EMBRYOLOGY
(i)Intracoelomic part of yolk sac forms GI tract attached to extracoelomic part of by vitellointestinal duct (yolk stalk)
(ii)Allantois buds from hindgut in week 3; grows into body stalk
Yolk stalk + body stalk fuse → umbilical cord

Umbilical cord = (i)VID + body stalk fused
(ii)Umbilical vein to ligamentum venosum; umbilical arteries x2 from placenta in round ligament

Umbilical ring = covered by Richet's fascia, transversalis fascia and peritoneum

Ligaments = median umbilical ligament → bladder as urachus
medial umbilical ligaments

Failed obliteration → abnormal communications/cysts/umbilical hernia

UMBILICAL HERNIA
Epidemiology: early infancy/black/ESI/20% prevalence
Risk factors: low bwt/prem/trisomy 13, 18, 21/Beckwith-Wiedemann/hypothyroidism
Features: umbilical swelling (pain/irreducibility/obstruction)
Management: (i)non-operative: asymptomatics <1.5cm monitored up to 3yrs
(ii)operative: symptomatic/asymptomatic >1.5cm, still open at 3yrs, large proboscis

paraumbilical hernia = linea alba defet unlikely to spontaneously close → operative management (sutures only)*

UMBILICAL GRANULOMA
Pink, friable lesion at base of umbilicus
Management: silver nitrate/excise

UMBILICAL POLYP/ECTOPIC MUCOSA
Retained gastric/intestinal mucosa from VID +/- opening
Management: silver nitrate/excision

SWELLING
History
Obstetric: Age/gestation/bwt
Swelling: appears when cries/disappeares when asleep; obstruction, irreducibility, strangulation; discharge
PMHx: syndromes (trisomies/B-W/hypoT4)

Examination
Swelling: reducibility/expansile cough impulse; overlying skin; opening of VID/urachus
Syndromes

Investigations

Management
UH: non-operative vs operative
UG/UP: silver nitrate/excision

VITELLOINTESTINAL DUCT REMNANTS
Persistent VID → small bowel discharge at umbilicus
VID cyst – mucosa-lined inclusion cyst
VID sinus – partly closed duct
Meckel's diverticulum: fibrous cord from ileum to umbilicus

URACHAL DUCT REMNANTS
Persistent UD → clear discharge from umbilicus; umbilicus retracts on micturition
Urachal cyst – painful mass between umbilicus and syprapubic region
Investigations: USS/fistulogram

DISCHARGE
History: nature of discharge – blood/mucous = ectopic mucosa/granuloma
- faeces = VID
- urine = persistent urachus

MECKEL's DIVERTICULUM

Remnant of vitello-intestinal duct containing all layers of bowel wall (true diverticulum)
2% population, 2 feet from IC valve, 2 inches long
Antimesenteric border
50% contain gastric mucosa; some contain pancreatic mucosa
Blood supply = ompaholmesenteric artery

Features:
Asymptomatic
Duct: patent VID, umbilical granuloma
Obstructive: intussusception/volvulus
Inflammatory: diverticulitis/peptic ulceration
Bleeding: haemorrhage(peptic ulcer on opposite wall) → melaena

Investigations:
Technetium scan ^{99m}Tc taken up by gastric mucosa
Barium follow-through

Management:
Wedge resection
Conservative: leave alone if wide mouth and thin-walled