.
- 48% patients have congenital heart disease, and it is
  - Most common- Patent Ductus Arteriosus
  - Second M/C- Pulmonary Artery Stenosis (Right is more common than Left).
  - Third M/C- Valvular pulmonic stenosis
  - Fourth M/C- Septal defects.
- Many patients of Rubella can have IUGR, microcephaly and about 10-20% patients can have meningoencephalitis.
- Congenital Rubella is also characterised by delayed presentations.
  - 20% of patients may develop Type I diabetes.
  - About 5% of patients will develop Thyroid disease.
  - Rarely renal disorders and long-standing visual changes may be present.





- Salt and pepper retinopathy (in 39%).
- Metaphyseal dark and light bands.
  - It is sometimes called the Celery stalk appearance of metaphysis in long bones.
  - It occurs in about 5-10% of Rubella infection.

Diagnosis of Congenital Rubella 00:52:05

- Evidence of maternal infection in pregnancy- Clinical picture in unimmunized female
- Fever in 1st trimester
- Non Itchy rash for 3-4 days.
- Associated lymphadenopathy.
- There will be +/- 4-fold rise in IgG titre.
- Evidence of fetal/neonatal infection.
- Rubella specific IgM in cord blood or neonatal blood- Highest detection rate if test is done within 3 months.
- Persistence of IgG titres in the neonate > 6 months are less sensitive.
- Rubella isolation is not very common in India.

Treatment of Congenital Rubella 00:53:17

- There is no therapy available for congenital Rubella.
- Only supportive treatment can be given.
- In case an unimmunized pregnant woman gets a confirmed Rubella infection in the 1st trimester, then medical termination of pregnancy can be considered.
- Because it can lead to major birth defects.