Paediatric Laryngotracheal Conditions on a Page

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Anatomy

Sits high at C2-3, descends age 2 to adult C6-7
Epiglottis tip behind soft palate – suck & breathe
Thyroid notch behind hyoid
Thyroid cartilage rounded, not V
Newborn glottis diameter 7mm, posterior glottis 4mm
Prominent arytenoids. Top half of cricoid is V-shaped.
Lax mucosa therefore prone to oedema
Subglottis larger segment than glottis
Arytenoids form half of A-P glottis
Glottic inlet cross section diamond shaped, not triangular
Omega shaped epiglottis and short AE folds
Subglottis slightly elliptical
Trachea newborn to adult: doubles in length, triples in diameter, and 6-fold increase in cross sectional area

Prevalence of congenital LT Conditions

1:10,000-50,000 live births
Laryngomalacia > VCP > SGS > webs > SG Haemangioma > cysts/laryngocoeles > clefts
Principles: Assess airway and aspiration risk. FNE +- FEES. Oxymetry/airway monitoring. SLT RV +- MBS. Gold standard L&B.
Must always check for concurrent airway anomaly & syndromes.

1. Laryngomalacia (60%)

Most common cause of stridor. M:F 2:1
Dynamic supraglottic collapse (?anatomy vs neurological).
2w – 8m (up to 12-24m). Small rare subset late around 5y
80% a/w GORD. 80%mild-mod. 20% severe needs Surg.
1-3% v severe, req trache.
3 Types: Arytenoid prolapse, tubular infolding, epiglottic collapse. Target surgery accordingly.
Mx: FNE, FEES/MBS, o/n oximetry, PPI +- H2RA, Surgery.
Indications for surg: FTT, cyanosis, severe obstruction

2. VCP (15-20%)

2nd commonest cause of stridor. 45% w assoc airway lesion
Check palsy vs arytenoid fixation vs post glottic scar.
UVCP: 48% of all VCP, 50% of these iatrogenic. Most will resolve, 8% need trache. Oxym, SLT, feeding manoeuvres.
BVCP: 52% of all VCP. Birth trauma, Arnold chiari, idiopathic. 50-65% need trache. 60% resolve in 12m. 80-90% by 24m. CPAP. SLT. Trache.
Surveillance till age 2, then consider glottic interventions to aim for decannulation. (cordotomy, cordectomy, arytenoidectomy, lateralisation procedures, endoscopic vs open)

3. SGS (10-15%)

3rd most common cause of stridor. Congenital vs acquired.
Cong: hard cartilaginous elliptical.
Acq: soft oedematous concentric. Mixed acq + cong.
Symptomatic when >50% stenosis. Cotton-Myer grade.
Assess: firmness, extent, grade, glottic extent, assoc anomalies.
Rx: cuts, laser, balloon, cricoid split, cricoid split + graft, endoscopic posterior graft, LTR, CTR (PCTR & ECTR)

4. Webs & Atresia (5%)

Spectrum w SGS. Cohen's Grading system.
22q11/VCFS/DiGorge
Rx: endoscopic, cold steel, laser, flaps, keel, open, stents, LTR, CTR.

5. Subglottic Haemangioma (3%)

60% of all haemangiomas occur in H&N
50% of haemangioma in bearded distribution a/w SGH
F:M 3:1. PHACES syndrome.
Natural history: rapid proliferation (1m-10m), stabilisation (10-12m), involution (1-5y), therefore:
Usually symptomatic by 6m, progressive resolution by 18m, complete resolution by 5-10y.
Rx: steroids +- balloon/intubation, MRI for extent of disease in mediastinum or neck. propanolol. If critical airway - laser or surgical excision.
Propanolol start at 0.5mg BD, work up till 1.5mg BD, keep for 18m, side effects: bradycardia, hypotension, hypoglycaemia. ECG.

6. Ductal cysts, sacular cysts, laryngocoeles (2%)

Mucous retention cysts. Laryngocoeles may be air-filled.
Goal of Rx to marsupialise or excise.
Endoscopic (laser, diathermy, cold steel) vs open.

7. Laryngotracheal clefts (1%)

Benjamin-Ingliss classification. 60% syndromic (VACTERL, CHARGE, Opitz-Frias, Pallister-Hall)
14% overall mortality, depends on severity and syndrome.
Surgical approach determined by extent of cleft:
Endoscopic cold steel/laser and sutures to open neck and thoracic approaches.

8. Tracheomalacia & tracheal stenosis

Trachea, oesophagus & cardiac embryology intertwined.
Tracheomalacia defined as >50% collapse of airway.
Intrinsic (rare), segmental (a/w TOF or vascular rings)
5 Types of TOF, all affect trachealis width and patency.
Vascular anomalies determine intervention:
cardiac/vascular repair, aortopexy, posterior tracheopexy.
Congenital tracheal stenosis (Grillo types 1-4)
Rx: stents, resection & anastomosis, homografts, autografts, pericardial patch etc all trumped by slide tracheoplasty which has excellent results.

9. Acquired laryngotracheal conditions

Intubation trauma and tracheostomy complications.
Oedema, granulation tissue, granuloma, scarring, adhesions, arytenoid dislocation, pressure necrosis, ulcer, stenosis, artery fistula. Prevention. Risk factors. Targeted treatment. Balloon, laser, stents, steroids, mitomycin.
Injury: traumatic injury (blunt vs sharp, clothesline injury), caustic injury (inhaled vs ingested, battery)
Infection/inflammation: VC nodules, laryngitis, autoimmune.
HPV Papillomatosis: HPV 6 & 11, juvenile vs adult. Gardasil, IVIG, laser, microdebrider, cidofovir, avastin.