Contents

GENERAL PAEDIATRICS : GROWTH

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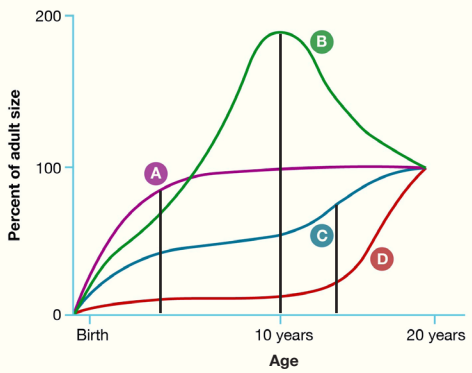
Normal Growth

00:00:34

Growth Phases :

	Period of growth		Days of life
Prenatal (Before birth)	Ovum		0 – 14 days of gestation
	Embryo		14 days – 8 weeks of gestation
	Fetus		9 weeks – Birth
Perinatal			22 weeks of gestation – 7 days after birth
Postnatal	Newborn	Early	0 – 7 days after birth
		Late	8 – 28 days after birth
	Infancy		Till 1 yr
	Toddler		1 – 3 yrs
	Preschool		3 – 6 yrs
	School age		6 – 12 yrs
	Adolescence	Early	10 – 13 yrs
		Mid	14 – 16 yrs
		Late	17 – 19 yrs

Growth Patterns :



Scammon growth curve

- A : Brain growth (max at 2 yrs). Parabolic.
- B : Lymphoid growth (E.g : Tonsils). >100% adult size.
- C : Somatic growth. Growth spurt after 12 yrs.
- D : Gonadal growth

Anthropometry

00:07:06

Weight :

- Average birth weight : 2.9 Kg.
- Low birth weight (LBW) : < 2.5 Kg.

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Weight loss after birth : D/t loss of excess extracellular fluid.

	Weight loss (In % in 1st week)	Regains weight by
Term	10	10th day
Preterm	15	15th day

Weight gain :

Age	↑ in weight
Till 3 months	30 g/day
Till 1 yr	400 g/month
1 – 7 yrs	2 Kg/yr
>7 yrs	3 Kg/yr

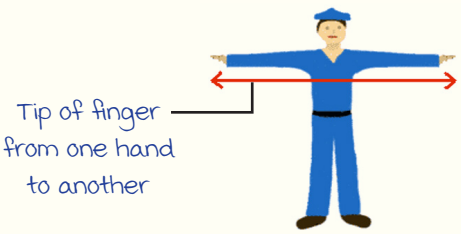
- Doubles : 5 – 6 months
- Triples : 1 year
- Quadruples : 2 years

} After birth.

Height/Length (< 2 years) :

Arm span : Height equivalent in older children.

Comparison	Age
Arm span (< 2.5 cm) < Length	Birth
Arm span = Length	11 yrs
Arm span (> 1 cm) > Length	> 11 yrs



Arm span

Increase in height :

Age	Height
At birth	50 cm
At 1 year	75 cm
At 2 years	87.5 cm (Height = Half of adult height at 18 to 24 months)
> 2 yrs – Till puberty	↑ of 6 cm/yr
Growth spurt at puberty	• Boys : 20 – 30 cm • Girls : 16 – 28 cm
Adult	160 – 170 cm

- Doubles (100 cm) : 4 years.
- Triples (150 cm) : 12 years.

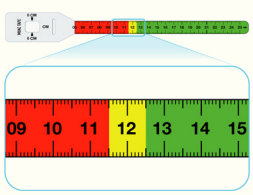
Circumference :

Mid arm circumference (MAC) :

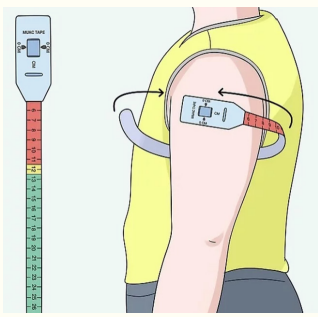
- Nutritional status assessment.
- Age : 1 – 5 years.

Shakir's tape :

- Normal : >12.5 cm
- Malnutrition : 11.5 – 12.5 cm
- Severe malnutrition : <11.5 cm



Shakir's tape



Head circumference :

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Brain growth assessment.

Age	Head circumference & growth rate
At birth	33 – 35 cm (34 cm)
First 3 months	2 cm/month (40 cm)
3 – 6 months	1 cm/month (43 cm)
6 months – 1 yr	0.5 cm/month (46 cm)
1 – 2 yr	2 cm/year (48 cm)
At 12 yrs	Adult value : 52 cm

WHO Growth Chart, Dentition & Puberty

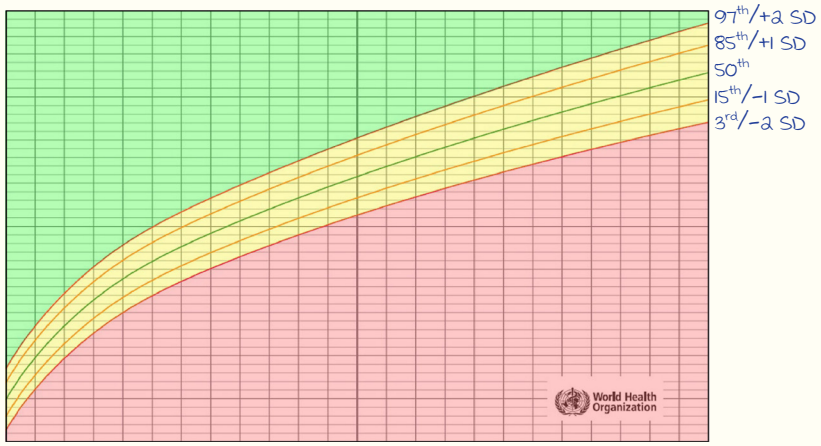
00:24:25

WHO Growth Chart :

Colours :

- Pink : Girls.
- Blue : Boys.

: Tall stature (>97th centile/>+2 SD).
: Normal height.
: Short stature (<3rd centile/<-2 SD).



Height for age : Growth chart

Dentition :

	1° dentition (Temporary)	2° dentition (Permanent)
Total no. of teeth	20	32
1st tooth to erupt	Lower central incisor	1st molar
Time of eruption	6 months	6 yrs

Mixed dentition :

- Both temporary & permanent teeth.
- Age : 6 – 12 yrs.

Supernumerary teeth :

- Additional teeth.
- m/c : In b/w 2 central incisors.

Delayed dentition : Non-appearance of teeth by 13 months.

Cause :

- Idiopathic (m/c).
- Malnutrition.
- Genetic syndromes (Down, Turner).
- Hormonal deficiency (GH, thyroid).

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Puberty Changes :

Females (8 – 13 years) :

Thelarche : Breast enlargement
↓
Pubarche : Pubic hair appearance
↓
Growth spurt
↓
Menarche.

Males (9 – 14 years) :

Testicular enlargement
↓
Penile enlargement
↓
Pubarche
↓
Growth spurt
↓
Axillary & facial hair.

Sexual maturity rating (SMR) : Tanner's staging.

Stage 1 : Prepubertal.

Stage 3 : Growth spurt in girls.

Stage 4 : Growth spurt in boys.

Stage 5 : Adult-like.

Short Stature

00:36:21

Height/age : < 3rd percentile or < −2 SD.

Causes :

- Normal variants (m/c than pathological causes).
  - Constitutional delay : m/c cause of short stature & delayed puberty.
  - Familial short stature.

Mid parental height : Child's genetic potential.

$$\frac{\text{Father's height + mother's height}}{2} \pm 6.5$$

- For boys : + 6.5
- For girls : − 6.5

Constitutional delay vs familial short stature :

	Constitutional delay	Familial short stature
Adult height	Normal	Short
Puberty	Delayed	Normal for age
Bone age		
Parent's height	Normal	Short

US:LS Ratio :

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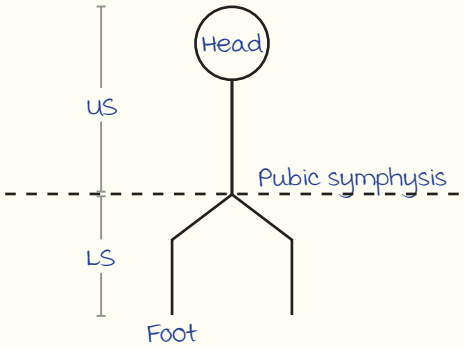
Age	US : LS
At birth	1.7 : 1
3 yrs	1.3 : 1
10 yrs	1 : 1
>10 yrs	0.9 : 1



US : Upper segment
LS : Lower segment

Approach to short stature :

US : LS ratio is normal for age : Proportionate short stature	US : LS ratio is abnormal for age : Disproportionate short stature	
	Short trunk (US)	Short limbs (LS)
• Normal variants • Chronic malnutrition (Stunting) • GH deficiency	• Spondylo-epiphyseal dysplasia • Hemivertebrae • Mucopolysaccharidosis (MPS) • Pott's disease : TB spine	• Achondroplasia • Rickets • Congenital hypothyroidism

Anomalies of Head Size & Growth

00:45:55

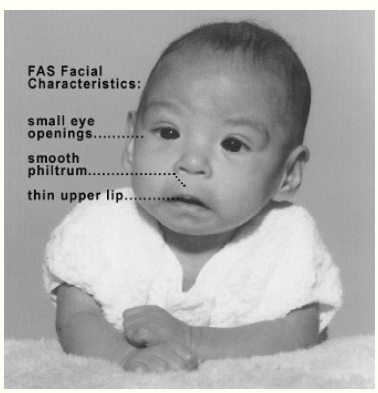
MICROCEPHALY

Causes :

1°/genetic microcephaly	2° microcephaly
• Developmental anomalies • Genetic defects (Trisomies)	• Prenatal : Maternal TORCH infections, teratogenicity • Perinatal : Birth asphyxia • Postnatal : Infections, trauma

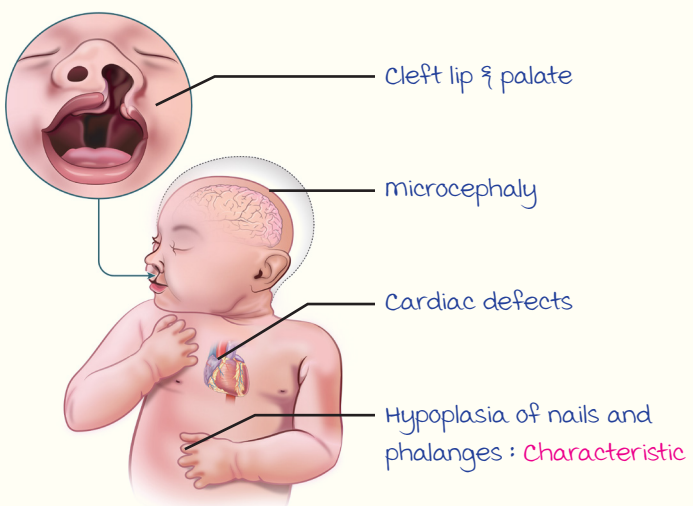
Fetal Alcohol Syndrome :

VSD : m/c heart disorder.



Fetal Hydantoin Syndrome :

VSD : m/c heart disorder.



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Rett's Syndrome :

- X-linked dominant disorder.
- Defect : MECP2 defect.
- Clinical features :
  - Microcephaly
  - Developmental regression
  - Stereotypes : Hand wringing movements
  - Speech defects, ataxia

} Symptoms appear after 1 yr (Normal at birth).

MACROCEPHALY

Causes :

- Hydrocephalus : ↑CSF.
- MPS
- Leukodystrophies :
  - Alexander disease
  - Canavan disease

} Megalencephaly.

- Thalassemia
- Osteogenesis imperfecta

} ↑Bony component.

Congenital Hydrocephalus :

Normal CSF :

- Adults : 150 mL.
- Infants : 50 mL.

Etiopathogenesis :

Anomalies → Obstruction in CSF pathway.

Aqueductal stenosis (m/c) : Narrowing b/w 3rd & 4th ventricle.

Clinical features :

1. Macrocephaly :
   >2 cm/month ↑in head circumference.
2. Bulging fontanelle.
3. Congested/prominent scalp veins.
4. Sunset appearance : Visible upper sclera (D/t downward rotation of eyeball).
5. Cracked pot resonance : D/t ↑pressure.

Features of macrocephaly

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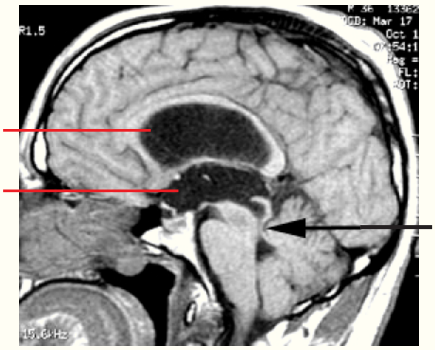
Investigation :

- Postnatal MRI :



- Intranatal USG :
  - Anomalies detected at 2nd trimester.
  - Fetal ventriculomegaly (m/c cause : Aqueductal stenosis).

Management :

- Ventriculo-peritoneal shunt (m/c) : CSF shunting.
- Endoscopic 3rd ventriculostomy.

Disorders of Puberty

01:04:04

Abnormal onset of 2° sexual characteristics :

	Males	Females
Delayed puberty	> 14 yrs	> 13 yrs
Precocious puberty	< 9.5 yrs	< 8 yrs

Delayed Puberty :

Cause :

Constitutional delay (m/c).

Central causes	Peripheral causes
• CNS abnormalities (Pituitary/hypothalamus) : Tumours, trauma, infiltration in pituitary. • Syndromes : Kallman syndrome (Anosmia).	• Genetics (Gonadal defects) : – Turner : Streak ovaries. – Klinefelter, Noonan } Cryptorchidism.

Precocious Puberty :

Central causes (Pituitary, hypothalamus) : Gonadotropin dependent (↑ LH, FSH)	Peripheral causes : Gonadotropin independent
• Tumours : – Hypothalamic hamartoma (m/c overall & m/c in boys). – Glioma. • Idiopathic (m/c in girls).	• Functional testicular tumors (↑testosterone) : Seminoma, germinoma. • Autonomously functioning ovarian cyst : McCune Albright syndrome. – Precocious puberty (D/t ↑estrogen). – Polyostotic fibrous dysplasia. – Cafe-au-lait macules.

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GENERAL PAEDIATRICS : DEVELOPMENT AND NUTRITION

Four domains :

1. Gross motor. 2. Fine motor. 3. Language. 4. Social.

Gross & Fine Motor Milestones

00:00:37

Gross Motor Milestones :

Tripod posture

Crawling

Creeping

Age	Milestone attained
3 months	Neck holding
4 months	Roll over
6 months	Sit with support, Tripod posture
8 months	Sit without support, crawling
10 months	Stand with support, creeping
12 months	Stand without support
	Walk with support
15 months	Walk without support
18 months	Running
2 years	Climbing with 2 feet/step
3 years	Climbing with 1 foot/step : Upstairs, rides tricycle
4 years	Climbing downstairs, hops

Fine Motor Milestones :

Age	Milestone attained
4 months	Bidextrous grasp
6 months	Unidextrous grasp : Ulnar (Immature) palmar grasp, transfers objects
8 months	Unidextrous grasp : Radial (mature) palmar grasp
9 months	Immature pincer grasp (Hold with sides of fingers)
12 months	Mature pincer grasp (Holds with tip of fingers)
15 months	Makes tower of 2 cubes
18 months	Makes tower of 3–4 cubes
2 years	Draws line, makes tower of 5–6 cubes
3 years	Draws circle, makes tower of 8–9 cubes
4 years	Draws cross (X)
4.5 years	Draws square
5 years	Draws triangle
6–7 years	Draws diamond

Palmar grasp :

Proximal (Palm) → Distal (Fingers).

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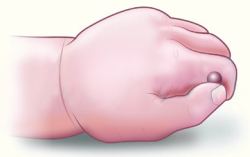

Immature pincer grasp

Mature pincer grasp

Language, Social Milestones & Nocturnal Enuresis

00:09:16

Language Milestones :

Sounds → Syllables → Words.

Age	Milestone attained
3 months	Cooing (musical) sound
6 months	Monosyllables
9 months	Bisyllables
1 year	1–2 words
18 months	8–10 words
2 years	100 words, sentences
3 years	Recognises and tells name, age, and gender
4 years	Tells stories and rhymes

Social Milestones :

Age	Milestone Attained
2 months	Social smile
3 months	Mother regard
6 months	Stranger anxiety, smiles at mirror image
9 months	Waves bye-bye, plays "peek a boo"
1 year	Simple ball game
3 years	Parallel play (Non-interactive)
4 years	Group play (Interactive play)

Red Flag Signs in Development :

Milestone	Upper age limit
Vocalization	6 months
Sitting	10 months
Standing	17 months
Walking	18 months
Single words	18 months

Developmental Quotient (DQ) :

$$DQ = \frac{\text{Developmental age (DA)}}{\text{Chronological age (CA)}} \times 100$$

- DA : Max. development attained.
- CA : Actual age.

Developmental delay : DQ <70.

Global developmental delay :

- DQ <70 in ≥2 domains.
- m/c cause : Cerebral palsy.

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Nocturnal Enuresis :

Eneuresis at night at least twice a month beyond 5 yrs of age.

Types :

	1° (m/c)	2°
Enuresis	Since birth	Previously dry
Cause	Developmental/maturation delay of bladder	Stress/UTI
Mx	• Improves with age • Spontaneous resolution	Treat the cause

Treatment for 1° nocturnal enuresis :

- Behavioural therapy : For age <6 yrs.
  - Caffeinated drinks avoided.
  - Regulated fluid intake (40% – 40% – 20% : morning – noon – evening after 6pm).
  - Timed voiding habits.
- 1st line : Non-pharmacological —(No response)→ Pharmacological :
  - Motivational therapy + alarm therapy.
  - Oral desmopressin : Preferred.
  - Anticholinergic : Oxybutynin.

Nutrition

00:23:16

Breast Milk :

Nutritional value : Calories (67 Kcal/100 mL).

Components	Breast milk characteristics (Vs cow's milk)
Carbohydrate	↑↑ (Lactose)
Protein	3 times ↓, easily digestible
Fat	• Same • Rich in PUFA (Eg : DHA) → Helps in brain growth

Immunological properties :

- Colostrum : Ig A, anti-infective proteins, Vitamin-A.
- Mature milk : PLAB.
  - PABA : Low → Protective against malaria.
  - Lactoferrin, Bifidus factor → Antibacterial against E. coli.
  - Ig A.

Deficient micronutrients :

Vitamins	Supplementation
Vit K	1mg, IM at thigh
Vit D	Oral, 400 IU/day till 1 yr

Storage :

- Room temperature : 6–8 hrs.
- Refrigerator : 24 hrs.
- Freezer (–20°C) : Up to 3 months.

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Nutritional supplements for LBW babies :

	1500 – 2499 g : LBW	<1500 g : VLBW
Supplements	1. Vit D 2. Iron (2mg/kg/day) : Started at 6–8 wks till 1 yr	• Human milk fortifier (HMF) + Iron : Till 40 wks • Vit D + Iron : After 40 wks – 1 yr

LBW : Low birth weight ; VLBW : Very low birth weight.

Daily fluid requirement (mL/kg/day) :

	D1	D2	D3	D4	D5
<1500 g	80	95	110	120	130
≥1500 g	60	75	90	105	120

Note : + 15ml/kg/day successive days.

Modes of Feeding :

Age	Modes of feeding		
34 wks	Direct breast feeding	INT →	Spoon/paladai feeds
32 – 34 wks	Spoon/paladai feeds	INT →	OGT/NGT
28 – 31 wks	OGT / NGT	INT →	TPN, IV fluids
<28 wks	TPN, IV fluids		

OGT : Oral gastric tube, NGT : Nasogastric tube.

TPN : Total parenteral nutrition, INT : If not tolerating.

Breastfeeding in HIV Mother :

Relative contraindication.

Management in neonate :

Up to 6 months	>6 months	>1 yr
Exclusive breastfeeding	Complementary feeding	Breastfeeding gradually stopped over 1 month

ARV prophylaxis :

Risk stratification	Prophylaxis
Low risk (mother on ART)	Nevirapine x 6 weeks
High risk (mother not on ART, high viral load)	Nevirapine + zidovudine x 12 weeks

Management in mother : Initiate ART.

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Malnutrition

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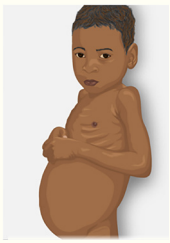
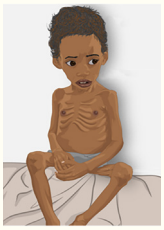
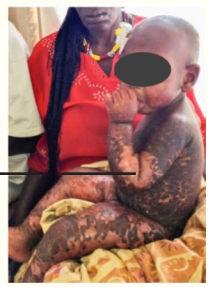
Kwashiorkor vs Marasmus :

	Kwashiorkor	Marasmus
		
Age of onset	> 1 yr	< 1 yr
Predominant deficiency	Protein (Albumin)	Calories
Edema	+++	Wasting of muscles, fat
Appearance	Dull	Alert
Appetite	↓↓↓	Preserved
Prognosis	Poor	Good
Other features	• Flaky paint appearance : Hyperpigmentation of skin • Flag sign : Alternate black & white pigmented hair	-



WHO Classification :

	Characteristics	Chart	Moderate malnutrition	Severe malnutrition
Acute malnutrition (<3 months)	Wasting	↓W/H	-2 to -3 SD	< -3 SD
Chronic malnutrition (>3 months)	Stunting	↓H/A		
Edema	-	-	⊖	⊕

W : Weight, H : Height, A : Age.

SEVERE ACUTE MALNUTRITION (SAM)

1. Weight/height : < -3 SD.
2. B/L pedal edema.
3. Mid Arm Circumference (MAC) : <11.5 cm.

} Any 1 +ve

Note :

Other causes of pedal edema : Heart failure, renal failure to be ruled out.

Management :

Assessment :

1. Good appetite.
2. No complication.
3. No/minimal edema.

→ Yes → Home management.

→ No → Hospital management.

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Hospital management : 10 steps.

	Stabilization		Rehabilitation
	Day 1-2	Days 3-7	Weeks 2-6
Hypoglycemia	– – – – – – →		
Hypothermia	– – – – – – →		
Dehydration	– – – – – – →		
Electrolytes	– – – – – – – – – – – –		– – – – – – – – – – →
Infection	– – – – – – – – – – →		
Micronutrients	– – – – – Without iron – –		– – – – – With iron – – →
Cautious feeding	– – – – – – – – – – →		
Catch-up growth	– – – – – – – – – – – –		– – – – – – – – – – →
Sensory stimulation			– – – – – – – – – – →
Prepare for follow-up			– – – – – – – – – – →

Complication of SAM : SHIELDED.

- Sugars (Hypoglycemia : <54 mg/dl).
- Hypothermia (Axillary temperature <35°C).
- Infections : Gram -ve enterobacteriaceae (m/c).
- Electrolyte disturbances ($\downarrow K^+$, $\downarrow Mg^{2+}$, $\uparrow Na^+$).
- Dehydration.
- Deficiencies (micronutrients).

Fluids in SAM on the basis of shock :

- SAM with shock —IV fluids→ RL + 5% Dextrose.
- SAM without shock → ReSomal.

ReSomal (Rehydration solution for malnourished children) :

	ReSomal mmol/L	Reduced Osmolarity ORS (WHO) mmol/L
Glucose	125	75
Sodium	45	75
Potassium	40	20
Zinc	3	-
Copper	0.3	-
Magnesium	0.045	-
Osmolarity (mOsm/L)	300	245

Criteria for discharge :

- No edema : For at least 2 weeks.
- Weight-for-height : ≥ -2 SD.
- MAC : ≥ 12.5 cm.

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RICKETS

- Vit D deficiency ⟶ Defective mineralization of bone (D/t defective Ca^{2+}/PO_4 metabolism).
- Site : metaphysis.

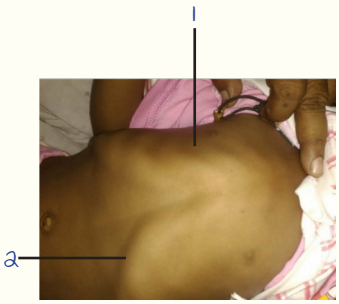
Clinical Features :

Skull :

- Craniotabes : "Ping pong" ball appearance of skull.
- Wide open fontanelle.
- Frontal bossing.

Chest :

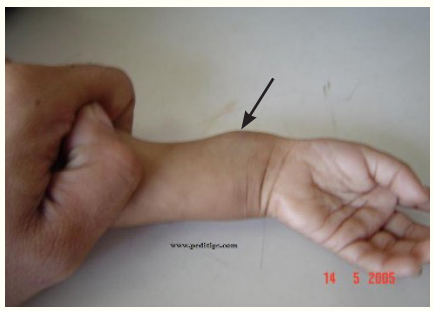
1. Rachitic rosary : String of beads/rounded appearance. Costochondral junction widening/swelling.
2. Harrison's sulcus/groove : D/t pull of diaphragm.



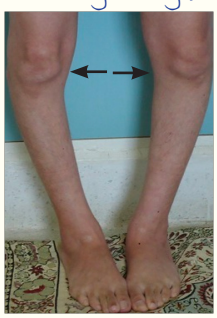
Changes in chest

Bones :

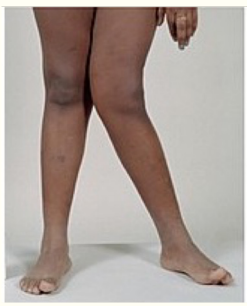
1. Widening of wrist



2. Genu varus (Bowing of legs)



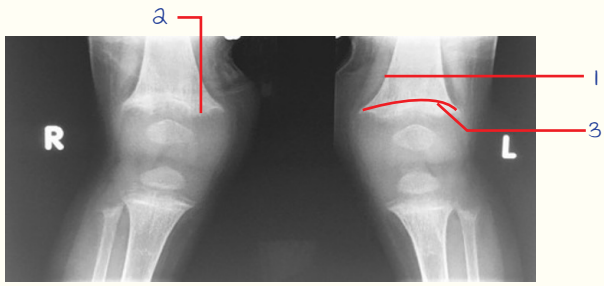
3. Genu valgus/knock knees (Lateral deviation of limbs)



Investigation :

X-ray :

1. Splaying : Lateral deviation of ends of long bone.
2. Fraying : Irregular edges.
3. Cupping.



X-ray of rickets

Refractory Rickets :

Rickets not responding to Vit D therapy.

	Causes	Inheritance
Vit D dependent rickets (VDDR)	Vit D metabolism	AR
Familial hypophosphatemic rickets	Phosphate wasting	X-linked dominant
Others	CKD, RTA	-

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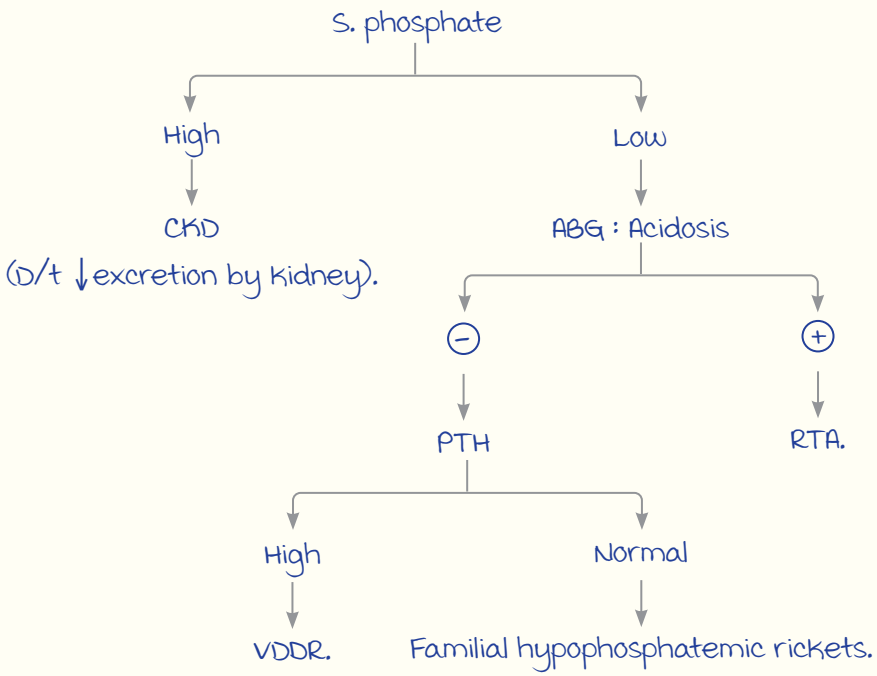
Work up :



OTHER MICRONUTRIENTS DEFICIENCY

	Deficiency	Characteristics
Scurvy	Vitamin C	Bleeding (d/t collagen defects) : • Gum bleed • Perifollicular bleed : Cork screw appearance • Subperiosteal bleed : pseudoparalysis
Acrodermatitis enteropathica	Zinc : SLC 39A4 gene defect.	• Periorificial rash : B/L, symmetrical • Diarrhoea
Xerophthalmia	Vitamin A	• Corneal & conjunctival xerosis • Keratomalacia (Thinning of cornea) • Bitot's spots : Characteristic greyish white plaques on bulbar conjunctiva.

Note : Copper deficiency mimics scurvy (D/t collagen defect).

Vit A :

Indication : Malnutrition.

Dosage :

	Dose
<6 months	50,000 IU
6-12 months or <8 kg	1 lakh IU
>1 yr	2 lakh IU

Schedule : Day 0, 1, 14.

Note : Age of 1 yr + <8 kg : 1 lakh IU.

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GENERAL PAEDIATRICS : GENETICS, INFECTIONS & METABOLIC DISORDERS

Chromosomal Aneuploidies

00:00:21

Down syndrome : Trisomy 21.
Klinefelter's syndrome : 47, XXY (Supernumerary 'X' chr).
Turner Syndrome : 45, XO (Monosomy of X).

TRISOMY DISORDERS

Down Syndrome :

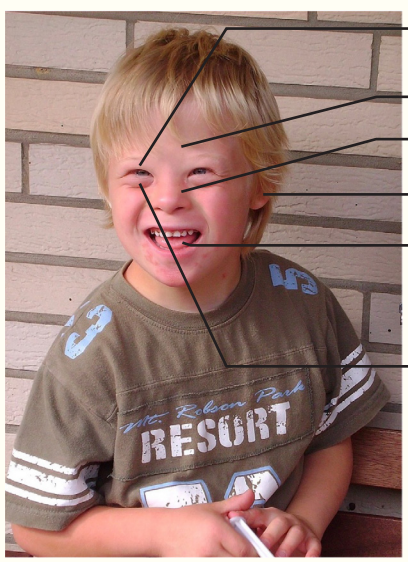
m/c genetic disorder.

Etiology :

- Maternal meiotic non-disjunction of chromosome 21 : m/c (95%).
- Robertsonian translocation : Translocation b/w 2 acrocentric chromosomes (4%).
  - Eg : t(14 ; 21), t(21 ; 21).
  - ↑ recurrence in subsequent children.
- Mosaicism (1%).

Clinical features :

	Features
Face & lip	• Mongoloid facies • Simian crease : Single transverse crease • Sandal gap : ↑ gap b/w 1st & 2nd toe • Clinodactyly : Curved little finger
CVS	Endocardial cushion defects (m/c) : ASD + VSD + valve defect (mitral valve)
CNS	• Low IQ, hypotonia • Premature Alzheimer's disease
GI	Duodenal atresia (m/c) ⟶ X-ray : Double bubble sign
Blood	Leukemia : ALL > AML < 3yrs : AML – M7 (m/c)



Upslanting palpable fissure
Flat face
Flat nose
Low set ears
Protruding tongue (D/t hypoplasia of mandible)
Epicanthal folds

Risk of recurrence :

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Maternal age → ≤ 35yrs : 1%.
→ > 35yrs : 1% + Age-related risk (upto 4%).

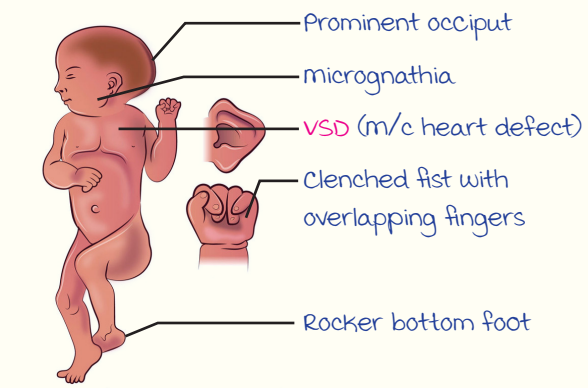
Translocation → t(14; 21) :
- Maternal inheritance : 10%.
- Paternal inheritance : 4–5%.

→ t(21; 21) : 100%.

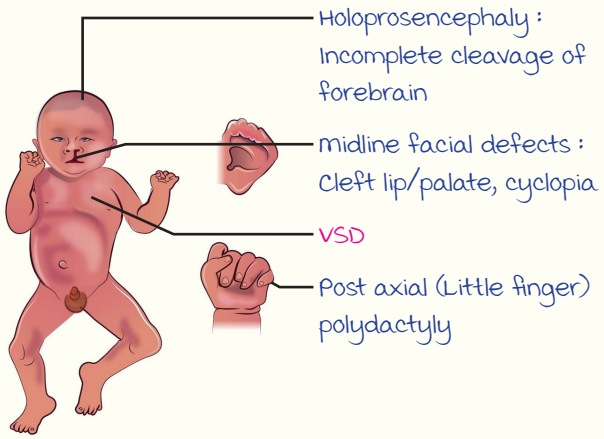
Other Trisomies :

Trisomy 16 : m/c in spontaneous abortion.

Trisomy 18 : Edward syndrome
2nd m/c trisomy.



Trisomy 13 : Patau syndrome



KLINEFELTER & TURNER SYNDROME

	Klinefelter syndrome	Turner syndrome
Sex chromosomal aneuploidy	m/c cause in males (47 XXY)	m/c cause in females (45 XO)
IQ	Low IQ (D/t supernumerary Chr. 'X')	Normal IQ
Stature	Tall stature (Height-for-age > 97th percentile/> +2SD)	Short stature
Chest	Gynaecomastia	• Flat/shield chest • Wide spaced nipples
Limb	Long limbs	Cubitus valgus
Gonads	Cryptorchidism → ↓ testosterone → Delayed puberty, infertility	• Streak ovaries (Rudimentary) • ↓ Estrogen → Low fertility, delayed puberty
Other systems	↑ risk of malignancies : • Male breast Ca • Extragonadal germ cell tumours : Mediastinum (m/c)	• Webbed neck • Heart defects : – Bicuspid aortic valve (m/c) – Coarctation of aorta • Horseshoe kidneys

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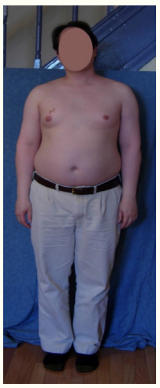
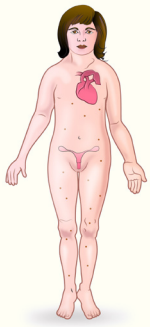


Klinefelter syndrome



Turner syndrome

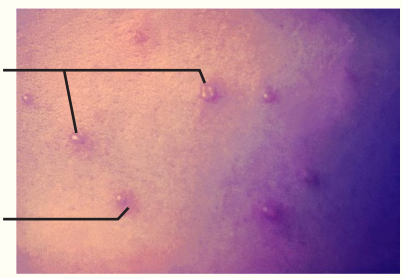
Infections

00:20:20

Varicella/Chicken Pox :

Clinical features :

1. Prodrome (24–48 hrs) : Fever, malaise.
2. Rash : Centripetal.
   - Trunk → Face → Extremities.
   - Pruritis.



Rash

Complication : Secondary bacterial infections → Staph aureus, Strep. pyogenes.

Period of infectivity : 24–48 hrs ← before Rash → till Crusting of lesions.

Treatment : Acyclovir (Oral/IV) x 5 days, started within 24–48 hrs.

Congenital Varicella :

- Intrauterine TORCH infection.
- Severe form of varicella.

Clinical features :

- Cortical atrophy :
  - Microcephaly.
  - Intellectual disability/low IQ, developmental delay.
- Hypoplasia of limbs.
- Cicatricial (Irregular) scars.

Congenital Rubella :

Most severe TORCH infection.

Clinical features : Triad of

- Heart defects : PDA, pulmonary stenosis, VSD.
- Cataract.
- Sensorineural hearing loss (SNHL).

Congenital CMV :

- m/c TORCH infection.
- 90% infants : Asymptomatic.
- Transmission (most) : 3rd trimester.
- Symptomatic if transmission in 1st trimester → Cytomegalic inclusion disease.

- ↑ risk : Primary infection of mother with CMV during pregnancy.

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Clinical features :

- Cytomegalic inclusion disease.
- Hepatosplenomegaly.
- Chorioretinitis.
- Petechiae.
- Microcephaly.

Investigation :

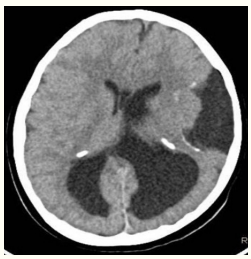
Viral isolation : Urine > Blood sample.

- PCR.
- Serology IgM antibody.

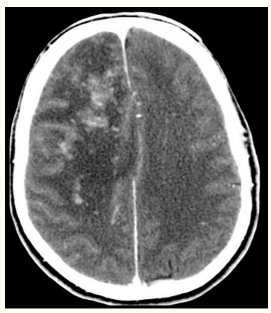
Complication :

SNHL (m/c cause of non-syndromic hearing loss) :

- Long term sequelae.
- m/c in symptomatic infants.



Periventricular calcification



Diffuse parenchymal calcification

Congenital Toxoplasmosis :

- SNHL.
- Chorioretinitis.
- Microcephaly.
- Hydrocephalus (Less common).

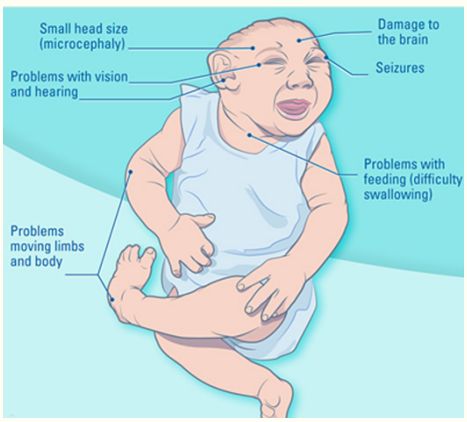
Congenital Zika :

Emerging infection.

Vector : Aedes mosquito.

Clinical features :

- Microcephaly.
- Visual defects : D/t macular scars.
- CTEV
- Arthrogryposis congenita : Limb deformities.



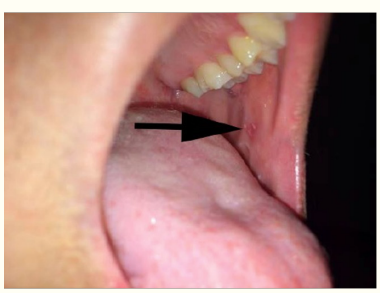
Zika infection

Measles :

Toxic appearance.

Clinical features :

1. Prodrome : Fever (Intensity ↑ with appearance of rash).
2. Koplik spots :
   - Appears on day 2–3.
   - Opposite to 2nd molar.
   - Rice grain appearance with surrounding redness.
   - Diagnostic.



Koplik spots

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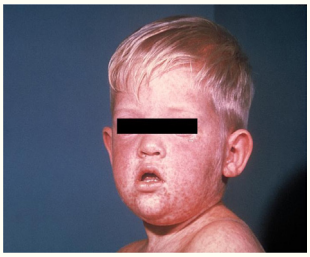
3. Maculopapular rash :

- Characteristic rash.
- Appears on day 4.
- Starts behind ear.
- Lasts for 4 days.
- Pigmentation on rash disappearance.


Maculopapular rash

Complication :

	Complications
Acute	• Otitis media (m/c). • Bronchopneumonia (most severe).
Chronic	Subacute sclerosing panencephalitis (SSPE) : myoclonic seizures + personality disturbances.

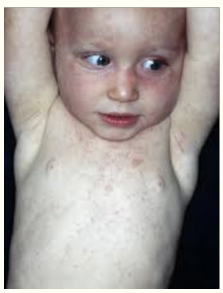
Investigation : Anti-measles antibody in CSF.

Exanthema Subitum/Roseola Infantum :

Etiology : HHV-6 (m/c)/HHV-7.

Clinical features :

- Non-toxic appearance.
- Maculopapular rash : On the trunk.
- Fever intensity ↓ on appearance of rash.

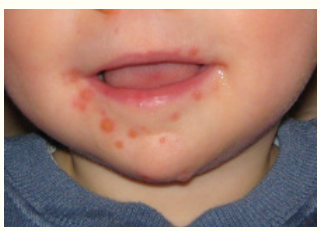

Roseola infantum

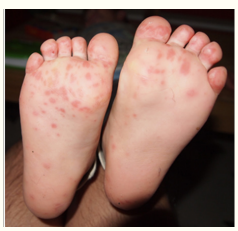
Hand Foot Mouth Disease :

Self limiting disease.

Etiology : Enterovirus 71,
coxsackie virus A16.

Clinical features : Fever ⊕.


Perioral blister


Papulovesicular lesions
(On hand & foot)

Erythema Infectiosum :

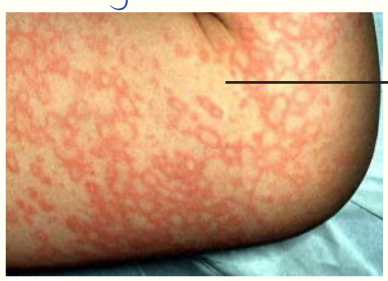
Etiology : Parvovirus B19.

Clinical features :

1. Fever ⊕.
2. Slapped cheek appearance


Erythematous flushing of face

3. Lacy/reticulated rash


Central clearing

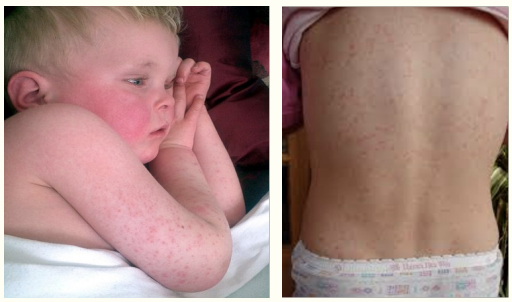
Associations :

----- Active space -----

- Arthralgia/arthropathy.
- Aplastic crisis in chronic hemolytic anemia.
- Intrauterine transmission from mother : Severe anemia, myocarditis, non-immune hydrops fetalis in neonate.

Scarlet Fever :

Etiology : Strep pyogenes (Group A β hemolytic).
Toxin : Pyrogenic exotoxin.



Scarlet fever

Clinical features :

- Fever ⊕.
- Papular rash.
  - Appears on day 2.
  - Face → Extremities.
  - Sandpaper rash.
  - Pastia's line : Accumulation of rash in skin creases.
- Pharyngitis.
- Strawberry tongue :
  Coated tongue + swollen papillae $\xrightarrow{\text{Desquamation}}$ Reddened papillae.

Treatment : Penicillin.

Metabolic Disorders

00:45:59

CARBOHYDRATE RELATED DISORDER

Galactosemia :

Enzyme deficient	Effect	C/F
Galactose-1-phosphate uridyl transferase (GALT) : m/c	↑ Galactose-1-phosphate accumulation	• Jaundice • Chronic liver disease • Oil drop cataract • Proximal tubule dysfunction
Galactokinase	(Benign)	Oil drop cataract

Investigation :

Screening :

Test	Galactosemia	Glycosuria
Urine for reducing substances	⊕	⊕
Glucose oxidase method/dipstick testing	⊖	⊕

Confirmatory tests :

- ↑ RBC galactose-1-phosphate.
- ↓ GALT enzyme activity in RBCs.

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Management :

- To stop breastfeeding as it is C/I.
- Lactose free formula/soy based feeds.

Glycogen Storage Disorders (GSD) :

Liver > Muscle

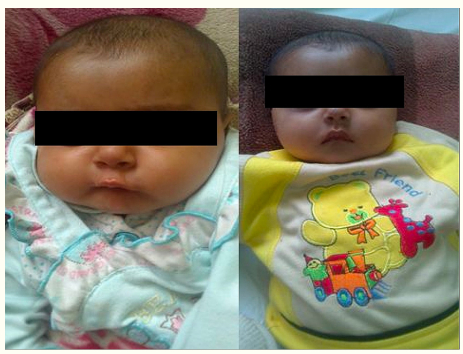
Type Ia (m/c) : Von Gierke disease

Type V (m/c) : McArdle disease

Von Gierke disease : ↓ Glucose-6-phosphatase → ↓ glucose → Recurrent fasting hypoglycemia.
→ Hepatomegaly.
→ Doll-like facies.

Mx :

- Frequent feeding : To maintain euglycemia.
- Uncooked corn starch supplement : Slow release glucose.
- Overnight tube feeding.
- Orthotropic liver transplant : In advanced liver disease.



McArdle disease :

↓ muscle phosphorylase → Exertional fatigue.

Pompe Disease/Type II GSD : ↓ α-glucosidase.

- Also a lysosomal storage disorder.
- Muscles affected → Skeletal : Floppy infant (Hypotonia).
  → Smooth.
  → Cardiac : Hypertrophic cardiomyopathy.
- Mx : Enzyme replacement with rhGAA (Recombinant human α-glucosidase).

Lysosomal Storage Disorder (LSD) :

Gaucher's disease : m/c LSD.

↓ glucocerebrosidase → Glucocerebrosides accumulation
→ Abdominal distension d/t hepatosplenomegaly.
→ Short stature.
→ Bone lesions with pain.
→ Pancytopenia.

Investigation :

- X-ray : Erlen Meyer flask deformity.
- Biopsy : Crumpled tissue paper appearance.

Mx : Enzyme replacement of glucocerebrosidase.

----- Active space -----

AMINO ACID DISORDER

Phenylketonuria :

m/c amino acid disorder.

✕ : Defective enzyme
↑↓ : Pathological features

Pathophysiology & clinical features :

↑ Phenylalanine —(✕ Phenylalanine hydroxylase, Tetrahydrobiopterin (BH_4))→ Tyrosine ↓ → Melanin ↓

↑ Metabolites : Phenylacetate → Mousy odour.

Hypopigmentation of skin, hair, eyes

Brain damage :

- Low IQ.
- Seizures.
- Developmental delay.

Investigation :

- ↑ Phenylalanine concentration : > 2mg/dL.
- Phenylalanine : Tyrosine ≥ 3 (Normal : < 1).

Treatment :

- Low protein diet.
- Restriction of phenylalanine.
- Trial of sapropterin (Synthetic BH_4).

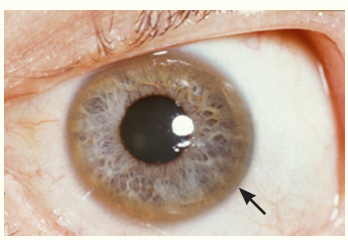
COPPER METABOLISM DISORDERS

Wilson Disease :

Defect : ATP 7B gene on chromosome 13.

↓

Accumulation of free S. Cu in liver, brain, cornea.



KF ring

Clinical features :

Liver	Neurological	Eyes
• Earliest features. • Seen in 1st decade. • Acute/chronic hepatitis (Liver failure).	• Seen in 2nd decade. • Tremor, dysarthria, dysphonia. • Psychiatric : Personality disturbances, psychosis, depression.	• KF ring : Characteristic. • Sunflower cataract.

Investigation :

- ↓ S. ceruloplasmin (Cu transporting protein).
- ↑ Urine copper.
- Liver biopsy : Diagnostic → Copper level > 250µg/gram dry weight of liver.

Management :

- Copper chelating agents : Trientene, D-penicillamine.
- Maintenance : Zinc (↓ absorption of intestinal copper).

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Menke's Disease :

Genetics :

- Defect : ATP 7A gene on X-chromosome.
- Inheritance : X-linked recessive.

Pathogenesis : ↓ Cu level d/t malabsorption.

Clinical features :

Brain	Hair
• Microcephaly • Developmental delay • Low IQ	• Brittle, breaks (Kinky hair) • Fracture of hair shaft • Trichorrhexis nodosa : Nodular swelling } On microscopy

NEONATOLOGY

----- Active space -----

Newborn Care & Hypothermia

00:00:46

Normal parameters in newborn :

- HR : 120–160/min.
- Respiratory rate : 40–60/min.
- BP : 60/40 mmHg.
- Meconium passage : Up to 48 hrs after birth.
- Urine passage : Up to 24 hrs after birth.
- Temperature : 36.5–37.5°C.

Care of Newborns :

1. Aseptic precautions :
   - Clean hands.
   - Clean surface.
   - Clean cutting of cord.
   - Clean clamp.
   - Clean cord.
2. Early skin to skin contact :
   - To prevent hypothermia.
   - Establishes early breastfeeding.
3. Delayed cord clamping : 30–60s after birth.
   - ↓Incidence of anemia.
   - ↓Incidence of IVH (Intraventricular hemorrhage) in preterm baby.
4. Cleaning : Meconium, secretions, blood on the baby.
   - Vernix caseosa : Not cleaned.
   - Bathing : >24 hrs.
5. Eye antibiotic prophylaxis : Not recommended.

Hypothermia :

Grades :

	Temperature	Features
Cold stress (mild)	36–36.4°C	Cold extremities, warm body
Moderate hypothermia	32–36°C	Cold body
Severe hypothermia	<32°C	

Prevention/Rx in a hemodynamically stable baby : Kangaroo mother care.

- Indicated for : Stable babies, preterm & LBW babies.
- Level : Mother's chest.
- Posture : Vertical/upright, frog-leg (Folded leg).
- Exclusive breastfeeding.
- Head :
  - Covered at all times.
  - Site of heat loss d/t ↑body surface area.

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Rx in a hemodynamically unstable baby :

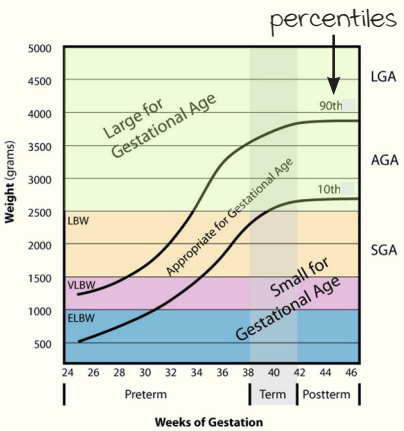
	Warmer	Incubator
Image		
mechanism of heat gain	Radiation	Convection

IUGR & Infant of Diabetic Mother

00:09:08

Weight classification according to gestational age :

AIIMS intrauterine growth charts : Percentile charts.



Grading :

- Large for gestational age (LGA) : >90th.
- Appropriate for gestational age (AGA) : 10-90th.
- Small for gestational age (SGA) : <10th.

IUGR :

SGA + Wasting (Eg : Loose skin folds).

Types :

	Asymmetrical IUGR (m/c)	Symmetrical IUGR
Cause	Maternal cause (m/c) : Uteroplacental insufficiency	Fetal causes : Genetic anomalies
Head size	Normal	↓
Ponderal index	<2	>2

Ponderal index : $\frac{\text{Weight (g)}}{(\text{Length in cm})^3} \times 100$.

Infant of Diabetic Mother (IDM) :

Pathogenesis :

Hyperinsulinemia → Large for gestational age (LGA).
→ Hypoglycemia (Blood glucose : <45 mg/dL).

Characteristics :

Congenital anomalies : In infants born to overt diabetics.

- VSD : m/c.
- Caudal regression syndrome/Sacral agenesis : most specific.

Normal Findings in Newborn & Neonatal Reflexes

00:16:46 ----- Active space -----

Normal Findings in Newborn :

Condition	Features
Erythema neonatorum (Previously Erythema toxicum)	• m/c rash : Papulopustular lesion • Appears >24 hrs • Eosinophils in microscopy
Milia (Milk spots)	Over face & nose
Epstein pearls	White spots in palate
Breast enlargement	D/t maternal estrogen
Bleeding per vaginum	Few days after birth, d/t withdrawal of maternal hormones.

Mx : Reassurance.

Caput vs. Cephalhematoma :

	Caput succedaneum	Cephalhematoma
Cause	Scalp vein congestion d/t prolonged delivery	Trauma d/t instrumental delivery
Content	Fluid	Blood (Subperiosteal area)
Characteristic	Superficial, diffuse	Deep, localised
Appearance	At/Immediately after birth	12-24 hrs after birth
Complications	-	• Jaundice (D/t heme breakdown) • Linear skull fracture

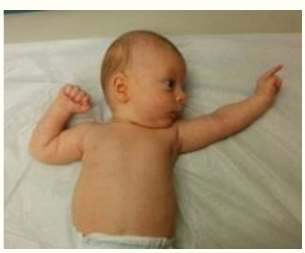
Neonatal Reflexes :

	Characteristics
Moro reflex	B/L, disappears 6 months after birth.
Asymmetric tonic neck reflex (ATNR)	On turning head → I/L extension. C/L flexion.
Parachute reflex (Post-natal reflex)	• Extension of hand on falling forward. • Appears 7-8 months after birth. • Persists throughout life.

Moro variants :

- Absent moro : Brain damage → Asphyxia, Hypoxic Ischemic Encephalopathy (HIE).
- U/L moro → Fractures (m/c : Clavicle)/Dislocation.
  → Injury to nerve : Brachial plexus injury (Erb's palsy).

Moro reflex



ATNR

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Neonatal Resuscitation & Respiratory distress

00:28:32

NEONATAL RESUSCITATION

Order of resuscitation : Temperature → Airway → Breathing → Circulation.

Initial steps :

1. Temperature : Warmer.
2. Airway :
   - Positioning : Slight extension of neck.
   - Suctioning of mouth → Nose (If necessary).
3. Breathing : Tactile stimulation.
   - Rubbing the back.
   - Tapping the soles.

↓ If still no response, check HR.

↓ If HR <100 bpm

Positive pressure ventilation (PPV)

Bag & mask ventilation : Non-invasive

- O_2 concentration :
  - ≥35 wks : Room air (21% O_2).
  - <34 wks : 21–30% O_2.
- Absolute C/I : Congenital diaphragmatic hernia (CDH).

→ HR >100 bpm : Sensitive indicator to response.

↓ If HR still <100 bpm

Ventilation corrective steps :

M : Mask reposition.
R : Reposition head.
S : Suction of secretions.
O : Open mouth.
P : ↑Pressure.
A : Alternate airway (ET tube).

→ If HR <60 bpm →

Chest compression + ventilation.

- Two thumb technique at lower 1/3rd of sternum.
- ET tube + 100% O_2.

↓ If HR still <60 bpm

Inj. Adrenaline :

- IV 1:10,000; 0.2 mL/kg.
- Umbilical vein : Preferred.

Resuscitation of Meconium Stained Liquor (MSL) baby :

- Initial steps → PPV.
- Tracheal suctioning in non-vigorous babies (weak cry) : Not recommended.

RESPIRATORY DISTRESS

----- Active space -----

Scoring system :

Criteria assessed	Scoring system
Postnatal assessment of gestational age	Expanded new Ballard score (ENBS) : 1. Physical appearance 2. Neuromuscular parameters
Assessment of physiological parameters	Apgar score : Done at 1, 5 mins after birth.
Assessment of respiratory distress	1. Silverman score 2. Downe score

APGAR score :

Sign	0	1	2
Activity (muscle tone)	Limp (No tone)	Some flexion	Good flexion/ active movements
Pulse (Heart Rate)	Nil	<100/min	> 100/min
Grimace (Reflex irritability)	No response	Grimace	Cry/cough/ sneeze
Appearance (Color)	Blue/Pale	Pink body, blue extremities (Acrocyanosis)	Pink all over
Respiratory effort	Nil	Irregular, slow breathing	Good cry

Total : 10.

Normal : 7–10.

Low : <7 ⟶ D/t birth asphyxia.

Birth Asphyxia :

Features :

- APGAR : 0–3 at >5 minutes.
- Umbilical cord pH : <7.0 d/t lactic acidosis.
- Neurological damage : Hypoxic Ischemic Encephalopathy (HIE).
- Multiorgan damage.

HIE :

Sarnat & Sarnat staging :

	Stage 1 : Mild	Stage 2 : Moderate	Stage 3 : Severe
Consciousness	Normal/Irritable	Lethargic	Comatose
Brain stem	Reflexes : Normal		Reflexes : Absent
Autonomic functions	Sympathetic : ↑ (↑HR)	Parasympathetic : ↑ (↓HR)	HR : Variable (ANS control lost)
Motor functions	Normal	Hypotonia	↓↓↓/Absent

----- Active space -----

Treatment :

- Symptomatic Mx (As existing brain damage is irreversible).
- Induced hypothermia in (3° care settings).
  - Temperature : 33° to 34°C.
  - Indication : Moderate to severe HIE.

Neonatal seizures :

- HIE : M/C cause.
- Subtle seizures : M/C type.
- Phenobarbitone : Initial DOC.
- Vit B6 :
  - Used in refractory seizures.
  - Vit B6 → ↑GABA (Inhibitory neurotransmitters) → ↓Seizures.

Disorders of Preterm Birth & CDH

00:51:03

DISORDERS OF PRETERM BIRTH

Necrotizing Enterocolitis (NEC) :

D/t bacterial colonization of intestine.

Risk factors :

- Immaturity of intestine.
- Top feeds : Cow milk/Formula milk.

Modified Bell's Staging :

		Features	Mx
Stage I	I A	Non-specific (Abdominal distension, vomiting)	• NPO/TPN • Medical Mx : Broad spectrum IV antibiotics.
	I B	Blood in stools (+)	
Stage II	II A	Pneumatosis intestinalis (Air in intestine)	
	II B	Pneumatosis portalis (Air in portal vein)	
Stage III	III A	Peritonitis	
	III B	Pneumoperitoneum	Sx : Laparotomy.

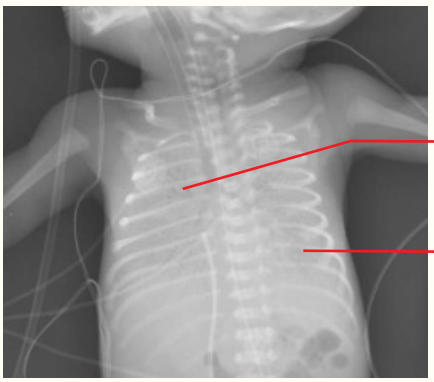
RDS/HMD :

- RDS : Respiratory Distress Syndrome.
- HMD : Hyaline Membrane Disease.

Age : <34 wks (Preterm).

Pathogenesis : Surfactant deficiency → Alveolar collapse → Respiratory distress.
→ ↓Lung compliance.

X-ray :



----- Active space -----

Scoring systems :

Silverman scoring :

	0	1	2
Upper chest retractions	Synchronized	Lagging	See-saw
Lower chest retractions	Nil	Mild	Severe
Xiphoid retractions			
Nasal flaring			
Grunt	Absent	Heard with stethoscope	Heard without stethoscope

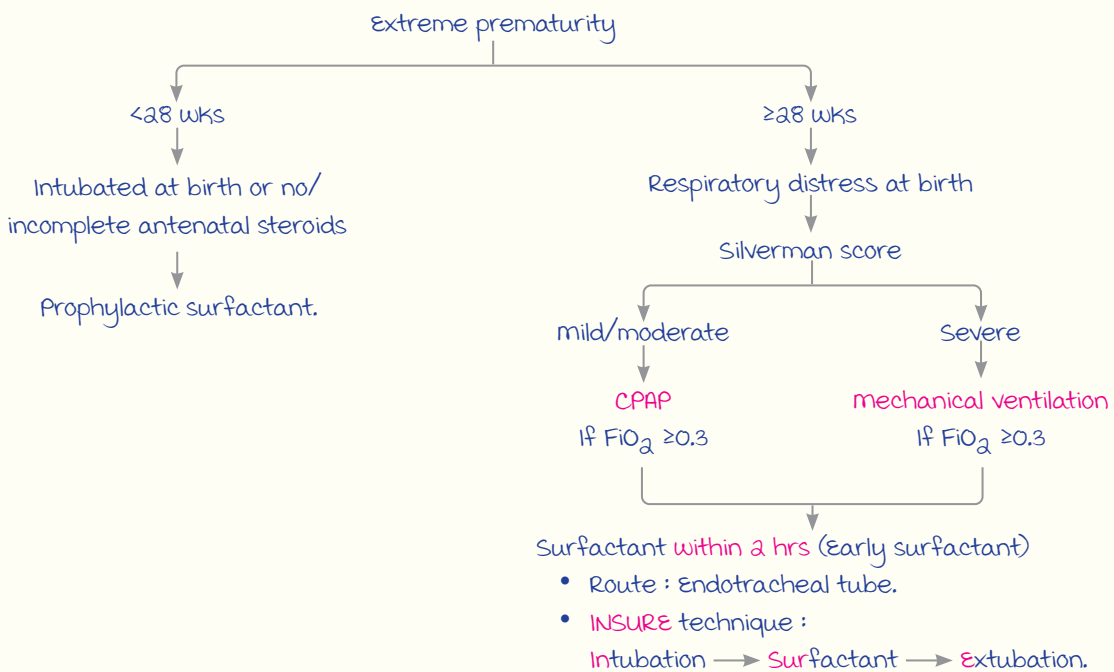
Interpretation :

- <3 : Mild.
- 4–6 : Moderate.
- ≥7 : Severe.

Downe scoring parameters :

- Respiratory rate.
- Air entry.
- Grunting.
- Retractions.
- Cyanosis.

Management protocol for preterm :



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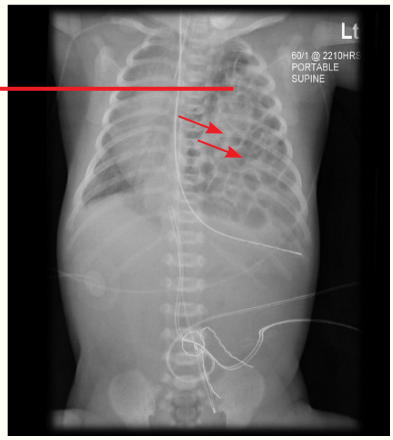
CONGENITAL DIAPHRAGMATIC HERNIA (CDH)

Intestines → Compress lung → Pulmonary hypoplasia → Respiratory distress.

On examination :

- Heart sounds in Ⓡ hemithorax.
- Scaphoid abdomen.



Intestinal air shadows in thoracic cavity

Types :

	Bochdalek hernia	Morgagni hernia
Diaphragm defect	Posterolateral	Anterior
m/c side	Left	Right

Prenatal markers of severity :

- Lung-to-head ratio < 1
- Liver in thoracic cavity

} Poor prognosis.

Neonatal Jaundice

01:09:03

Physiological jaundice > Pathological jaundice.

Bilirubin ≥5 mg/dL : Visible jaundice.

Kramer's Rule :

Cephalocaudal progression.

Area	Approx bilirubin level (mg/dL)
I. Head (Eyes)	5–7
II. Chest	7–9
III. Abdomen	9–11
IV. Limbs	11–13
V. Palms/soles (Last area)	13–15 : Danger sign (↑Risk of brain damage.)

Physiological Jaundice :

	Breast feeding jaundice	Breast milk jaundice
Appearance	1st week of birth	2nd/3rd week of birth
Cause	Inadequate breastfeeding	Pregnanediol in breastmilk → Inhibits conjugation → ↑Unconjugated bilirubin.
Mx (Never stop breastfeeding)	Adequate breastfeeding	Continue breastfeeding (Self-limiting)

Pathological Jaundice :

----- Active space -----

Criteria : Any one of the following.

- Appearance : <24 hrs of birth.
- Duration : >3 weeks.
- Involvement of palms & soles.
- Dark yellow urine & clay stools : ↑Conjugated bilirubin d/t obstruction.

Treatment :

↑Unconjugated bilirubin	↑Conjugated bilirubin
1. Phototherapy : • Blue light : 460–490 nm. • Mechanism : Structural isomerisation (Bilirubin → Lumirubin). • C/I : Conjugated hyperbilirubinemia d/t bronze baby syndrome. 2. Exchange transfusion : Indication : • ↑ TSB than age specific cut-off (Nomogram). • Features of bilirubin encephalopathy ⊕. • Rh isoimmunization : Cord blood → Bilirubin >5mg/dL or Hb <10 g/dL.	Etiology : D/t obstruction. ↓ Extrahepatic biliary atresia (EHBA) : m/c. Rx : Hepatico-jejunostomy ↓ Followed by Liver transplantation.

Kernicterus/Biliary Induced Neurological Damage (BIND) :

AKA biliary encephalopathy.

Brain damage

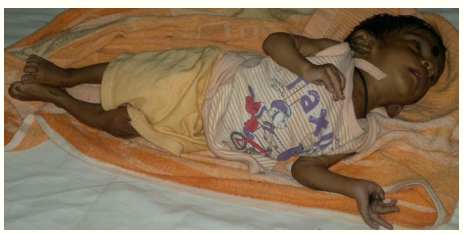
Acute (Neonatal) :

- Hypotonia → Hypertonia.
- Seizure.
- Lethargy.
- ↓Feeding.

Chronic (In older children) :

Extrapyramidal cerebral palsy

- Basal ganglia : m/c site affected.
- Extrapyramidal effects : Chorea, athetosis.
- Sensorineural hearing loss, enamel hypoplasia, upward gaze palsy.



Opisthotonus : Arching of the back. (Characteristic)

----- Active space -----

SYSTEMIC PAEDIATRICS : NEUROLOGY

Neural Tube Defects (NTD)

00:00:52

Pathophysiology :

Normal closure of neural pore (4th week of gestation) → Failure → NTD
- Anterior → Cranial NTD.
- Posterior (m/c) → Caudal NTD.

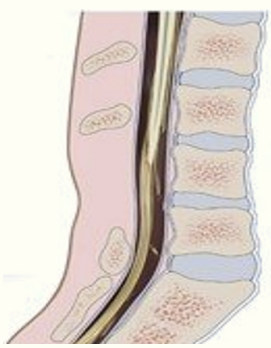
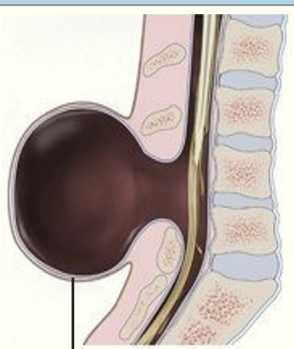
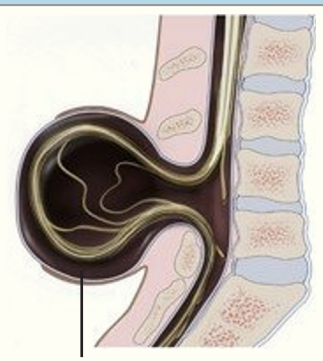
Risk Factors :

- Overt diabetes in mother
- Teratogenic drugs : Valproate, carbamazepine
- Folic acid deficiency

→ Multifactorial inheritance.

Defects :

Caudal NTD :

Spina bifida occulta	Meningocoele	Meningomyelocoele
	 Protrusion of meninges	 Protrusion of meninges + Spinal nerve roots
• Failure of fusion of posterior vertebral arch. • m/c site : L5/S1. • Asymptomatic (Spinal cord & meninges are unaffected).	• Swelling in lumbosacral area. • Transillumination +ve (As content is CSF). -	• Lower limb weakness. • Bladder incontinence. • ↑ Risk of infections (D/t rupture).

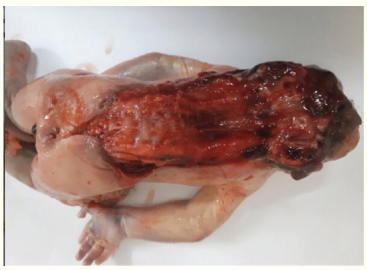
Cranial NTD :

----- Active space -----

Anencephaly	Encephalocoele
• Absent/ incomplete development of cerebral hemispheres. • Intact brainstem (Autonomic functions & primitive reflexes are ⊕). 	Defect of skull ↓ Protrusion of brain tissue ↓ Swelling m/c site : Occipital region.

Combined NTD :

- Craniorachischisis.
- Failure of fusion of skull + spine.



Craniorachischisis

Investigations :

USG : IOC.

- Done at 16 wks of gestation.
- Earliest identification : Anencephaly (10–12 wks).

Amniotic fluid markers :

- AFP : Screening.
- Acetylcholinesterase : Best marker.

Management :

Rx :

NTD detected during
- Antenatal period → Terminate the pregnancy.
- Preconceptional period (Previously affected child ⊕) → Folic acid : 4000 mcg (4mg/day).

Prevention : Folic acid 400mcg (0.4mg) /day.

Febrile Seizure

00:12:08

- Fever + Seizure + Absence of CNS infection.
- Age : 6 months to 5 years.

Types :

Simple febrile (m/c type) :

- 1 episode of GTCS
- Duration : < 15 mins

Criteria not met → Complex/Atypical febrile seizures.

----- Active space -----

Management :

Treatment :

1. Rx of fever : Antipyretics, tepid sponging.
2. Rx of seizure :

Stabilize : Airway, breathing, circulation
↓ If seizure > 5 min
Benzodiazepine IV upto 2 doses : 1st line DOC
Diazepam per rectal / Midazolam intranasal } Alternatives if IV line can't be secured
↓ No response
Fosphenytoin / valproate / levetiracetam : 2nd line
↓ No response

Refractory seizure :
- Continuous IV : Thiopental/midazolam/phenobarbital/propofol.
- EEG monitoring.

Recurrence of seizures (upto 5 yrs) :

- Risk factor for recurrence :

Major :
- Age < 1 yr.
- Duration of fever < 24hrs.
- Fever 38 – 39°C (100.4 – 102.2°F).

Minor :
- Family h/o febrile seizures/epilepsy.
- Complex febrile seizure.
- Lower S. Na^+ at presentation.

- If major risk factors ⊕ → Add oral clobazam with PCT for first 48–72 hrs of fever (Intermittent prophylaxis).
- Incidence of recurrence :
  - 1st episode : 30%
  - Age < 1yr at 1st episode
  - ≥ 2 episodes

  } 50%.
- Risk of recurrence of subsequent epilepsy :

Risk factors	Risk stratification
• Simple febrile seizure • Recurrent febrile seizure	Low risk
• Complex febrile seizure • Family H/o epilepsy • Neurodevelopmental abnormalities	High risk : Ix to be done • EEG • MRI brain without contrast

Indications of lumbar puncture in febrile seizure :

----- Active space -----

- Age < 6 months.
- Unimmunised child aged 6–12 months.
- Pretreated with antibiotics.
- Clinical features of meningitis (Any age).

OTHER SEIZURES :

	Features	EEG	Rx
Absence seizures	• F > M. • School-going children m/c. • Provoked by hyperventilation.	3Hz spike & wave.	• Valproate : DOC. • Ethosuximide.
Juvenile myoclonic epilepsy/ Janz Syndrome	• Adolescents. • Photosensitivity ⊕.	4–6 Hz polyspike & wave.	Valproate : DOC.
West syndrome/ Infantile spasm	• < 1 year. • Jack knife seizure : Sudden jerky movements. • Salaam spells : Spasm of neck muscles (Flexors). • Developmental regression.	Hypsarrhythmia : High voltage spikes in chaotic background.	• Inj. ACTH : DOC . • Vigabatrin : (Doc if a/w tuberous sclerosis).

Meningitis

00:26:17

Fever + signs of meningeal irritation.

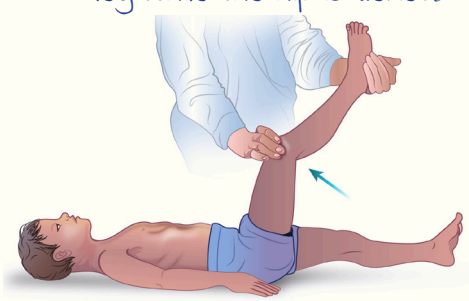
Signs Of Meningeal Irritation :

Uncommon in young children (Especially infants).

1. Nuchal rigidity : Neck stiffness.

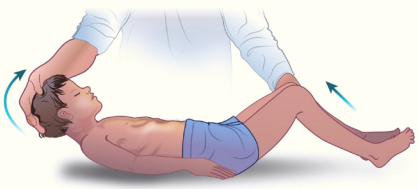
2. Kernig's sign :

Resistance to extension of leg while the hip is flexed.



3. Brudzinski's sign :

Flexion of neck ⟶ Flexion of hips & knees.



----- Active space -----

Features in young children :

- Irritability.
- Bulging fontanelle d/t ↑ ICT.
- Poor feeding.

Etiology :

- Bacteria (m/c) :
  - Streptococcus pneumoniae : Overall m/c.
  - E. coli : m/c in neonates.
- Viral : JE ⟶ m/c virus.

Investigation :

- CSF analysis by lumbar puncture : IOC.

	Bacterial meningitis	Viral meningitis
Sugar	Low : Hypoglycorrhachia	Normal
Protein	High	Normal / ↑
WBC	↑ : Neutrophils ++	↑ : Lymphocytes ++

- Follow up Ix post Rx of meningitis : BERA (To rule out SNHL).

Treatment :

1. IV antibiotics : 3rd gen. cephalosporins + Vancomycin } x 2 weeks.
   - Meropenem : If allergic to cephalosporin
2. IV steroids : Dexamethasone.
   - ↓ Inflammation.
   - ↓ Incidence of sensorineural hearing loss (SNIHL) : m/c long term sequelae.

Special Situations :

	Etiology	Management
T lymphocyte deficiency	Listeria monocytogenes	Ampicillin
C_5-C_8 complement deficiency	N. meningitidis	3rd gen. cephalosporins
CSF leaks	Strep. pneumoniae	-
Shunt associated meningitis (V-P shunt for congenital hydrocephalus)	CONS (Coagulase negative staphylococcus) : S. epidermidis	Shunt tap (IOC)

Cerebral Palsy(CP)

00:37:13

----- Active space -----

- m/c cause of global developmental delay (DQ < 70 in ≥ 2 domains).
- Insult to brain during development :
  - Low IQ.
  - Seizure.
  - Vision & hearing defects.

Etiology :

Birth asphyxia ⟶ Hypoxia & ischemia of brain ⟶ CP.

Types :

	Spastic quadriplegia (m/c)	Spastic diplegia	Extrapyramidal
Features	All 4 limbs spasticity	Scissoring gait (D/t ↑ tone)	Chorea, athetosis
Neuropathology	• Parasagittal infarct • Multicystic encephalomacia	Periventricular leukomalacia	Basal ganglia lesions
Etiology	Birth asphyxia in term neonates	Birth asphyxia in preterm neonates	Chronic bilirubin encephalopathy

Scissoring gait

Duchenne Muscular Dystrophy (DMD)

00:41:41

- X-linked recessive.
- Defect : Dystrophin gene.

Clinical Features :

- Proximal muscle weakness (UL ⟶ Shoulder muscles, LL ⟶ Hip muscles) :
  - Delayed walking.
  - Difficulty in standing from sitting position : Elicited by Gower sign.
- Pseudohypertrophy :
  - D/t fibrofatty deposition.
  - Calf muscle (m/c site), tongue muscle.
- Low IQ (< 70).
- Progressive scoliosis ⟶ Loss of ambulation (Wheelchair dependent).
- Cardiac failure.
- Respiratory failure : m/c cause of death.
- Death occurs in early 3rd decade.

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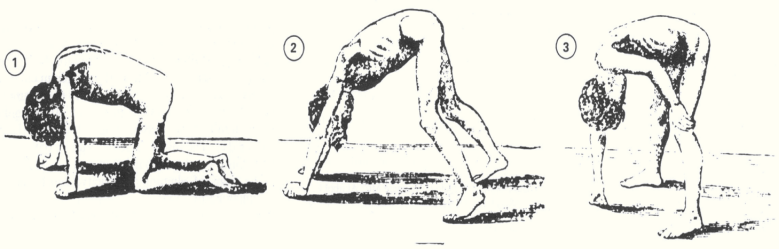
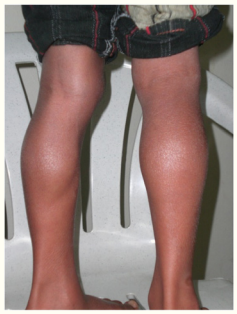


Gower Sign



Pseudohypertrophy of calf muscles

Investigations :

- Creatine phosphokinase (CPK) : 1st investigation.
- Muscle biopsy : Diagnostic.
  - Muscle fibre atrophy.
  - Fibro fatty tissue deposition.
- Dystrophin immunohistochemistry.
- Multiplex ligation probe dependent amplification (MLPA).

----- Active space -----

SYSTEMIC PAEDIATRICS : PULMONOLOGY & CARDIOLOGY

Upper Airway Disorders

00:00:15

Laryngomalacia :

- m/c cause of stridor in infants.
- m/c congenital anomaly of larynx.

Clinical feature :

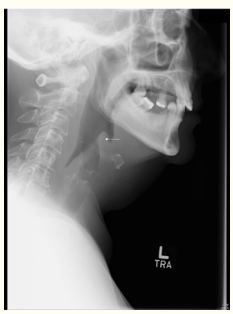
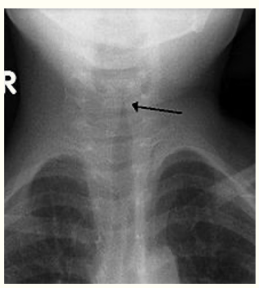
Stridor (Noisy breathing).

Postural variation → Supine : Stridor ⊕.
→ Prone : Stridor ⊖.

Investigation : Omega (Ω) shaped epiglottis on laryngoscopy.

Management : Reassurance as spontaneous resolution by 18 months.

Acute Epiglottitis vs. Croup :

	Acute epiglottitis	Croup
Age	3 – 6 yrs	6 months – 5 yrs
Etiology	H. influenzae type B	Parainfluenza
C/F	• Toxic appearance • Continuous drooling of saliva • Tripod position • Rapidly progressive • Fever + stridor	• Well-looking • Croupy cough • Gradually progressive • Low grade fever + stridor
Imaging	 Thumb sign : Swollen epiglottis	 Steeple sign : Narrowed larynx
Rx	• Airway management • IV antibiotics : 3rd gen Cephalosporins (Ceftriaxone, cefotaxime)	• Dexamethasone : ↓inflammation • Racemic epinephrine nebulisation : – ↓Edema – In moderate to severe croup (Retractions, ↓SpO_2)

----- Active space -----

Lower Airway Disorders

00:08:48

Acute Bronchiolitis :

- 1st episode of wheeze following URTI.
- Seasonal presentation : Winter.

Etiology : Respiratory syncytial virus (RSV).

Clinical features :

- B/L wheeze.
- URTI progresses to LRTI + fever.

Investigation :

X-ray : B/L hyperinflation due to air trapping effect of lung.

Treatment :

- Supportive (Self-limiting illness).
- Comorbidities ⊕ :
  - Rx : Ribavirin.
  - Prophylaxis : Palivizumab (Monoclonal antibodies against RSV proteins).

Pneumonia :

Causes under-5 mortality.

Etiology :

- Strep. pneumoniae : Overall m/c.
- RSV : m/c virus.
- Pneumocystis jirovecii : m/c in HIV +ve children.

IMNCI guidelines (Based on revised WHO guidelines) :

Terminology	Clinical features	Management
No pneumonia	Fever, cough/cold	Home mx : Paracetamol
Pneumonia	• Fever, cough/cold + Fast breathing ± Chest indrawing • SpO_a : Normal	Home mx : Paracetamol + Oral Amoxicillin x 5 days
Severe pneumonia	• Hypoxia (or) • Danger signs : - Lethargy - Poor feeding - Convulsion - Cyanosis	Immediate referral to higher centre + 1st dose of IV antibiotic (Inj. ampicillin + gentamicin)

- Fast breathing :

Age	Respiratory rate (Per min)
< 2 months	> 60
2 – 12 months	> 50
> 12 months	> 40

----- Active space -----

- Wheeze ⊕ : Add bronchodilators x 5 days.
- Evaluate for TB : If persistent cough for > 14 days.

Foreign Body Aspiration :

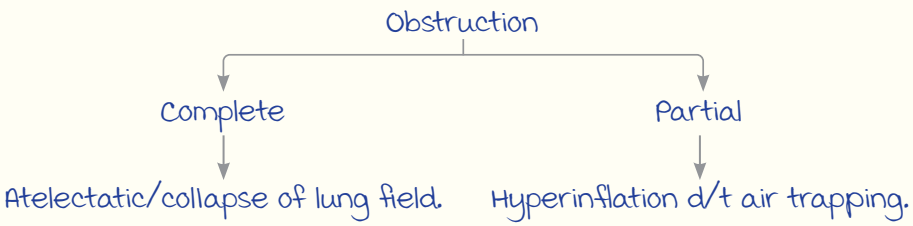
- Young child < 4 years.
- Site : Rt bronchus (m/c location).

Clinical features :

- Sudden onset breathing difficulty.
- Monophonic U/L wheeze.

Note : Polyphonic wheeze is seen in asthma.

Investigation : X-ray.



Management : Foreign body removal with rigid bronchoscopes.

Asthma in Children :

Recurrent wheeze d/t bronchoconstriction.

Investigation :

- ↓FEV_1/FVC ratio.
- Response to inhaled β_2 agonist : 12%↑ in FEV_1.
- Diurnal variation in PEFR/FEV_1 : ≥ 20% ↑.
- Exercise challenge : ≥ 15%↓ in FEV_1.

Asthma management guidelines :

	Symptoms	Treatment
Intermittent	Infrequent < 2 episodes/month	Relievers (SOS) : SABA + ICS
Mild persistent	≥ 2 episodes/month or ≥ 1 night time awakening/month	Low dose ICS (Daily)
Moderate persistent	Daily episodes (Not continuous)	Medium dose ICS (Daily) OR Low dose ICS (Daily) + LABA
Severe persistent	• Daily episodes • Continuous limitation of activity	High dose ICS (Daily) + LABA

ICS : Inhaled corticosteroids ; SABA : Short acting β_2 agonist ;
LABA : Long acting β_2 agonist.

----- Active space -----

metered dose inhaler (MDI) :

- 12 yrs : MDI.
- 4 – 12 yrs : MDI + spacer.
- < 4 yrs : MDI + spacer + face mask.


MDI

Management of acute exacerbation :

First line :

1. O_2 Supplementation : SpO_2 > 92%.
2. Salbutamol nebulization : Once every 20 mins in 1st hr ± Ipratropium nebulization (If no response with salbutamol).
3. Systemic steroid : Oral prednisolone or IV hydrocortisone.

Second line :

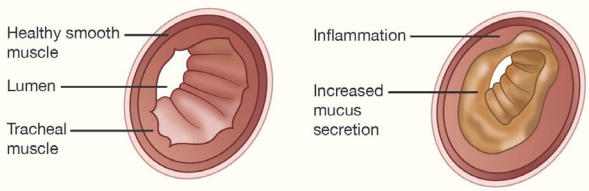
1. $MgSO_4$.
2. Terbutaline + theophylline.

Cystic Fibrosis (CF)

00:32:13

- Autosomal recessive.
- CFTR mutation (Cystic fibrosis transmembrane regulator).
- Del F508 mutation (M/C) : Deletion of phenylalanine at 508 position.
- Previously known as mucoviscidosis

Defect : Cl^- channel inactivation d/t misfolded proteins.



Healthy lumen CF lumen

Clinical features :

	Manifestations
RS	• Recurrent pneumonia (M/C) – Staph. aureus (M/C) – Pseudomonas aeruginosa • Bronchiectasis • B/L nasal polyp
GIT	• Meconium ileus (Early manifestation) • Distal intestinal obstruction syndrome (DIOS) • Malabsorption • Pancreatic insufficiency (In 85% of cases) – Steatorrhoea – ↓Vit A, D, E, K absorption (↓Fat absorption (Exocrine)) – Diabetes (Endocrine) • Cholestasis, biliary cirrhosis
Miscellaneous	• B/L absent vas deferens → Azoospermia → Male infertility • Excessively salty sweat d/t ↑Na, ↑Cl

Diagnostic criteria :

----- Active space -----

A. Suspect if :

Typical clinical features (RS, GIT or GU) OR Family history OR Immunoreactive trypsinogen test (IRT) in newborn screening ⊕

B. Confirmatory :

- 2 elevated sweat chloride on separate days > 60 mEq/L OR
- 2 CFTR mutations ⊕ : Best investigation OR
- Abnormal nasal potential difference measurement.

Treatment :

CFTR modulators

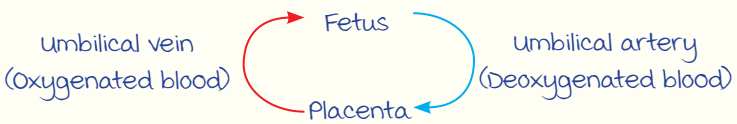
CFTR potentiator :
- ↑Duration of Cl channel opening.
- Eg : Ivacaftor.

CFTR corrector :
- Modifies protein folding.
- Eg : Lumacaftor.

Fetal Circulation & Acyanotic Congenital Heart Disease 00:43:18

Fetal Circulation :

Placenta dependent circulations.



Communications :

	Communications
Ductus arteriosus	Pulmonary artery & aorta
Foramen ovale	Connects 2 atria at interatrial septum
Ductus venosus	Connects umbilical veins & IVC

Closure post birth :

1. Umbilical vessels.
2. Ductus venosus.
3. Foramen ovale.
4. Ductus arteriosus.

Early → Late

	Closure of ductus arteriosus
Functional	10–14 hrs after birth
Anatomical	10–21 days after birth

Nadas Criteria :

Major criteria	Minor criteria
• Systolic murmur ≥ Grade 3 or thrill ⊕ • Any diastolic murmur • Central cyanosis • Congestive heart failure	• Systolic murmur < Grade 3 • Abnormal S2 • Abnormal ECG • Abnormal CXR, abnormal BP

1 major or 2 minor criteria → Congenital heart disease.

----- Active space -----

Acyanotic Heart Disease :

m/c type of CHD : Based on etiology

- Obstruction : Coarctation of aorta.
- L – R shunt :
  - VSD.
  - ASD.
  - PDA.

L – R shunt :

	m/c type	Characteristics
VSD (m/c)	Perimembranous VSD	• Pansystolic murmur • Site : Left 4th ICS, parasternal area
ASD	Ostium secundum ASD	• Wide, fixed split S2 • No murmur
PDA	-	• ↑Incidence in preterm • Continuous, loud, machinery murmur • Site : Left 2nd ICS

Management :

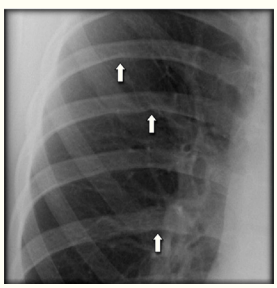
- VSD & ASD : Surgical Mx.
- PDA : In preterm babies, medical Mx can be tried.
  - NSAIDs (DOC) d/t COX ⊖ → ↓Prostaglandin.
  - Ibuprofen >> Indomethacin (As Ibuprofin has ↓risk of nephrotoxicity & necrotizing enterocolitis).

Coarctation of aorta :

- Partial narrowing of aorta → ↓Flow in descending aorta.
- Type : Juxtaductal (m/c).

Clinical features :

- Weak femoral pulses.
- Radiofemoral delay.
- Hypertension in upper limbs d/t ↑afterload in heart.



Compensation :

Collaterals formation → ↑size intercostal arteries → Inferior rib notching.

Cyanotic CHD

00:58:57

↑Pulmonary blood flow	↓Pulmonary blood flow
• Transposition of great arteries (TGA) : m/c cyanotic CHD in neonates • Truncus arteriosus • Total anomalous pulmonary venous communication (TAPVC)	• Tetralogy of Fallot : m/c cyanotic CHD overall • Ebstein anomaly • Tricuspid atresia

Tetralogy of Fallot :

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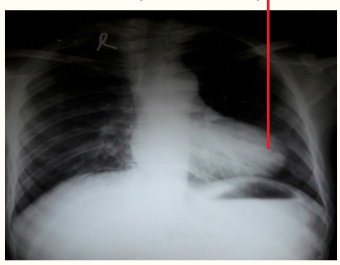
Best prognosis in cyanotic CHD (Longest survival).



Boot shaped heart on X ray

Features :

1. Overriding of aorta.
2. Right ventricular hypertrophy (RVH).
3. Subpulmonary stenosis d/t infundibular hypertrophy
   AKA right ventricular outflow tract obstruction.
4. Ventricular septal defect.

Complications :

- Polycythemia (D/t chronic hypoxia) → Thromboembolism.
- Brain abscess.
- Cyanotic spells : Infundibular spasm —Worsens→ Cyanosis.

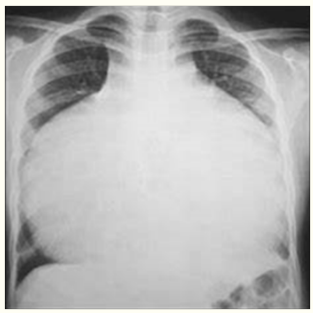
Management :

- β blockers : ↓infundibular spasms.
- O_2 supplementation.
- $NaHCO_3$: For acidosis
- Morphine : ↓hyperventilation.
- α agonists
- Squatting/Knee chest posture

} ↑Vascular resistance.

Ebstein's Anomaly :

- m/c CHD associated with arrhythmia.
- Downward displacement of tricuspid valve → ↑RA size.

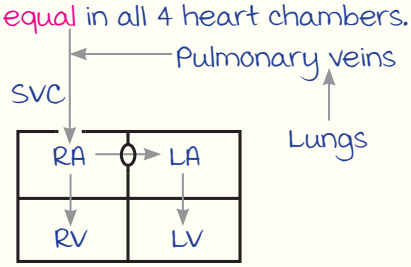

Box shaped heart

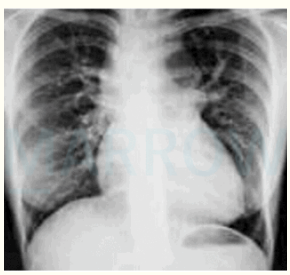
Associations :

- Wolff Parkinson White syndrome (WPW) :
  m/c type of arrhythmia : PSVT
  → Rx : IV adenosine 0.1 mg/kg (max : 6 mg).

Supracardiac TAPVC :

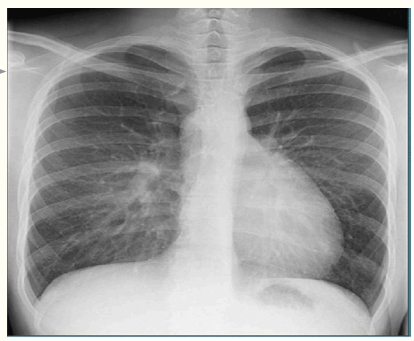
O_2 saturation equal in all 4 heart chambers.




Snowman/Figure of 8 appearance

TGA :

Egg on string appearance →



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Acute Rheumatic Fever

01:11:56

Etiology :

Age : 5 – 15 years.

Post streptococcal infection :

- Group A β-hemolytic streptococcus.
- Pharyngitis —(After few weeks)→ Rheumatic fever.

Modified Jones Criteria (2015) :

For high risk population :

Major	Minor
• Pancarditis (90%) : Clinical/subclinical • Arthritis (mono/poly) or polyarthralgia • Sydenham's chorea • Erythema marginatum • Subcutaneous nodules	• Monoarthralgia • Fever ≥ 38°C • ESR ≥ 30 mm/h in 1st hr OR CRP ≥ 3.0 mg/dL • Prolonged PR interval

Dx :

1. 2 major OR 1 major + 2 minor OR 3 minor (In recurrence).

+

2. ASO titre.

Prophylaxis :

2° prevention.

Drugs :

- Penicillin
  - Parenteral → Benzathine penicillin (Penicillin G) :
    - IM every 3–4 weeks.
    - < 30 kg : 6 lac units.
    - > 30 kg : 12 lac units.
  - Oral → Penicillin V
    250 mg twice daily.
- Erythromycin
  (If allergic to penicillin).

Duration :

	Duration (Whichever is longer)
Without carditis	5 yrs or till 18 yrs
With carditis	10 yrs or till 25 yrs
With RHD or following Sx	Lifelong

Kawasaki Disease

01:19:38 ----- Active space -----

- Age < 5 years.
- Medium vessel vasculitis : Affects coronary artery (20 – 30%).
- M/c childhood vasculitis in India.

Stages :

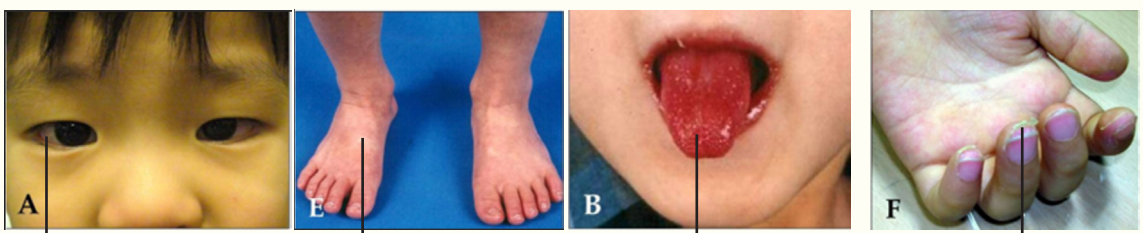
If treated (Can prevent complications)

Acute (1–2 weeks) → Subacute (3–4 weeks) → Recovery

- Fever ≥ 5 days.
- Any 4 out of 5 (CREAM) :
  1. B/L non-purulent conjunctivitis.
  2. Maculopapular rash (Non-specific).
  3. Edema.
  4. U/L cervical lymphadenopathy.
  5. Mucosal involvement : Strawberry tongue.

A. Periungular skin peeling.

B. Complications :
- Cardiac ischemia.
- Coronary aneurysms & thrombosis.



Treatment :

- IVIg : Drug of choice.
- High dose aspirin :
  - Anti-inflammatory.
  - 80–100 mg/kg/day.

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SYSTEMIC PAEDIATRICS : GASTROENTEROLOGY, NEPHROLOGY AND ENDOCRINOLOGY

Congenital Anomalies in GIT

00:00:25

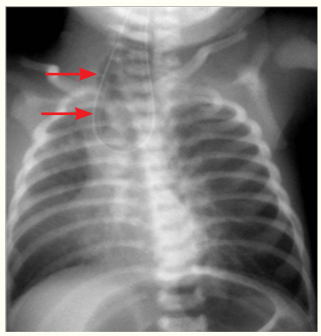
Esophageal Atresia :

Clinical features :

- Onset : Immediately after birth while feeding.
- Excess frothing.
- Vomiting.

} Obstruction of upper GI

- Aspiration → Respiratory distress.



Coiling of NG tube

Associations :

Tracheoesophageal fistula :

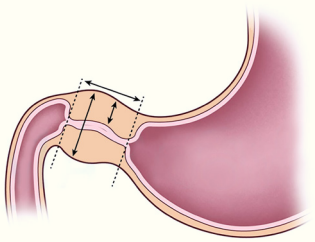
- m/c associated anomaly.
- m/c type : Type C → Proximal esophageal atresia with distal tracheoesophageal fistula.

Hypertrophic Pyloric Stenosis (HPS) :

Hypertrophy of circular muscle fibers in pylorus → Obstruction.

Clinical features :

- Onset at 2-3 weeks after birth.
- Projectile/non-bilious vomiting.
- Dehydration.
- Hypokalemic hypochloremic metabolic alkalosis with paradoxical aciduria.
- Erythromycin is associated with causing HPS.



Pylorus hypertrophy

On examination :

- Olive-shaped epigastric mass.
- Visible peristalsis from left to right.

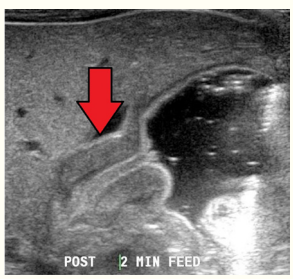
Investigation :

USG : IOC

- Pyloric muscle thickness : ≥4mm.
- Pyloric channel length : ≥16mm.

Treatment :

- Correction of dehydration : NS + K^+ → Fluid of choice
- Surgical Mx : Ramstedt's pyloromyotomy.



USG showing hypertrophy of the pylorus

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Hirschsprung Disease/Aganglionosis :

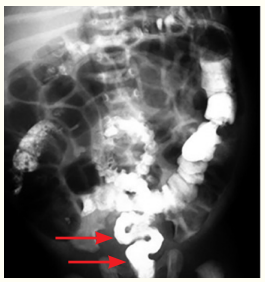
Absence of ganglion ⟶ No relaxation of rectum ⟶ Narrowed rectum.

Clinical features :

- Delayed passage of meconium.
- Abdominal distension.

Investigation :

- Contrast enema.
- Rectal biopsy : IOC.
  - Absence of ganglion.
  - Hypertrophied nerve fibers : Acetylcholine esterase stain.



Contrast enema showing narrowed rectum

Treatment : Resection & anastomosis.

Celiac Disease :

Malabsorption disorder.

Etiology :

Genetics : HLA DQ2 & HLA DQ8 predisposition.

↓

Gluten hypersensitivity (Barley, rice, oats, wheat).

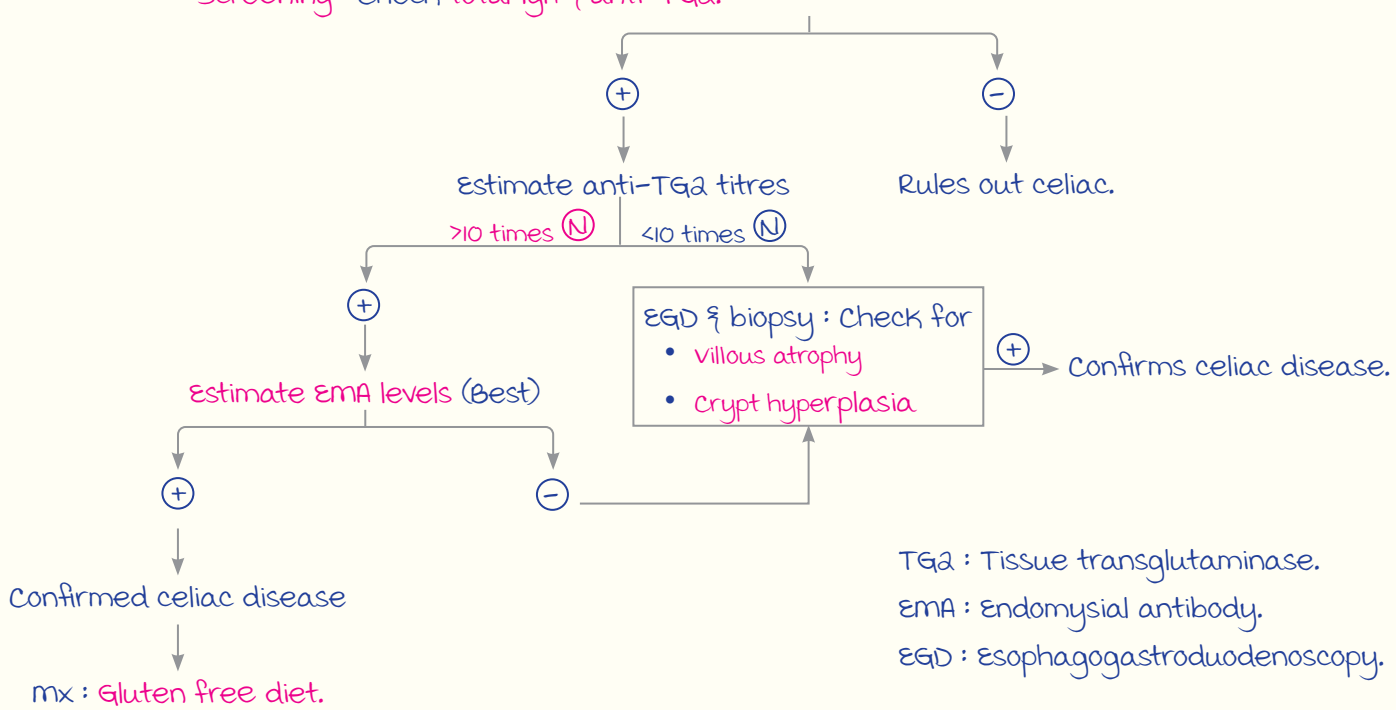
Clinical features :

- Chronic diarrhea (Non-infectious).
- Short stature.
- Failure to thrive.
- Anemia.

} Onset after initiation of complementary feeds. (After 6 months.)

Investigation :

Screening : Check total IgA & anti-TG2.



TG2 : Tissue transglutaminase.
EMA : Endomysial antibody.
EGD : Esophagogastroduodenoscopy.

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Diarrhoea

00:16:47

Acute Diarrhoea :

Cause of under-5 mortality.

Duration : <7 days

Etiology :

- Rotavirus (Overall m/c.)
- ETEC : Enterotoxigenic E. coli (m/c bacteria).

Note : Shigella flexneri is m/c cause of dysentery in children.

IMNCI management guidelines :

	No dehydration	Some dehydration	Severe dehydration
Features	Active, alert child	Irritability, thirst.	Lethargic
Skin pinch	Fast response (<1 sec)	Slow response (≤2 sec)	Very slow (>2 sec)
management	Plan A Replace ongoing loss per loose stools with ORS : • <2 yrs : 50-100 mL • 2-10 yrs : 100-200 mL • >10 yrs : As much as required	Plan B Rehydration with ORS : 75 mL/kg over 4 hrs.	Plan C Rehydration with IV fluids : RL + 5% dextrose at 100 mL/kg

Note : Skin pinch not reliable in malnutrition.
(D/t loss of subcutaneous fat)

Plan C :

Based on age.

Age	30 mL/kg	70 mL/kg
<1 yr	1 hr	5 hr
>1 yr	30 min	2.5 hr

WHO low osmolar ORS :

Components	Osm (mosm/L)
Glucose	75
Na	75
K	20
Cl	65
Citrate	10
Total	245

Transport by SGLT-1

Zinc : For growth of epithelium.

Age	Dose	Rx duration :
<6 months	10 mg/day	x 2 weeks
>6 months	20 mg/day	

Causes of Seizures + Diarrhoea in a Child :

----- Active space -----

- Febrile seizure.
- Cerebral venous or sagittal sinus thrombosis (D/t dehydration)
- Metabolic & electrolyte imbalance.
  - Hypoglycemia.
  - Hyponatremia.
  - Hypernatremia.

Liver Disorders

00:27:07

Inherited Hyperbilirubinemia/Syndromic Jaundice :

Autosomal recessive (m/c inheritance).

Syndrome	Defect	Age group
Unconjugated Hyperbilirubinemia		
Gilbert (Overall m/c)	↓ UDP-GT (mild)	Older children Intermittent jaundice
Crigler Najjar Type-I	Absent UDP-GT (Severe)	Neonatal
Crigler Najjar Type-II	Partial absence of UDP-GT	
Conjugated Hyperbilirubinemia : Transporter defect		
Dubin Johnson	ABCC transporter	Late onset : Adolescent, adult
Rotor syndrome	OATP transporter	

ABCC : ATP Binding Canalicular Cassette

OATP : Organic Anion Transport Protein

Neonatal Cholestasis :

- ↑Conjugated bilirubin d/t obstruction.
- Total conjugated bilirubin :
  a. >1 mg/dL or
  b. >20% of total S. bilirubin (TSB) if TSB >5 mg/dL.

Etiology :

- Extrahepatic biliary atresia (EHBA) : m/c cause.
- Neonatal hepatitis (Idiopathic).

Clinical feature : Pale stool & dark colored urine.

Liver biopsy :

	Neonatal hepatits (Idiopathic)	EHBA
Hepatic architecture	Disarray of hepatic lobules	Intact
Giant cells	⊕⊕⊕	⊕
Portal reaction	Lymphocytic infiltrates ⊕	Fibrosis ⊕⊕
Neo and periductal proliferation	⊖	⊕

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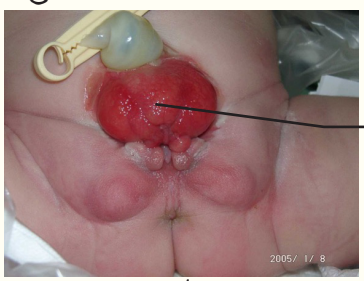
Congenital Bladder Anomalies & UTI

00:35:13

Congenital Bladder Anomalies :

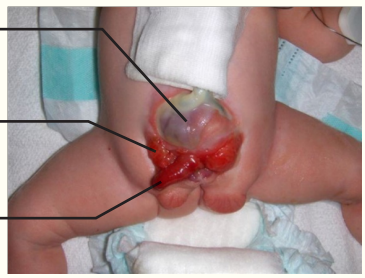


Ectopia vesicae/bladder extrophy

Omphalocele : Sac covered intestine.

Exposed bladder

Elephant trunk ileum : Exposed terminal ileum.



Cloacal exstrophy

UTI :

Etiology : E. coli (m/c).

Investigation :

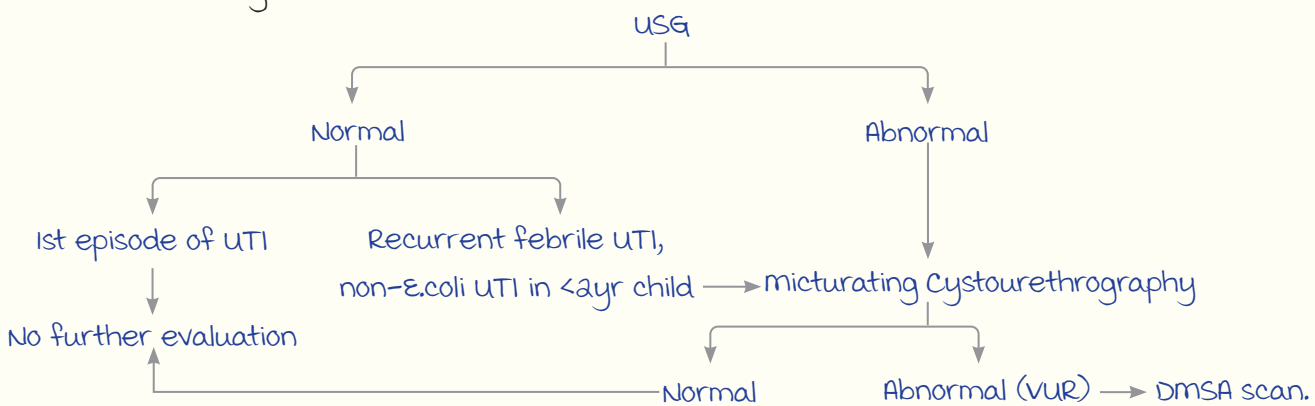
Urine culture : Diagnostic.

- Specimen : Mid-stream clean catch urine sample.
- Dx : ≥ 10^5 CFU/mL (CFU : Colony Forming Unit).

Follow up :

Investigations	Timings	Rationale
USG KUB	Any time (During/after Rx)	Screening
MCU (Micturating Cysto-Urethrogram)	2-4 weeks after treatment	Detect anomalies causing recurrent UTI Eg : PUV (Posterior Urethral Valve)
DMSA scan	3-4 months after treatment	Detect renal scars

Mx algorithm :

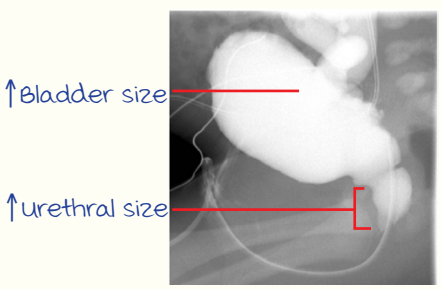


Posterior Urethral Valve :

m/c cause of obstructive uropathy in male child.

Clinical feature : Recurrent UTI.

Management : Cystoscopic fulguration of valve.



PUV in MCU

Renal Disorders

00:43:34 ----- Active space -----

Nephrotic Syndrome :

Characteristics :

1. Massive proteinuria : > 40 mg/m²/hr or 3+/4+ in urine dipstick
2. Hypoalbuminemia
3. Generalized edema
4. Hyperlipidemia

Etiology : Minimal Change Disease (MCD) → m/c.

	Minimal change disease	Significant change disorders (Eg : FSGS)
Age at onset	2-6 years	Late adolescent/adults
Hematuria/Hypertension	-	±
Renal function	Normal	Abnormal/↓↓ leads to CKI
Response to steroids	Excellent	Resistant

Based on steroid response :

Remission :	Urine albumin : Nil/trace (Or) Proteinuria < 4 mg/m²/hr } 3 consecutive early morning specimens.
Steroid resistance	• Absent remission despite daily steroid for 6 wks. • Rx : Calcineurin inhibitors (E.g., Cyclosporin, Tacrolimus)
Steroid dependence	• 2 consecutive relapses : - While on alternative day steroid (Or) - Within 14 days of steroid discontinuation • Rx : Steroid sparing agents (Eg., Levamisole, Mycophenolate)

Glomerulonephritis :

Characteristics :

- Hematuria :
  - Dysmorphic RBC with RBC casts in urine.
  - Cola-colored urine.
- Hypertension.
- Periorbital puffiness.
- Mild proteinuria.

Etiology :

- Post-streptococcus glomerulonephritis (PSGN).
- Group-A β hemolytic streptococcus.

----- Active space -----

Clinical features :

- Age : 5–15 yrs
- Pharyngitis (1–2 wks) → PSGN
- Pyoderma (3–6 wks) → PSGN

Investigation :

- ↑ASO titre, ↑Anti-DNase B
- ↓Serum C3.

Treatment : Conservative (Self-limiting).

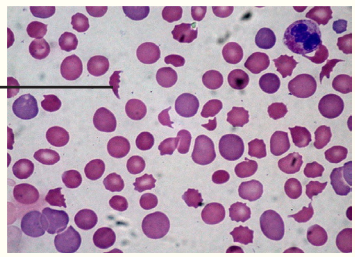
Note :

Rheumatic fever:

- Age : 5–15 yrs.
- Post streptococcal infection.

Hemolytic Uremic Syndrome (HUS) :

- Acute kidney injury ⊕
- Occurs post infection :
  Diarrhea (MIC) —5–7 days→ HUS : D+ HUS.



Peripheral smear

Etiology :

- EHEC : O157:H7, O104:H4.
- Shigella dysenteriae.

Toxin : Shiga, vero-like toxin.

Investigation :

PS : Thrombocytopenia, schistocytes (D/t hemolysis).

Management :

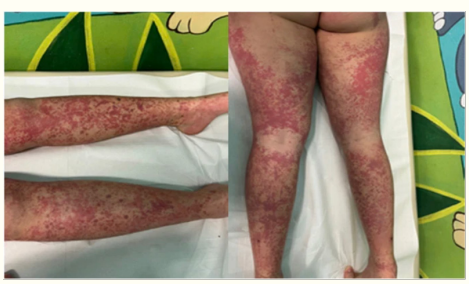
- Supportive mx of AKI : Fluid & electrolytes
- Monitor:
  - Serum creatinine.
  - Urine output.
  - eGFR : Schwartz formula → Length (cm) x 0.4 (Constant : K)/S. creatinine.
- Antibiotics : No role (D/t lysis of bacteria → Further toxin release).

Henoch Schonlein Purpura (HSP)/IgA Vasculitis :

- Small vessel vasculitis.
- D/t IgA deposition.

Clinical features :

- Post prandial abdominal pain.
- Joint pain.
- Nephritis.
- Non-thrombocytopenic palpable purpura.


Non thrombocytopenic palpable purpura

Management : Steroids.

↓

Indications : Severe GI complications (Abdominal pain/bleeding/intussusception).

Endocrinology Disorders

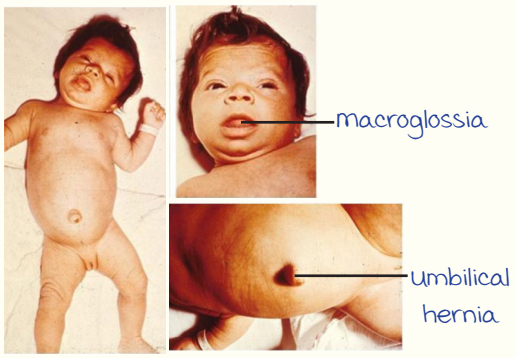
01:00:07 ----- Active space -----

Congenital Hypothyroidism :

Thyroid dysgenesis (Hypoplasia, aplasia, ectopic thyroid)

Clinical features :

- ↓metabolism.
- Hypothermia.
- Dry skin.
- Wide open fontanelle & late closure.
- Hoarse cry.
- Delayed passage of meconium.



Clinical features

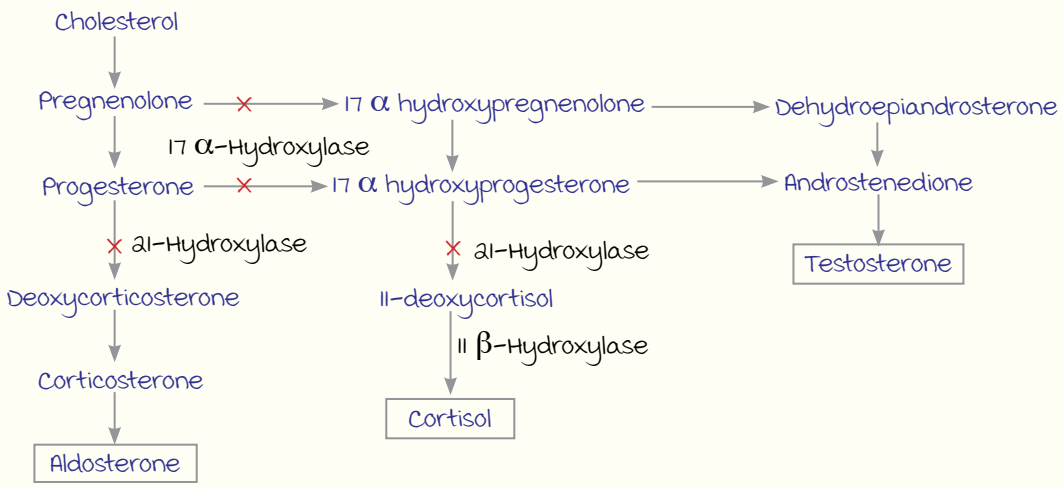
Note : C/f same in cretinism.

Investigation :

- Screening : ↑TSH at day 2-4.
- Radiology :
  - USG Thyroid.
  - Radioisotope scan with I^{123} > Tc^{99}.

Congenital Adrenal Hyperplasia :

Biochemical pathway :



Clinical features :

Enzyme deficiency	Aldosterone	Cortisol	ACTH	Testosterone
21 hydroxylase (m/c)	↓ (↓BP → Shock)	↓ (Hypo glycemia)	↑ (Hyper pigmentation)	↑ • Ambiguous genitalia. (In females) • Precocious puberty. (In males)
11 β hydroxylase	↓ (BP↑↑) (D/t 11-deoxycorticosterone having mineralocorticoid activity)			
17 α hydroxylase	↑ (↑ BP)			↓ Under virilisation. (In males)

Ix for 21-Hydroxylase deficiency : ↑17 α hydroxyprogesterone in neonatal screening.