

HANDWRITTEN NOTES

DAMS

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PÆDIATRICS

CRISP, CONCISE, CONCEPTUAL

Integrated Edition

Studentfirst 
@DAMS



Published by Delhi Academy of Medical Sciences (P) Ltd.

HEAD OFFICE

Delhi Academy of Medical Sciences (P.) Ltd.

House No.: 3, Green Park,

New Delhi-110 016

Phone : 011-4009 4009, 9899664533

<http://www.damsdelhi.com>

Email: info@damsdelhi.com

ISBN : 978-93-89309-74-4

First Published 1999, Delhi Academy of Medical Sciences

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Typeset by Delhi Academy of Medical Sciences Pvt. Ltd., New Delhi (India).



HOW TO MAKE BEST USE OF NOTES?

A Message by Mentor Duo Specially for you,



- Read the notes thoroughly, they are absolutely concise, crisp & conceptual and hence it is best advised not to add a lot of extra information to them as that will dilute the quality.
- Images have been provided alongside to aid in better understanding and also help you solve image-based questions, these images have been specially picked by the faculty so have a high probability of being asked in exams.
- Notes are handwritten in a way to help make them easier to retain, a lot of tables, graphs and algorithms have been used to simplify the learning.
- While reading notes try and use the **CFAQ technique** —
 - A. Use the C to denote concept part in the notes and ensure you are clear with this part in the first go if not then it's advisable to listen to this part of the video from your course.
 - B. Use the F To denotes facts in your notes, it is okay if you can't remember them in first go but will need repeat reading. But these facts are important for exams as they could be integrated to clinical questions.
 - C. Use A to denote applied parts, this is how concepts and facts are asked indirectly in exams. This will also help you develop MCQ solving skill.
 - D. Use Q to denote areas where faculty has said it's a direct question or a PYQ or a potential question.
- This technique will help you summarize your notes In way that your second reading will become easy and faster.
- Active space has been provided with these notes to make your own annotations alongside and this will help you maintain one single notebook for one subject.
- Try and solve MCQs with every topic from DQB. Your goal should be to start with at least 30 MCQs every day and then increase to at least 50 MCQs every day. Also, when you do a topic wrong write it alongside the notes that this topic needs to be read again but mark only the specific area that you have done wrong not the whole topic.
- After the topic is covered then in the active space try and summarize the topic in the form of mind map. This will help in active recall and make your revision easier.

Best Wishes & Happy Learning!!!!



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1. Neonatology

NEONATOLOGY - BASIC TERMS

- **LOW BIRTH WEIGHT** - BIRTH WEIGHT is less than 2500 gms irrespective of period of gestation.
- **VERY LOW BIRTH WEIGHT** - Birth weight is < 1500 gms.
- **EXTREMELY LOW BIRTH WEIGHT** - Birth weight is < 1000 gms.
Dose of Vitamin K at birth in ELBW = $0.5 \text{ mg } 1/M$

Normal dose of Vitamin K at birth = $1 \text{ mg } 1/M$.

- **MACROSOMIA** - Birth weight $> 4 \text{ Kgs}$.
- **INTRAUTERINE GROWTH RESTRICTED (IUGR)**
 - Prenatal diagnosis (pathological)
 - 2 types

Symmetrical IUGR

Asymmetrical IUGR

- | | |
|-------------------------------------|-------------------|
| • Period of insult and presentation | Earlier gestation |
| • Antenatal Scan | |
| • Head circumference | decreased |
| • Abdominal circumference | decreased |
| • Cell number | Decreased |
| • Cell Size | Normal |
| • Etiology | |
| • Genetic disorders | |
| • Congenital infections | |
| • Teratogens | |
| • Metabolic disorders | |
| (IGF-1 deficiency) | |

- | |
|---|
| Later gestation |
| Normal |
| decreased |
| Normal |
| Decreased |
| Placental insufficiency causing redistribution of blood flow. |
| • Cerebral blood flow is not decreased. |
| Causes |
| - Pregnancy induced HT |
| - Maternal HT |
| - Maternal vascular disease |

- | | | |
|------------------|--------|-------|
| • Ponderal index | Normal | < 2 |
|------------------|--------|-------|

• Ponderal index (PI) **Normal** **< 2**

$$\text{Ponderal index} = \frac{\text{Weight (gms)}}{(\text{Length cms})^3} \times 100$$

Normal PI = 2-2.5

- **SMALL FOR GESTATIONAL AGE** - Birth weight is less than 10th percentile
- Diagnosis is made at birth.
- Pathological or physiological (constitutionally small)

Problems in SGA

- Hypoglycemia
- Polycythemia

- **LARGE FOR GESTATIONAL AGE** - Birth weight is more than 90th percentile

Causes

- Constitutional
- Infant of diabetic mother
- Beckwith Wiedemann syndrome

Problems in LGA

- Increased chances of birth injuries
 - M/c bone to be $\neq$ in (n) delivery = clavicle
 - M/c bone to be $\neq$ in caesarean section = humerus
 - Brachial plexus injury
 - Cephalhematoma
- Polycythemia
- Hypoglycemia

PRETERM CHILD - period of gestation < 37 weeks

Extremely Preterm - < 28 weeks of gestation
 Very Preterm - 28 weeks - 31^{6/7} weeks of gestation
 Moderate Preterm - 32 weeks - 33^{6/7} weeks of gestation
 Late Preterm - 34 weeks - 36^{6/7} weeks of gestation

Problems of Preterm child $\Rightarrow$

- 1) **CNS** - Periventricular leukomalacia
 - Intraventricular hemorrhage
 - Retinopathy of Prematurity
- 2) **RS** - Hyaline membrane disease
 Apnea of Prematurity
 Bronchopulmonary dysplasia
- 3) **GIT** - Necrotising Enterocolitis
- 4) **CVS** - Patent ductus arteriosus
 Hypotension
- 5) **Temperature** - Hypothermia
 Hyperthermia
- 6) **Metabolic** - Hypoglycemia, Hypocalcemia
- 7) **Hematological** - Anemia of prematurity
 - Neutropenia
 - Thrombocytopenia
 - Hyperbilirubinemia

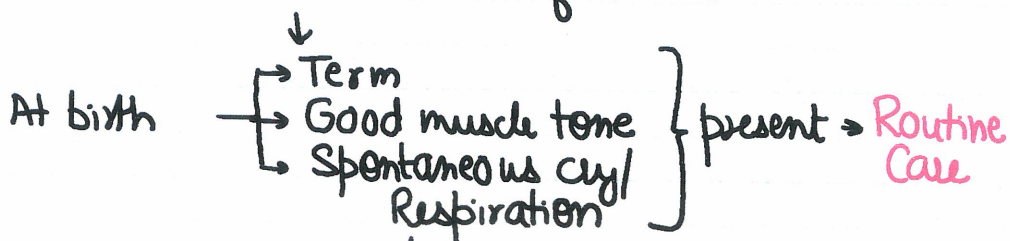
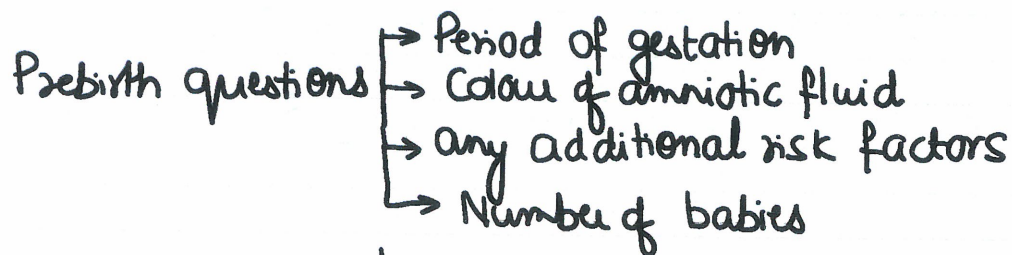
NORMAL NEONATE - At birth

(N) Heart rate = 120-160/min

(N) Respiratory rate = 40-60/min

(N) Temperature = 36.5°C - 37.5°C

NEONATAL RESUSCITATION

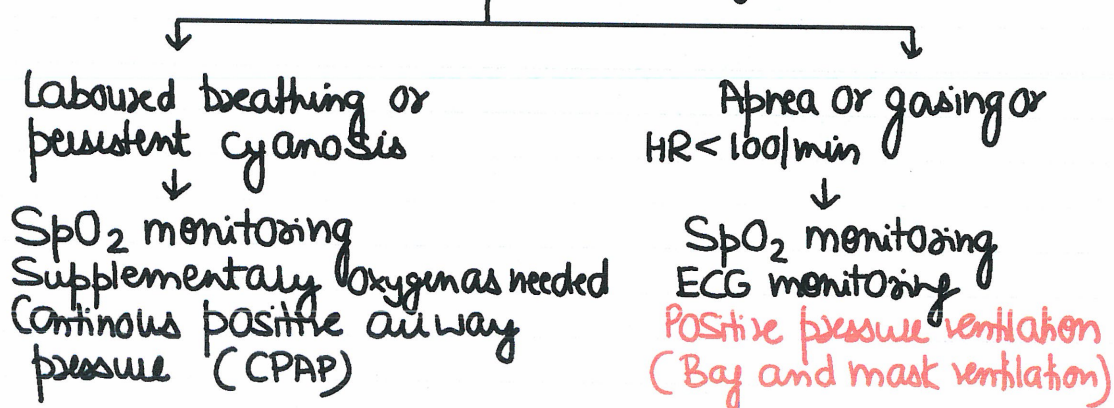


NO

Maintain the temperature
 Position the airway - neutral or slight extension
 Tactile stimulation
 Suction if required - first mouth followed by nose

No spontaneous cry / respiration

Evaluate HR, RR and color of the child



- Initial concentration of Oxygen
 - > 35 weeks - 21% Oxygen / Room air
 - < 35 weeks - 21 to 30% Oxygen
- O_2 flow rate - 10 L/min
- Ventilation rate - 40-60/min
- (PIP) • Peak inspiratory pressure - 20-25 cm H_2O
- (PEEP) • Positive end expiratory pressure - 5 cm H_2O

↓
Monitor the heart rate

↓
HR < 100/min

↓
Ventilation Corrective steps

- ↓
- M - Mask readjustment
 - R - Reposition the airway
 - S - Suction mouth and nose
 - O - Open mouth
 - P - Pressure increase (increase PIP by 5 cm H_2O , maximum 40 cm H_2O)
 - A - Alternative airway - Insert an endotracheal tube or laryngeal mask

↓
PPV given for 30 seconds

↓
HR < 60/min

↓
Chest compressions : PPV

- Ratio of 3:1 given every 2 seconds
- Intubate the baby if not done earlier
- Increase FI_{O_2} to 100%.
- Applied over lower $\frac{1}{3}$ rd of sternum
- $\frac{1}{3}$ rd of anteroposterior diameter of chest is compressed
- Two thumb technique is used

↓

Chest compression coordinated with PPV given for 1 min

↓
HR < 60/min

↓
Epinephrine (dilution of 1:10,000)

Can be given by

i) intravenous - given by umbilical vein } 0.2 ml/kg

ii) intraosseous route

In both of these route it is followed by 3ml of normal saline irrespective of gestational age or birth weight

iii) intratracheal route - 1 ml/kg followed by PPV
* Epinephrine is not given by intraarterial route

↓
HR < 60/min

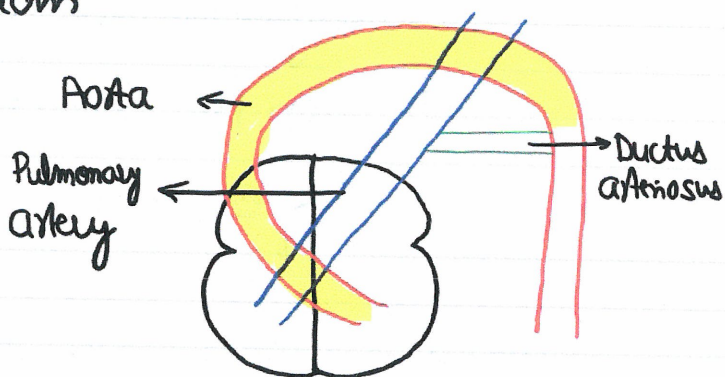
- Rule out pneumothorax (transillumination test)
- Rule out hypovolemia

Additional points

- In newborn preductal SpO₂ monitoring is done from

Right upper limb

1 min	= 60-65
2 min	= 65-70
3 min	= 70-75
4 min	= 75-80
5 min	= 80-85
10 min	= 85-95



- Bag and mask ventilation is contraindicated in
= Congenital diaphragmatic hernia
- Uncuffed endotracheal tube is used.
- Straight blade laryngoscope is used.

- If in newborn NO HR at birth, then
minimum duration of resuscitation = 20 min.
- APGAR Score - doesn't tell about need of resuscitation

* DELAYED CORD CLAMPING (DCC)

- i) Full term vigorous infant - 30-60 secs
- ii) Preterm (<37 weeks) } 60-120 secs
- Extremely preterm (<28 weeks) }

Due to DCC in preterm there is

- improved blood pressure
- decreased use of blood transfusions
- decreased rates of NEC and IVH

Due to DCC in term child there is

- decreased chances of iron deficiency anemia.

* If placental circulation is not intact, then cord should be clamped immediately after birth

* INSERTION OF ENDOTRACHEAL TUBE IN NEONATE

May be required for

- i) for effective positive pressure ventilation
- ii) Before chest compression
- iii) Suspicion of congenital diaphragmatic hernia

Depth of endotracheal tube is measured by NTL method. This method is used in both term and preterm child.

- distance between the nasal septum to the ear tragus + 1 cm.



AIM is to

- i) place the tip of ET in middle part of trachea
- ii) Tip should be 1 to 2 cms below the vocal cords
- iii) Not touch the carina or enter into a main bronchus
- iv) Optimum position of the ET is defined as the tip lying between the first and second thoracic vertebral bodies

* INSERTION OF OROGASTRIC TUBE

- Required in Neonates requiring CPAP or PPV.
- Should be left uncapped to act as vent for the stomach
- Distance is measured from the bridge of the nose to the earlobe and from the earlobe to a point halfway between the xiphoid process and the umbilicus.

APGAR SCORE

- practical method to evaluate respiratory system, cardiovascular system and central nervous system in infant immediately after birth

	0	1	2
A PPEARANCE (COLOUR)	Central Cyanosis	Peripheral or Acrocyanosis	Completely pink
P ULSE (HEART RATE)	Absent	HR < 100/min	> 100/min
G RIMACE (Response to catheter in nostril)	No response	GRIMACE	Cough or sneeze
A CTIVITY (Muscle tone)	LIMP	Partial flexion	Moving limbs
R ESPIRATORY EFFORT	ABSENT	SLOW, IRREGULAR	GOOD, SPONTANEOUS CRY

1st APGAR Score - 1 min of life 2nd Score - 5 min of life.
 If at 5 minute < 7, then also taken at 10, 15 and 20 min.

• APGAR Score doesn't tell about need of resuscitation.

INTERPRETATION OF SCORE

- 7-10 - NORMAL
- 4-6 - Moderately depressed
- ≤ 3 - Severely depressed

FACTORS AFFECTING THE APGAR SCORE

- Prematurity
- Delivery under general anaesthesia
- Congenital myopathy
- Congenital neuropathy
- Lung anomaly (diaphragmatic hernia)
- Airway obstruction (choanal atresia)
- H₂O MgSO₄ given to mother.

HYPOXIC ISCHEMIC ENCEPHALOPATHY

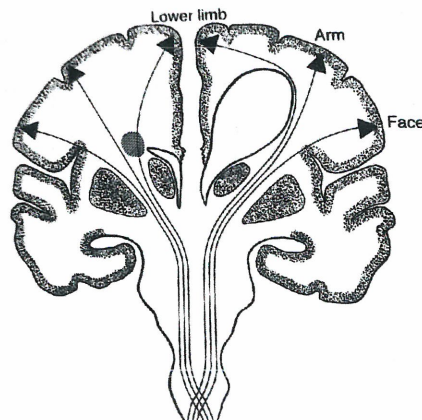
Diagnostic criteria (according to American Academy of Pediatrics)

- APGAR score < 3 at 5 minutes
- presence of acidosis - umbilical cord pH < 7
- Signs of neurological dysfunction - seizures, encephalopathy or tone abnormalities
- Evidence of multioorgan dysfunction

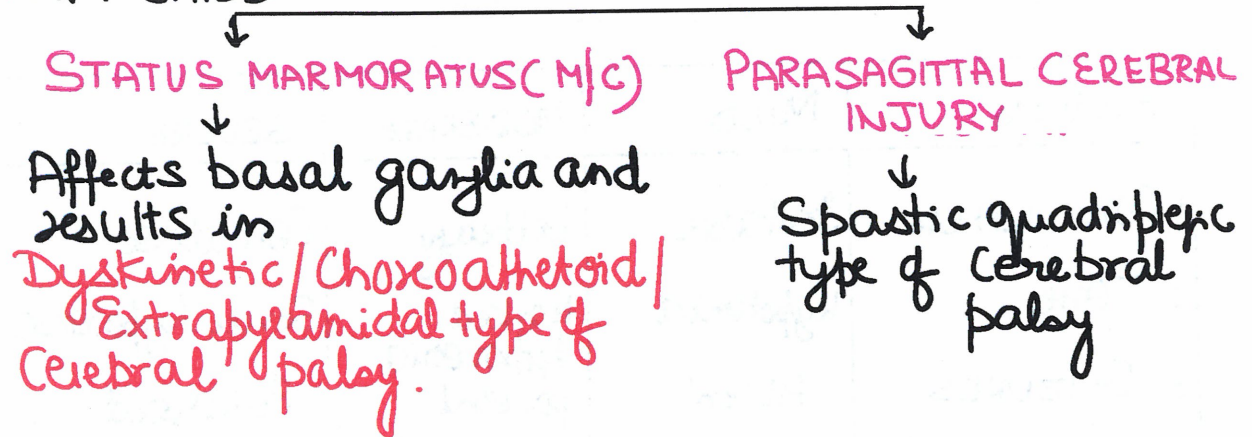
Neuropathological changes

1. PRETERM - Periventricular leucomalacia

- Mainly affects fibres supplying the lower limbs
- Fibres supplying the upper limbs and face are spared
- Results in spastic diplegic type of Cerebral palsy



2. TERM CHILD



SARNAT STAGING OF HIE

	Stage 1 (MILD)	Stage 2 (Moderate)	Stage 3 (Severe)
1. Level of Consciousness	Hyperalert	Lethargic	Stuporous or comatose
2. Tone	Normal	Hypotonia	Flaccid
3. MORO'S reflex	Increased	Incomplete, weak	Absent
4. SUCK	Present	decreased	absent
5. Autonomic nervous system	Sympathetic predominate	Parasympathetic predominate	Both are depressed
6. Heart rate	Tachycardia	Bradycardia	Variable
7. Pupils	Dilated	Constricted	Mid pupil size non responsive to light
8. Respirations	Hyperventilation	Periodic breathing	Apnea or requiring ventilation
9. Seizures	Absent	Present	Persistent

CLASSIFICATION OF HIE (LEVENE)

Features	MILD	MODERATE	SEVERE
1. Consciousness	Irritable	Lethargy	Comatose
2. Tone	Hypotonia	Marked hypotonia	Severe hypotonia
3. SEIZURES	Absent	Present	Prolonged
4. SUCKING/ RESPIRATION	POOR SUCK	UNABLE TO SUCK	UNABLE TO SUSTAIN SPONTANEOUS RESPIRATION

DIAGNOSIS

- 1) MRI - best imaging modality for determining prognosis in term neonates.
- 2) EEG -
Amplitude EEG - used for screening.
Conventional or multichannel EEG with video is the gold standard for monitoring newborn function.

TREATMENT

Therapeutic hypothermia / Cooling of head

Decreased cerebral blood flow $\downarrow$ used Cerebral edema
 $\downarrow$ used Reperfusion
 $\downarrow$ used formation of free radicals

It is given

- i) gestational age ≥ 36 weeks
- ii) Age < 6 hours

Temperature $33.5^{\circ}\text{C} \pm 0.5^{\circ}\text{C}$ to be kept for 72 hours

INTRAVENTRICULAR HEMMORHAGE

- Mainly seen in preterm child ≤ 32 weeks of gestation
- In child born > 32 weeks gestation there is low risk of IVH unless there is additional risk factors such as Lack of Antenatal steroids, shock requiring inotropes
- Most common cause is spontaneous hemorrhage
- Most common site is **subependymal germinal matrix**
 - On day 1 of life - 50% of IVH
 - On day 2 of life - 25% of IVH
 - On day 3 of life - 15% of IVH

Clinical features - Mostly are clinically silent.

- Only clinical sign may be unexplained fall in hematocrit.
- If symptoms are present then - Hypotension, pallor, tense fontanel, hyperglycemia & hyperkalemia.

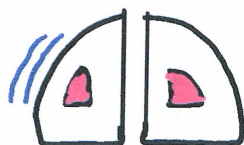
Diagnosis

- 1) Cranial ultrasonography - Investigation of Choice
- All child < 32 weeks of gestation cranial USG should be done by day 3/4.

Scan should be repeated at 3 weeks of postnatal age followed by another at 36 weeks of post menstrual age.

Complication -

Post hemorrhagic hydrocephalus



Due to obliteration of Subarachnoid space

Prevention - Most important protective factor is antenatal steroids.

NEONATAL SEIZURES

Jitteriness -

Stimulus sensitive
Can be abolished

No involvement of eye/tongue
No involvement of ANS

If recurrent jitteriness - then rule out hypocalcemia/hypoglycemia

Types of Neonatal seizures (Clinical classification)

I) SUBTLE SEIZURE - M/c type

- Present with motor automatisms. Examples include

a) Ocular

b) Oro-facial-lingual movements - chewing, lip smacking

c) Limb movements - Cycling, paddling

d) Autonomic phenomenon

II) CLONIC SEIZURE - Focal have best prognosis

III) TONIC SEIZURE

IV) MYOCLONIC SEIZURE - Worst prognosis