Paediatric Airway Disorders

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Paediatric Airway Disorders

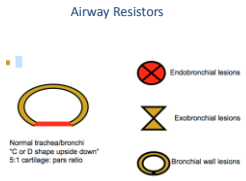
Topic	Incidence
• Croup-Atypical croup	• Relatively common
• Tracheomalacia	• 1: 1500 to 3000
• Tracheoesophageal fistula airway disorders	• 1: 2- 4000

An approach: Based on Sound

- Symptoms and Signs:-
  - Stridor
  - Stridulous-wheeze
    - Wheeze
    - Cough quality
    - Rattles

- Site of sound
- Laryngo-tracheal
- Laryngo-tracheal
- Bronchii-Pericarinal
- Laryngo-tracheal
- Large airways

Airway Lesions: Sites from Sound



- **Stridor or Stridor-Wheeze: Timing**
- Inspiratory:

Extrathoracic obstruction

- Expiratory :

Intrathoracic obstruction

- Biphasic:

Fixed airway obstruction

An approach: Based on Sound

- 30%-50% parents misinterpret ►audible wheeze
- Misinterpretation ◄►Missed diagnosis
- Sounds / terminology commonly misinterpreted
  - Snuffles, Stertor, Snore: naso-oro-pharyngeal
  - Stridor, Stridulous-wheeze: laryngotracheaobronchial
  - Wheeze: secondary pericarinal compression
  - Rattle/Purring sounds: tracheobronchial area
  - Ruttles: coarse sounds, palpable vibration (Yorkshire)
  - Short Wind (Torres Strait: Creole◄► Pigeon English)

Elphick,HE et al. Survey of respiratory sounds in infants. Arch Dis Child 2001;84:35–39.
Cane,RS and McKenzie,SA Parents ' interpretations of children's respiratory symptoms on video Arch. Dis. Child. 2001;84;31-34

Acute UAO: Croup ± Atypical Croup

- 2-4 days stridor, voice change, cough, temps
  - Resolve cough by 3 weeks
- 85-90% resolve with steroids (dexamethasone)
  - rapid onset effects to 4 days anti-inflamatory effects
  - 15% rebound rate
- Atypical croup (membranous, ulcerative, structure and infections combined, function)

Geelhoed G C. Oral Dexamethasone …P Pul.1995;20:362
Cherry JD. Croup NEJM 2008;358:384

Acute UAO: Atypical croup

- No definition!!!
  - Timing of stridor
    - Age
  - Duration/SFI
  - Severity
  - Frequency/recurrence
- Risk factors:
  - Prematurity, ETT
  - Vaccinations
    - FB
    - TB
  - Chemotherapy
  - Syndromes
  - Pre-existing stridor
  - Vasculities

- Tipping points UAO
- Biphasic stridor : always serious
  - <1 yr old
- > 1 week failed steroids
  - Recurrence
- Respiratory failure: severity of distress
  - Uncontrolled temps
  - Drooling/swallow Δ
  - Risk factors

Atypical croup: membranous croup

Parainfluenza

Herpes, Influenza A

Membranous Bacterial laryngitis

Bacterial pseudomembrane

Bacterial pseudomembrane

Atypical croup

Epiglottitis

NGT syndrome

Chronic stridulous conditions

- Chronic stridulous conditions
  - ± infection
  - ± local trauma
  - ± secretions
- > worsening obstruction
  - > Atypical Croup

Clinical Case 1

- 9 week old child
- Presented to ED 3 times with barking/honking cough and biphasic stridor
- Each time treated as croup with dexamethasone and nebulized adrenaline

Clinical Case 1 Audio and Video

Clinical Case 1 Bronchoscopy

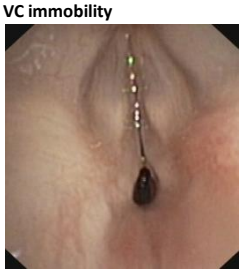
Chronic Stridulous Conditions

SG haemangioma (lateral)

SG haemangioma (posterior)

Chronic Stridulous Conditions

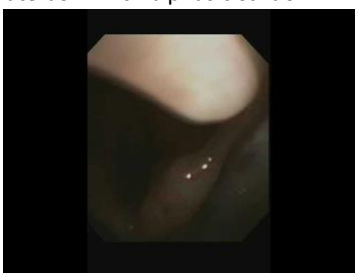
VC immobility



Laryngeal atresia

Case

- Neonate born with biphasic stridor



Chronic Stridulous Conditions

Laryngomalacia: infantile larynx

Lingual Cyst

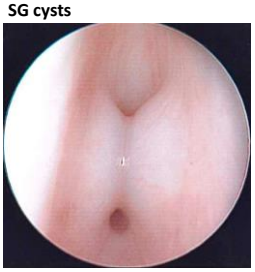
Chronic Stridulous Conditions

Subglottic stenosis (SGS)

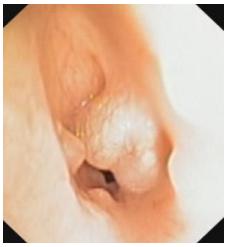
SGS stenosis + Infection

Chronic Stridulous Conditions

SG cysts



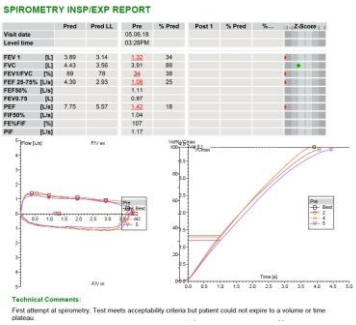
SG cysts



Clinical Case 2

- 15 yr old girl
- Intubated for 1-2 weeks at for OOHA(VF) secondary to myocarditis – Oct 2017
- Presenting with biphasic stridor and SOBOE – Jan 2018

Insp and Exp loops



SPIROMETRY INSP/EXP REPORT

	Pred	Pred LL	Pre	% Pred	Post 1	% Pred	%...	Z-Score
Visit date			05.06.18					
Level time			03:28PM					
FEV 1 [L]	3.89	3.14	1.32	34				
FVC [L]	4.43	3.56	3.91	88				
FEV1/FVC [%]	89	78	34	38				
FEF 25-75% [L/s]	4.30	2.93	1.08	25				
FEF50% [L/s]			1.11					
FEV0.75 [L]			0.97					
PEF [L/s]	7.75	5.57	1.42	18				
FIF50% [L/s]			1.04					
FET/FIF [%]			107					
PIF [L/s]			1.17					

Technical Comments:

First attempt at spirometry. Test meets acceptability criteria but patient could not expire to a volume or time plateau.

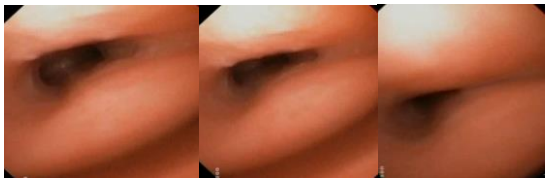
Clinical Case 2 Bronchoscopy

Management UAO

- Relieve hypoxia
- Relieve obstruction
  - Treat cause
- Define disorder
  - Anaesthetic, ENT, Respiratory, iCU
- Airway support
  - PAP
  - ETT
- Medical
  - Propranolol,Steroids,Abs
- Surgery

Masters IB. Current Pediatr Rev 2011;7:20

Primary Malacia

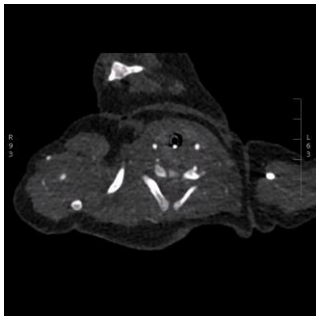


Primary shape and inspiratory - expiratory dynamic > biphasic stridor-wheeze

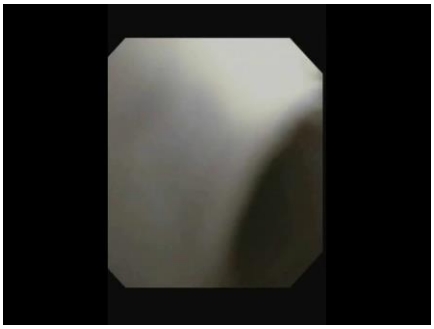
Clinical Case 3

- 2 month old child who presented with biphasic stridulous wheeze (mixed quality noise)
- Also having issues with feeds – choking episodes on suck feeds

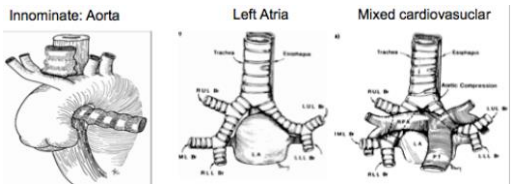
Clinical Case 3 CT



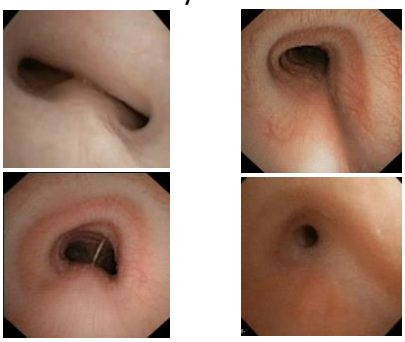
Clinical Case 3 Bronchoscopy



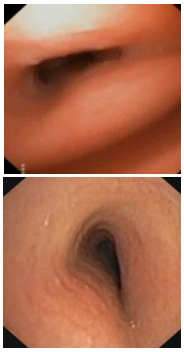
Cardiovascular Compression Disorders: 2ndry Tracheomalacia

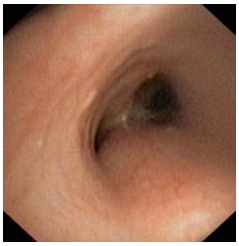


Cardiovascular Compression Disorders: 2ndry Malacia



Primary Tracheomalacia Disorders

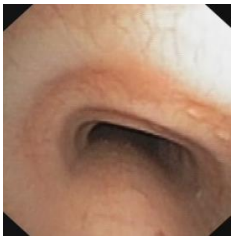




Triangular shapes of TM

Primary Tracheomalacia Disorders

- Rectangular shape: ant flat



Primary Tracheomalacia Disorders

Frowning face appearance

Tracheal dyskinesia

Boiselle PM Tracheal Morphology. J Thorac Imag. 2006;21:190.

Bronchomalacia

LMS malacia I* 2**

RUL malacia

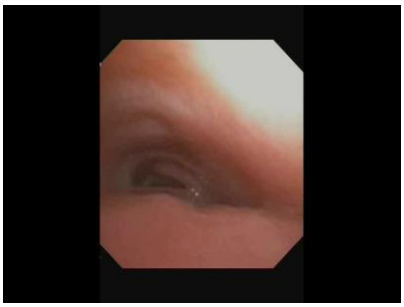
Malacia Disorders

- Shape abnormalities
- ± Dynamic features
  - ± Fixed features
  - ± Multiple sites

Clinical Case 4

- Child from Pakistan w/ prev TOF/OA which have been repaired
- Previously has been treated for aspiration pneumonia in Pakistan
- Issues with ongoing cough and choking

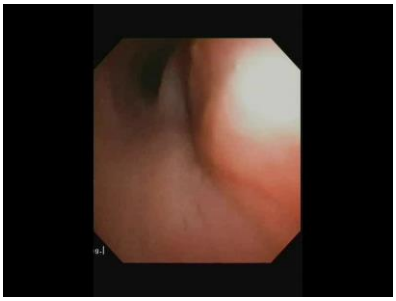
Clinical Case 4 Bronchoscopy



Clinical Case 5

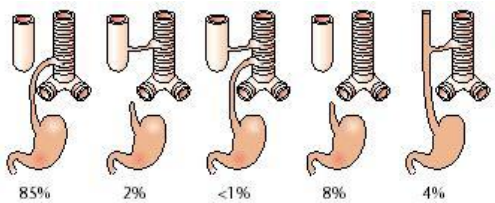
- Ex 27 weeker, 4 month corrected
- TOF/long gap OA – both repaired
- Deteriorated with gram negative sepsis
- Intubated – noticed that when bagging patient stomach seems to get distended
- Bronchoscopy in ICU

Clinical Case 5 Bronchoscopy



Wall Disorders: Dual TOF (1%)

TOF Airway Disorders



Anatomical variations of oesophageal atresia and tracheooesophageal fistula, indicating relative frequency

TOF: Wall Disorders/Malacia (37%)

TOF malacia at fistula site

TOF malacia proximal to fistula

Malacia at ± distal ± proximal ± all ± other sites

Wall Disorder: Recurrence of Fistula

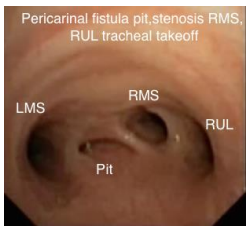
Wall Disorder: "H-N" Shaped Fistula (2%)

Groove to Fistula

Open fistula

Other TOF Airway Lesions

TOF airway lesions



Pit- Diverticulum post surgery

Other TOF Airway Lesions: UA Disorders

13%

26%

22%

Hseu A. Ann Oto Rhino Laryn. 2015 124:808

Management of Malacia

- Define the lesions & complications
  - Contrast CT
  - Bronchoscopy**
  - BAL CS
- Supportive care: vaccns, cigs, nutrition
- GE/Stricture management
- Other medical
  - Antibiotics for PBB CSLD: organisms??
  - Minimize steroid therapies
- Relieve obstruction/hypoxia
  - CPAP Bi PAP
  - Operative approaches eg aortopexy, tracheopexy, stents and slide-plasty procedures, v/ring divisions, remove diverticulum
- Transcription factors: BMP

Masters IB. Tracheobronchomalacia in children Exp Resp Rev 2009;3:425

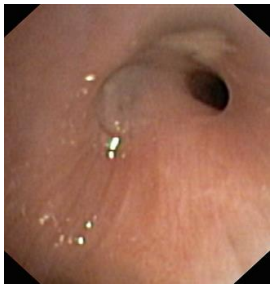
- Thank You
- Acknowledge

Barry Dean

Leanne Rodwell and

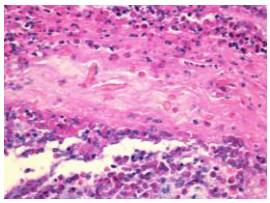
Margaret McElrea

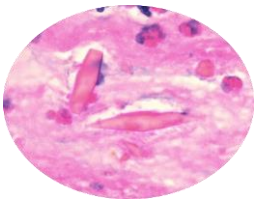
for Bronchoscopy Digital Library



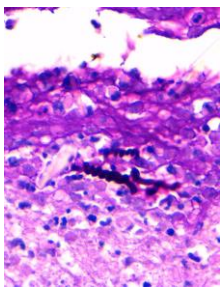
Bronchial casts

Charcot-Leyden Crystals





Curschmann's Spirals



Papanicolaou stain

Paradoxical VC Motion

- Psychogenic PVCM
- Exercise Induced PVCM
- Collapsing Larynx Syndrome
- Neurological Types PVCM

Forrest LA. PVCM: Laryngoscope 2012;122:844.