Site of airway obstruction

- Stertor ——— Supralaryngeal region
- Stridor — Inspiratory — Supraglottis, glottis
- Stridor — Biphasic — Subglottis, E-T trachea
- Stridor — Expiratory — I-T trachea, bronchi

Investigation of Stridor

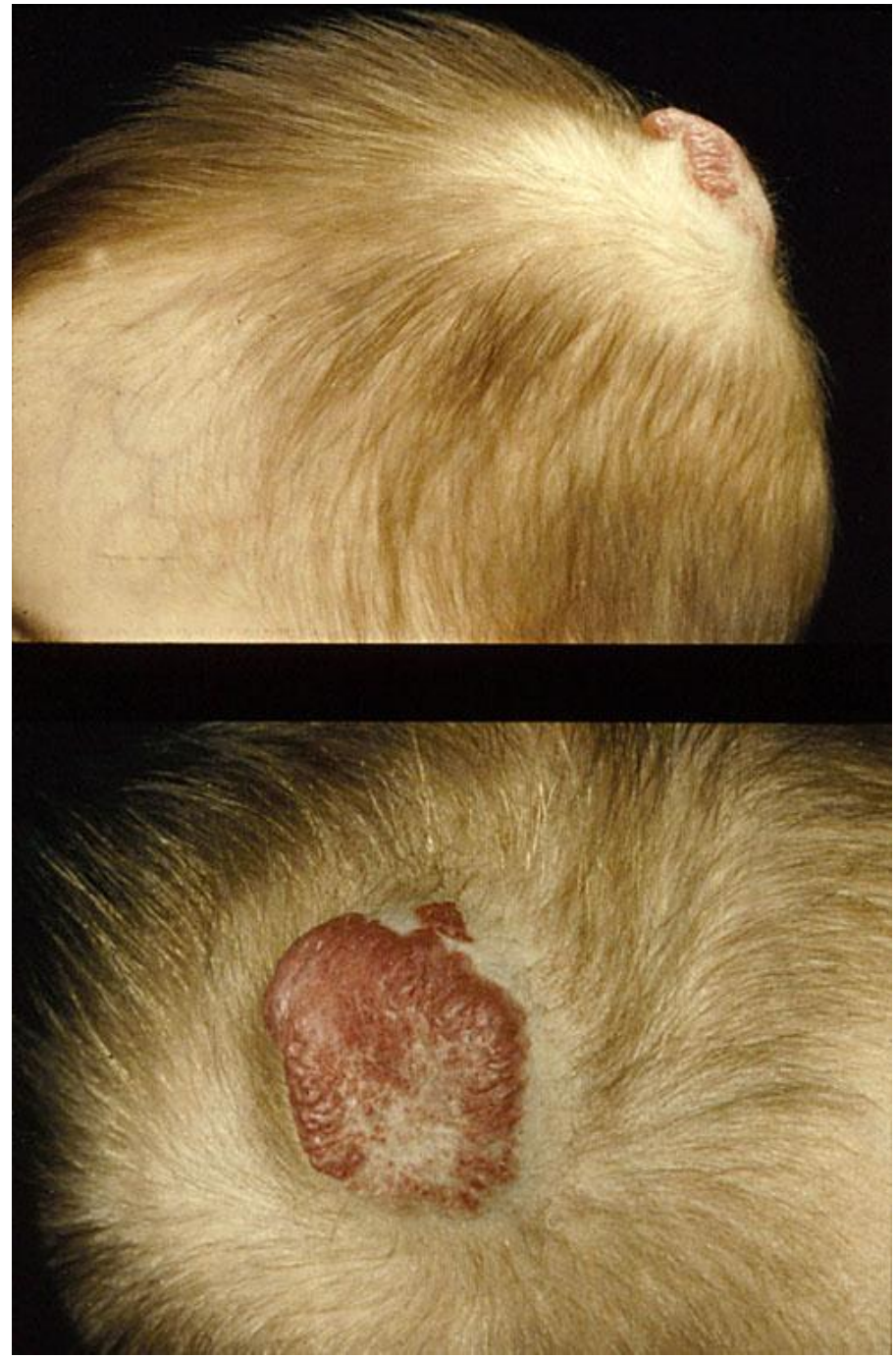
- History
- Examination
- Radiological investigations
- Endoscopy

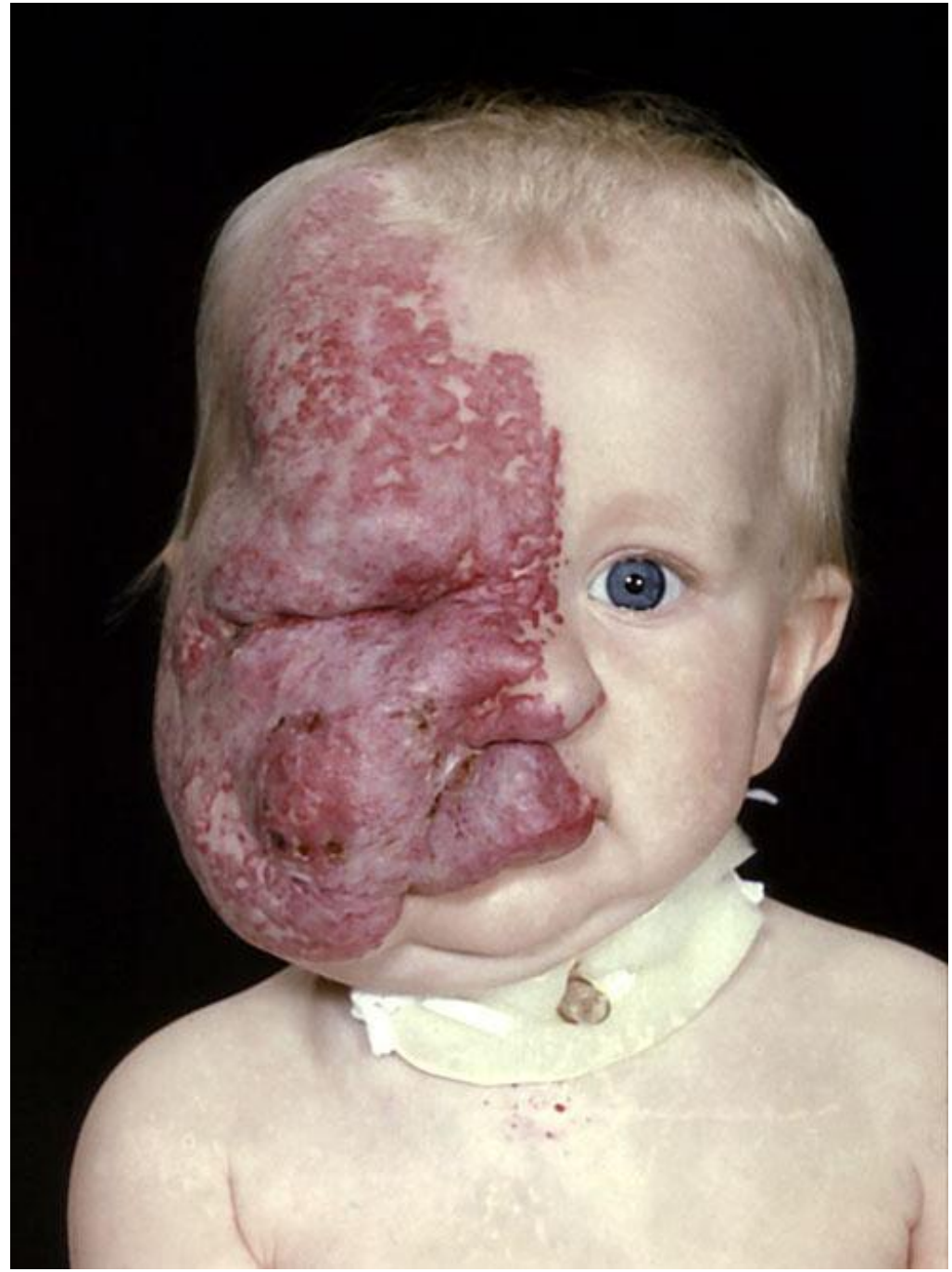
History

- Neonatal intubation
- Stridor / stertor
- Voice / cry
- Cough / cyanotic attacks
- Feeding difficulties
- Failure to thrive

Examination

- Pallor, cyanosis
- Tracheal tug, sternal recession, intercostal / subcostal recession
- Pectus excavatum, Harrison’s sulci
- Stridor / stertor
- Voice / cry
- Cough





Site of Airway Obstruction

	Stridor	Voice	Cough
Supralaryngeal region	**Stertor**	**Muffled**	**-**
Supraglottis, glottis	**Inspiratory**	**Hoarse**	**Barking**
Subglottis, E-T trachea	**Biphasic**	**Normal**	**Brassy**
I-T trachea, bronchi	**Expiratory**	**Normal**	**+**

Site of Airway Obstruction

- Pharyngeal (stertor):
  - worse when asleep

- Laryngeal, tracheal or bronchial (stridor):
  - worse when awake, especially if stressed

Radiological investigations

- Soft-tissue lateral neck X-ray
- PA chest X-ray
- Cincinnati (high-kv filter) view
- ? Barium swallow
- ? Bronchogram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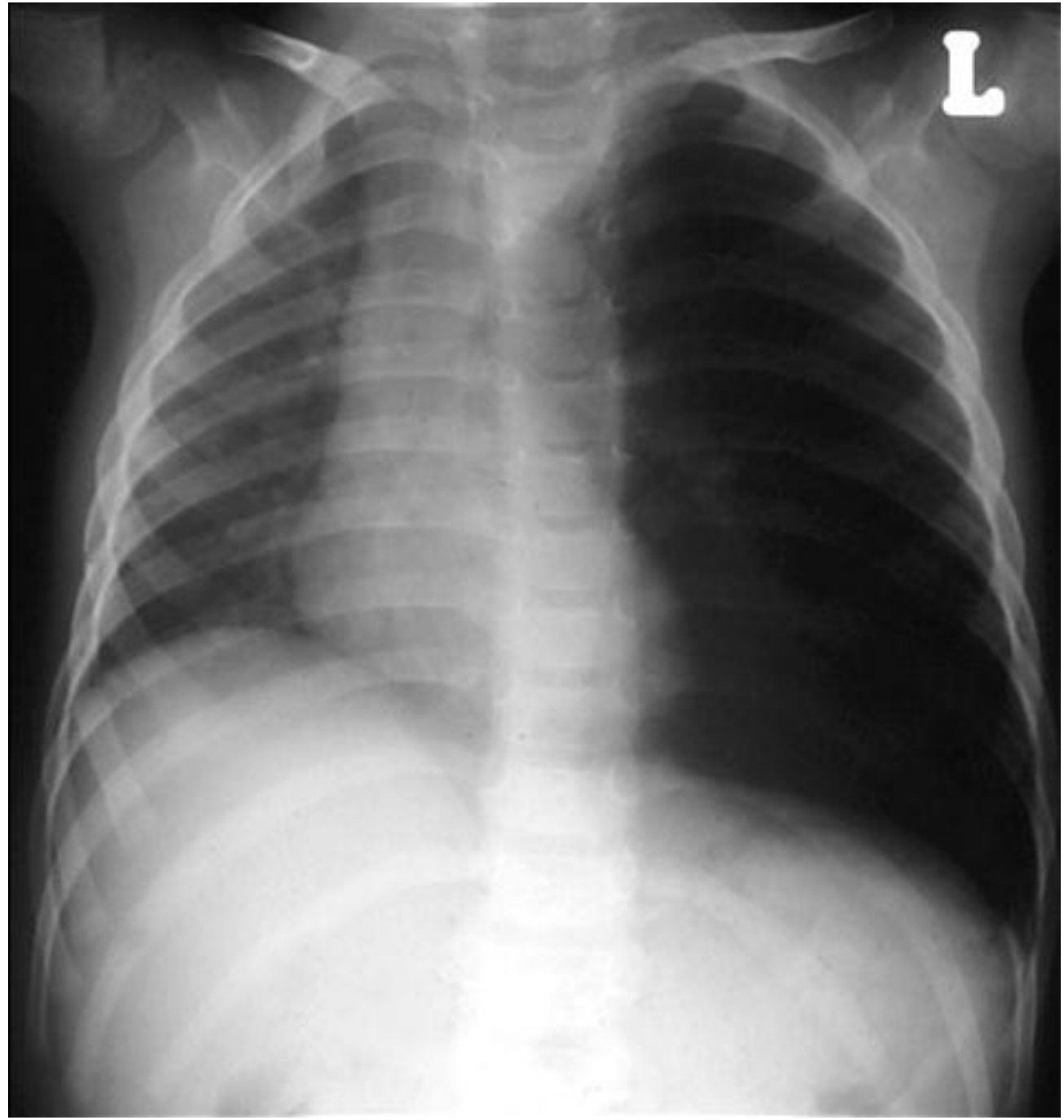
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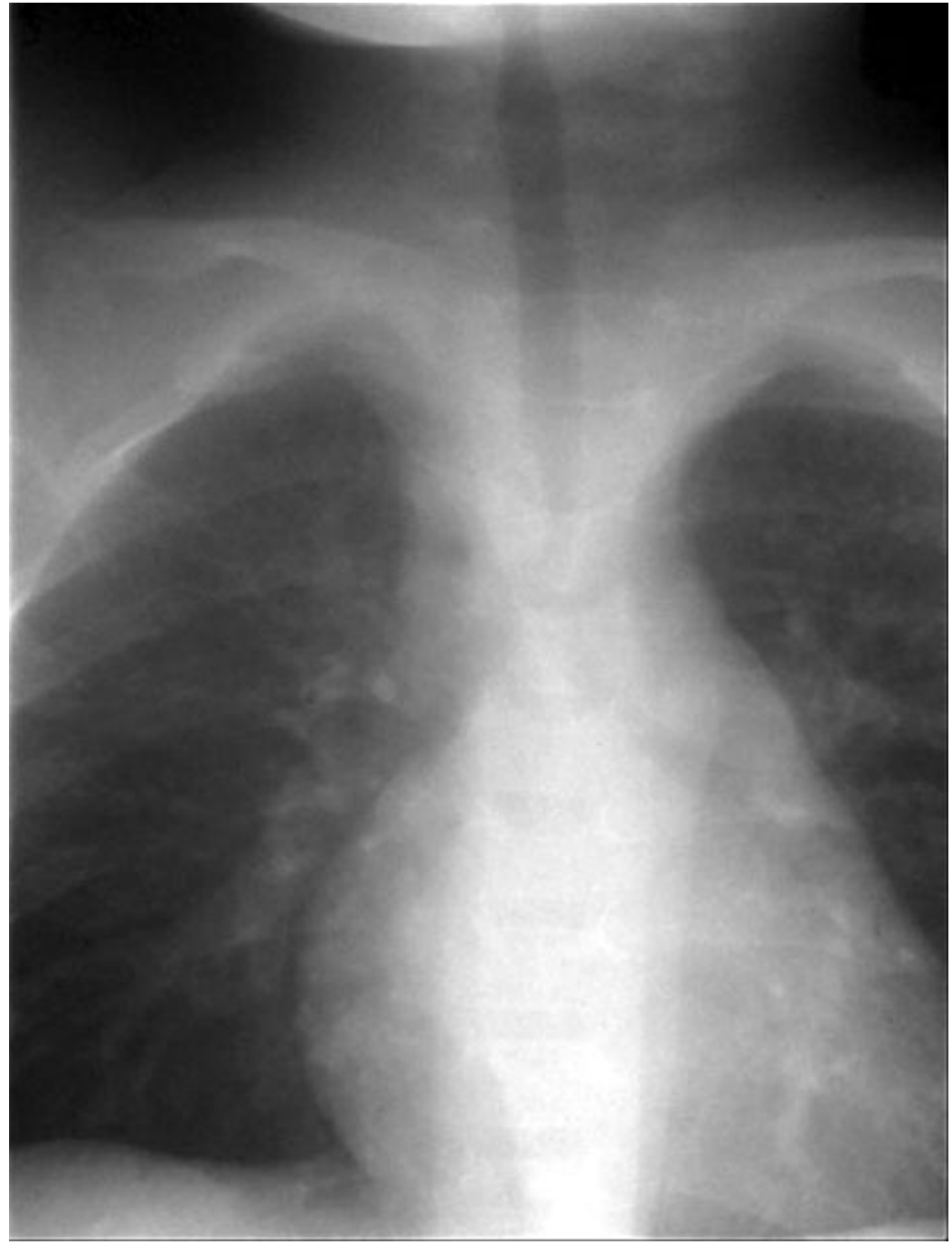
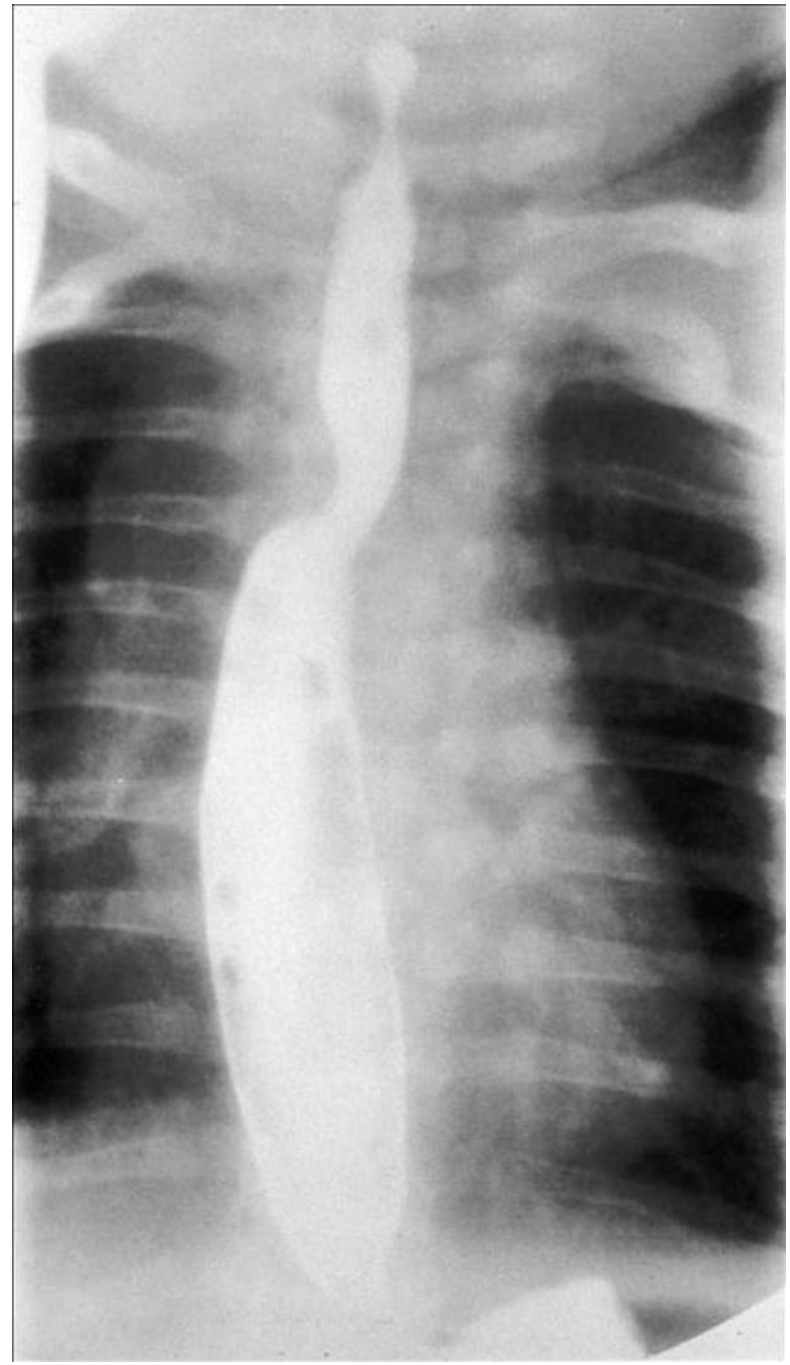
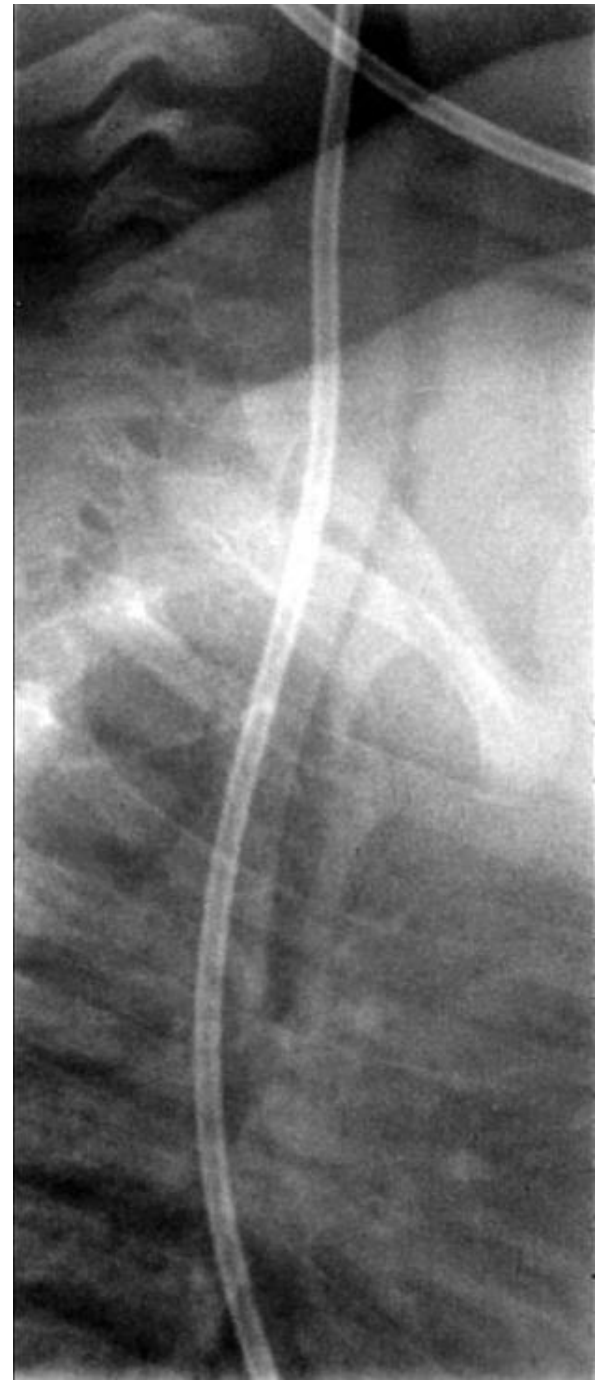
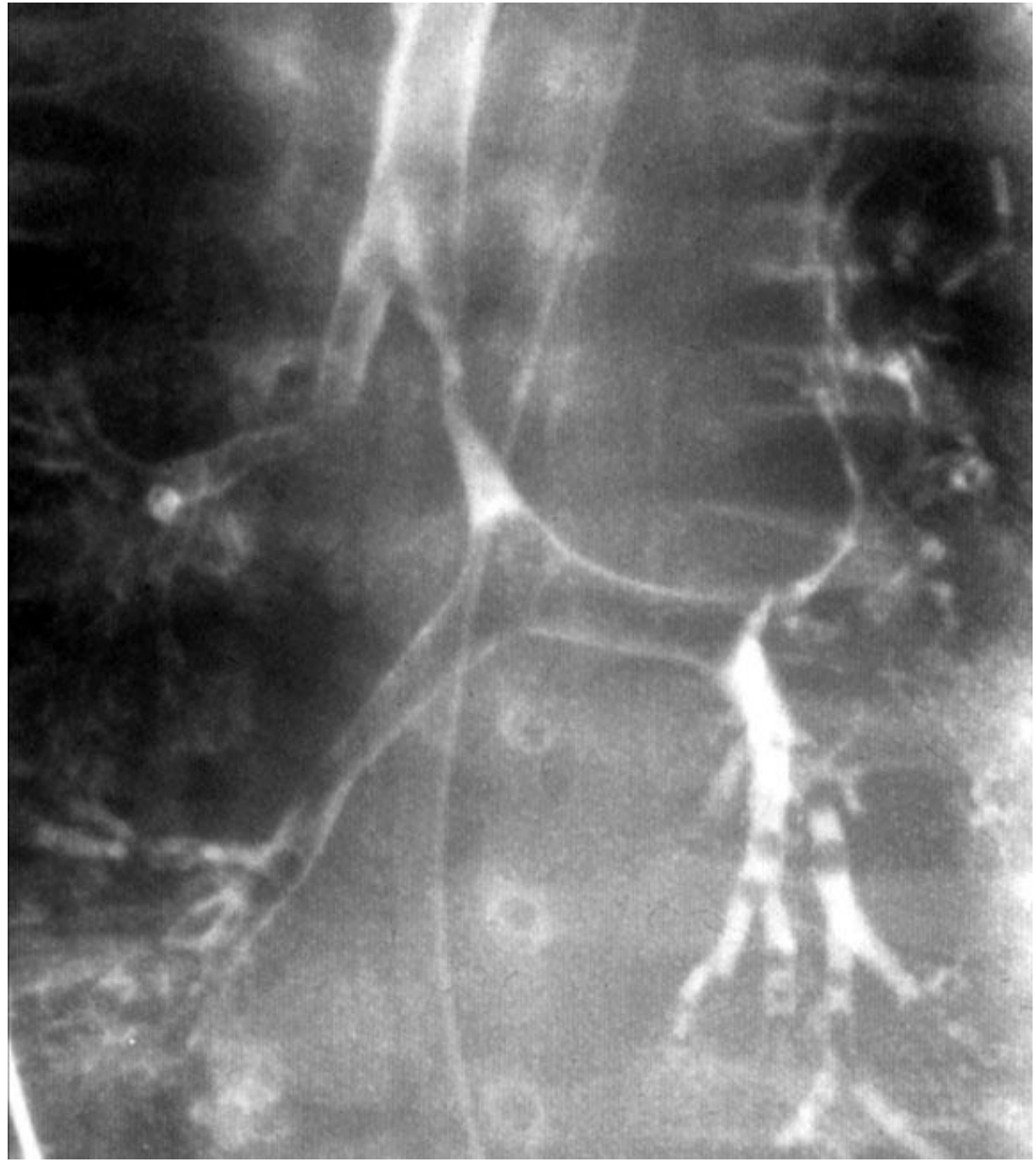
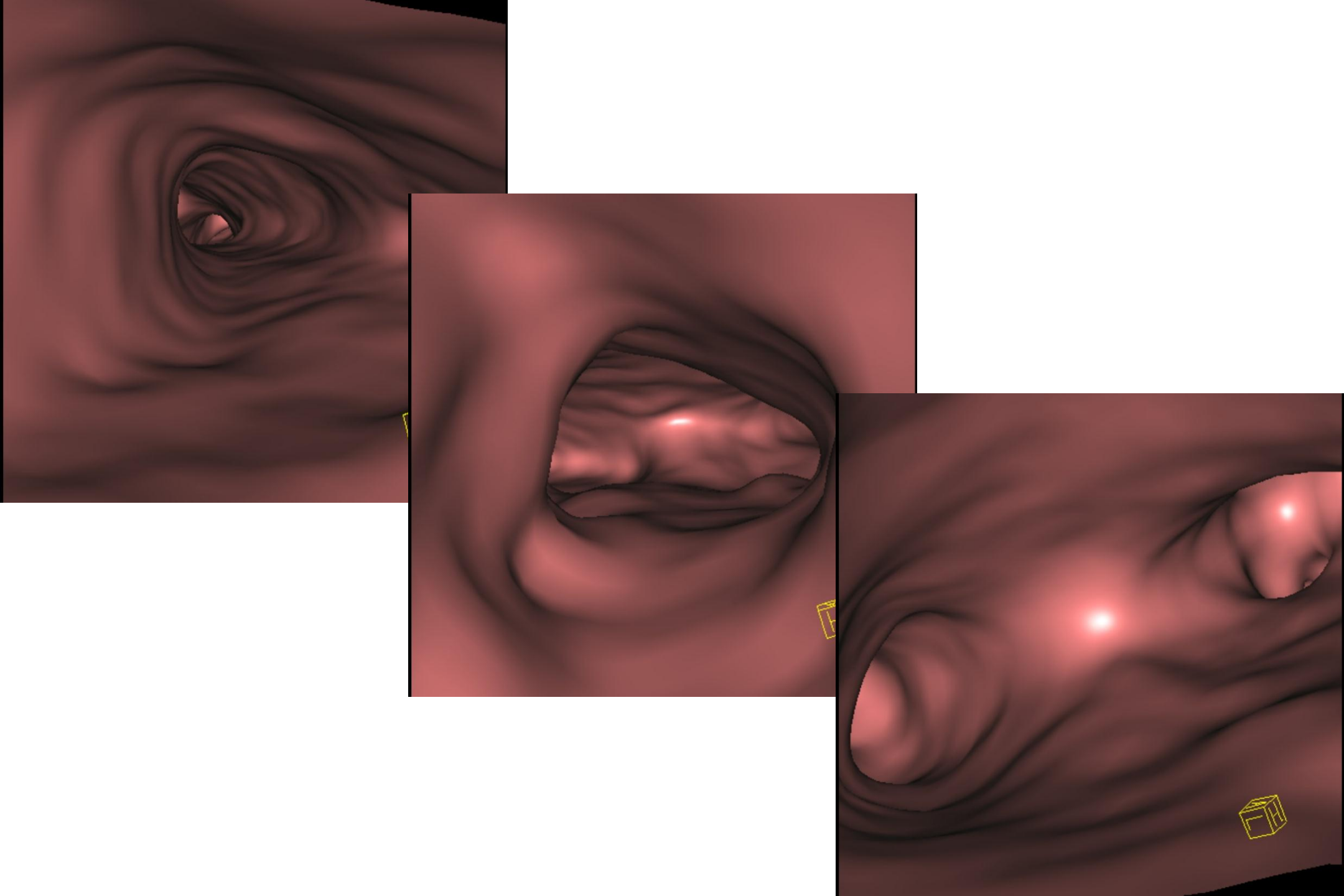










Endoscopy

- The definitive investigation for a child with stridor

Endoscopy

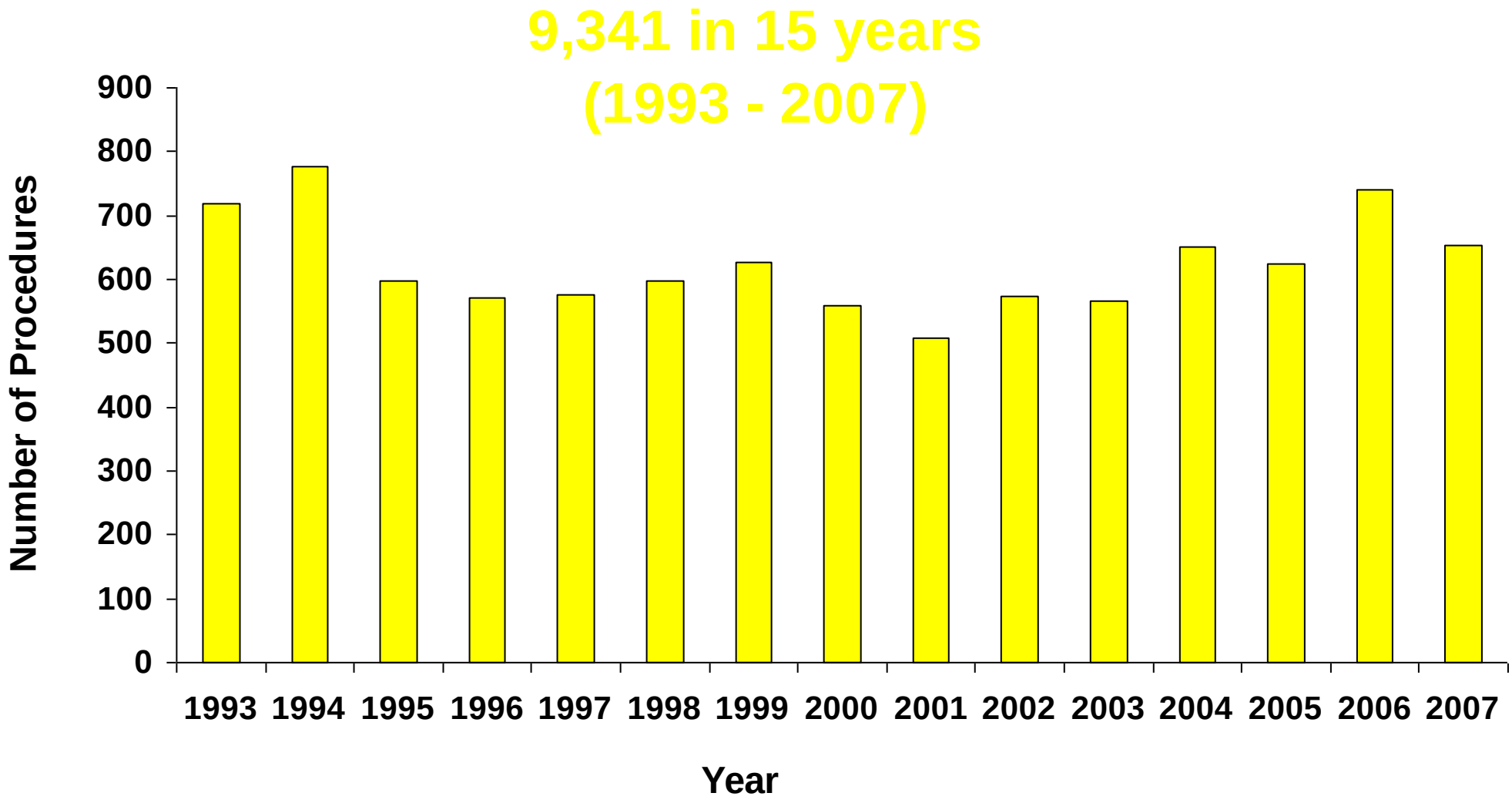
- Awake flexible fibreoptic laryngoscopy

- Suitable for infants using simple restraint
- Screening investigation for laryngomalacia
- May be helpful in assessing vocal cord palsy
- But *only* gives a view of the supraglottis
- Does not exclude coexisting lower airway pathology

Endoscopy

- Microlaryngoscopy + Bronchoscopy
  - *“The Gold Standard”*

Total airway endoscopies at GOS



Microlaryngoscopy & Bronchoscopy

- A partnership between

Endoscopist and Anaesthetist

Anaesthesia for airway endoscopy

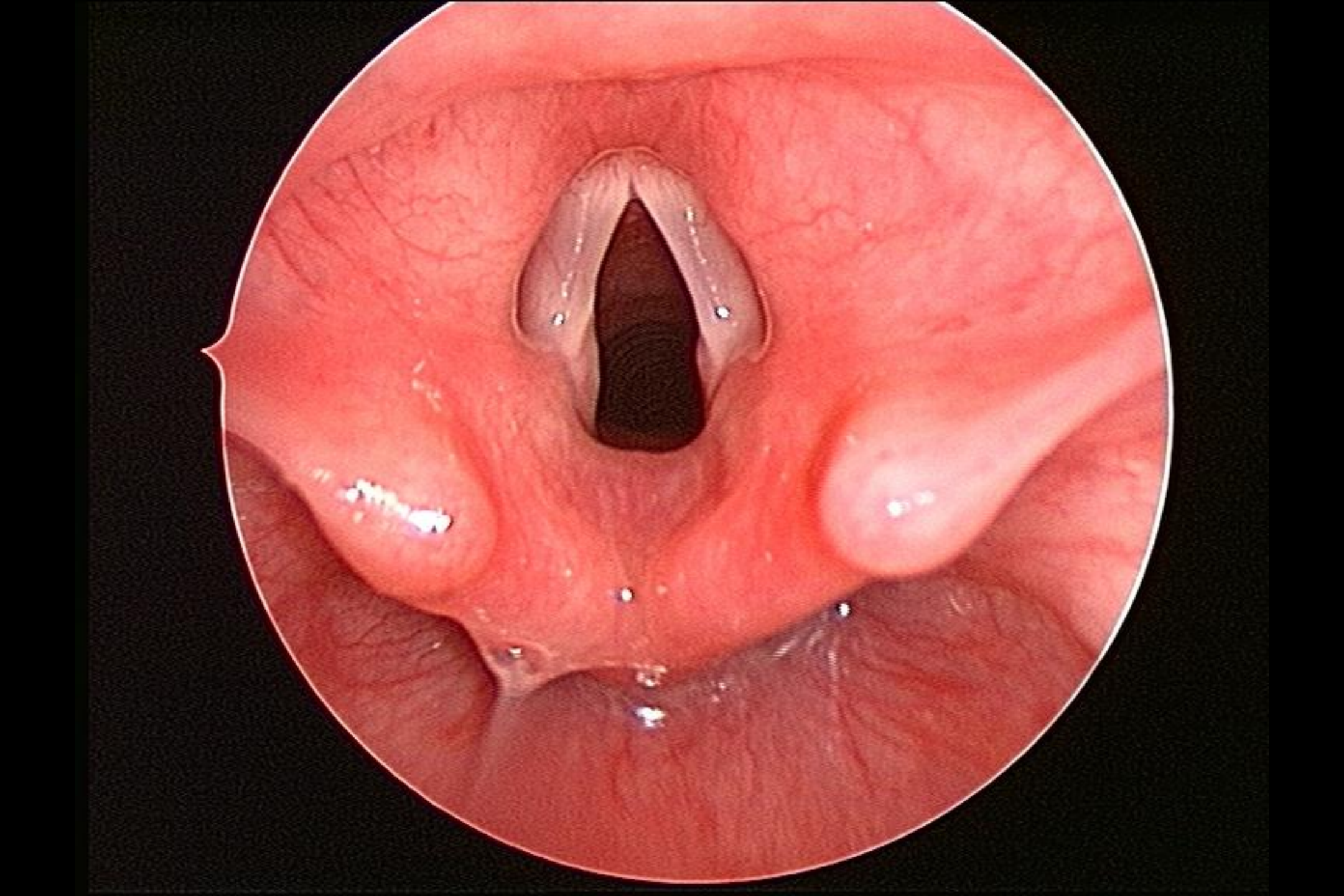
- Spontaneous respiration technique

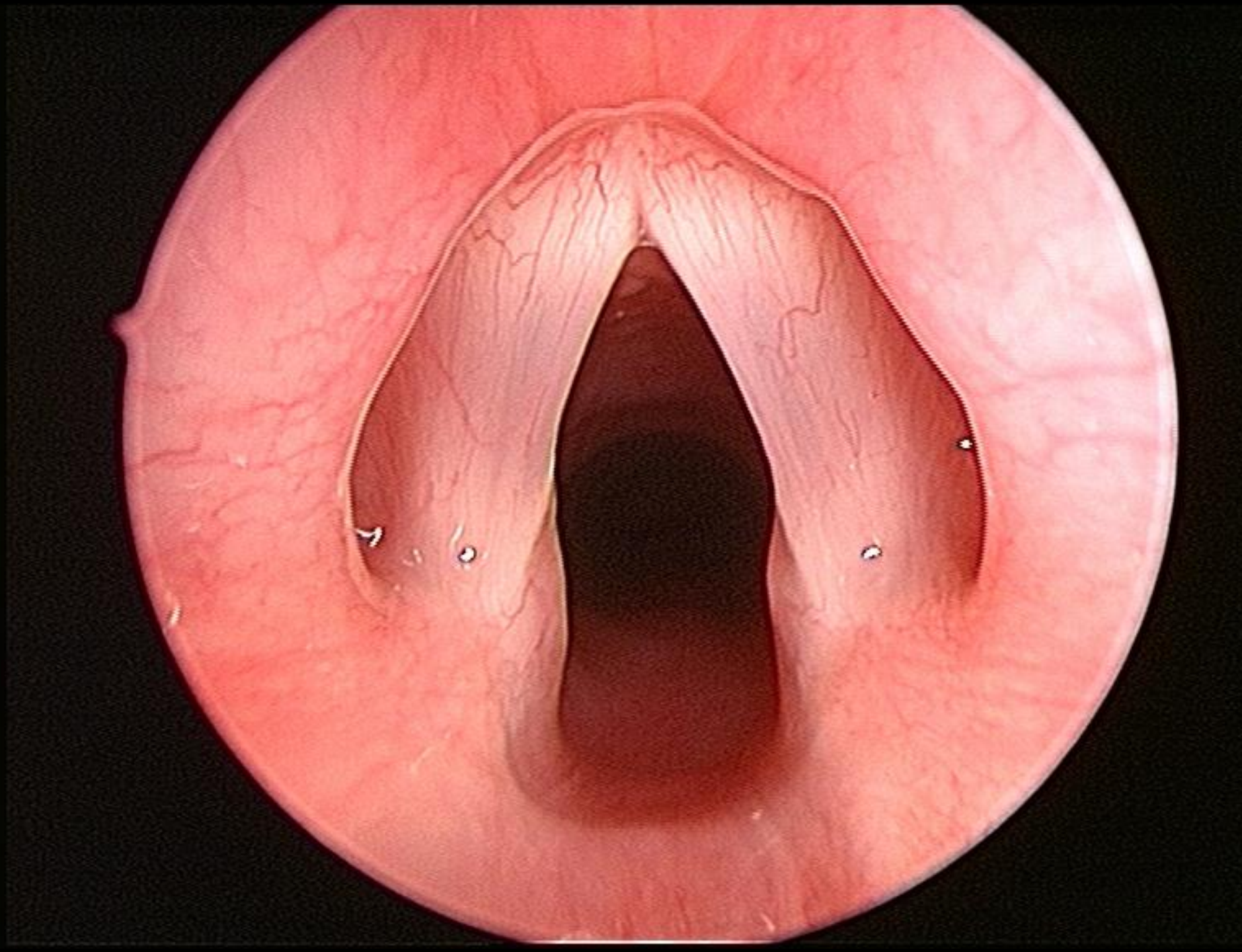
- Drying agent (IM Atropine premed)
- Inhalational induction of anaesthesia
- Metered dose of Lignocaine spray
- Nasopharyngeal tube insufflation
- IV access, full monitoring

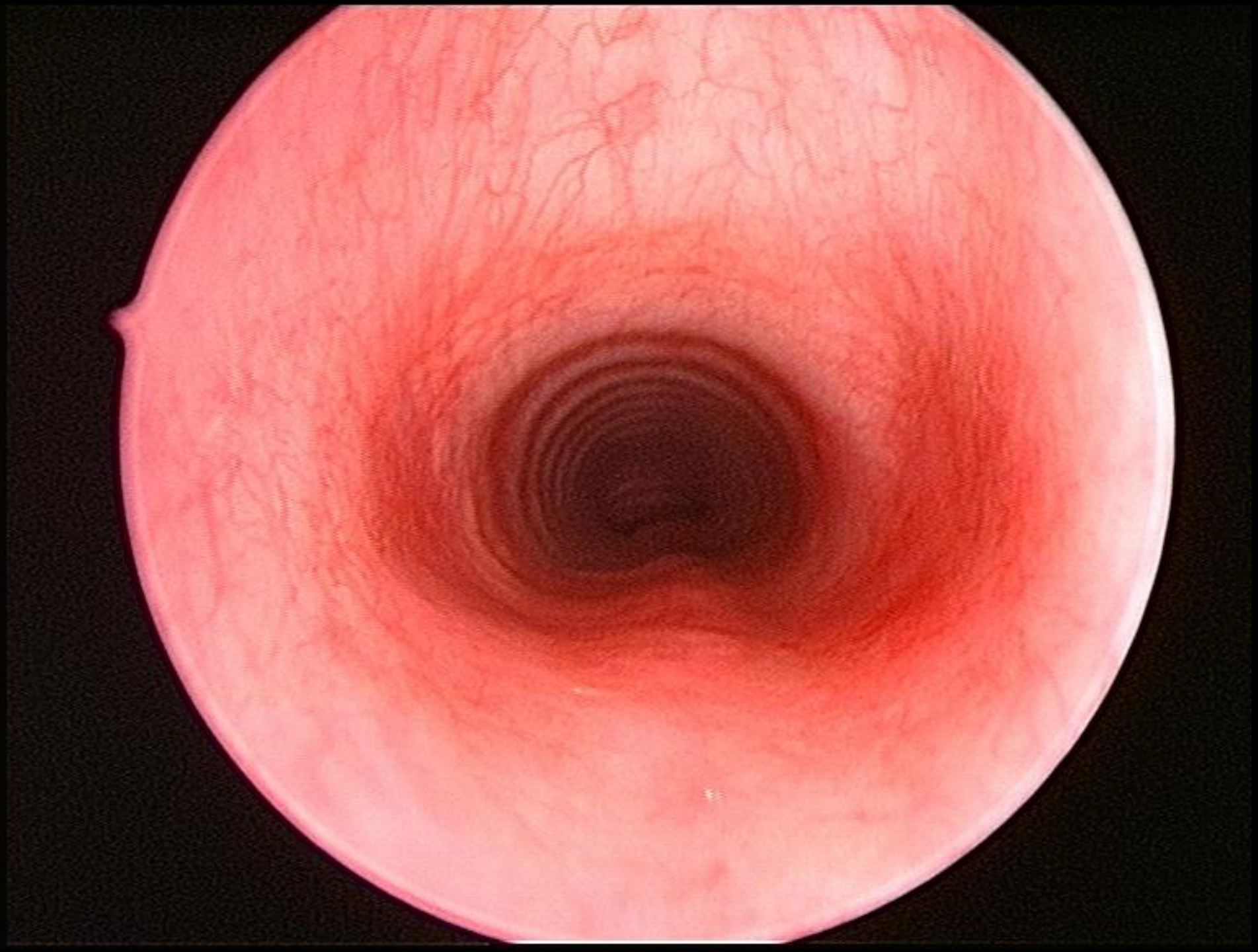
Microlaryngoscopy & Bronchoscopy

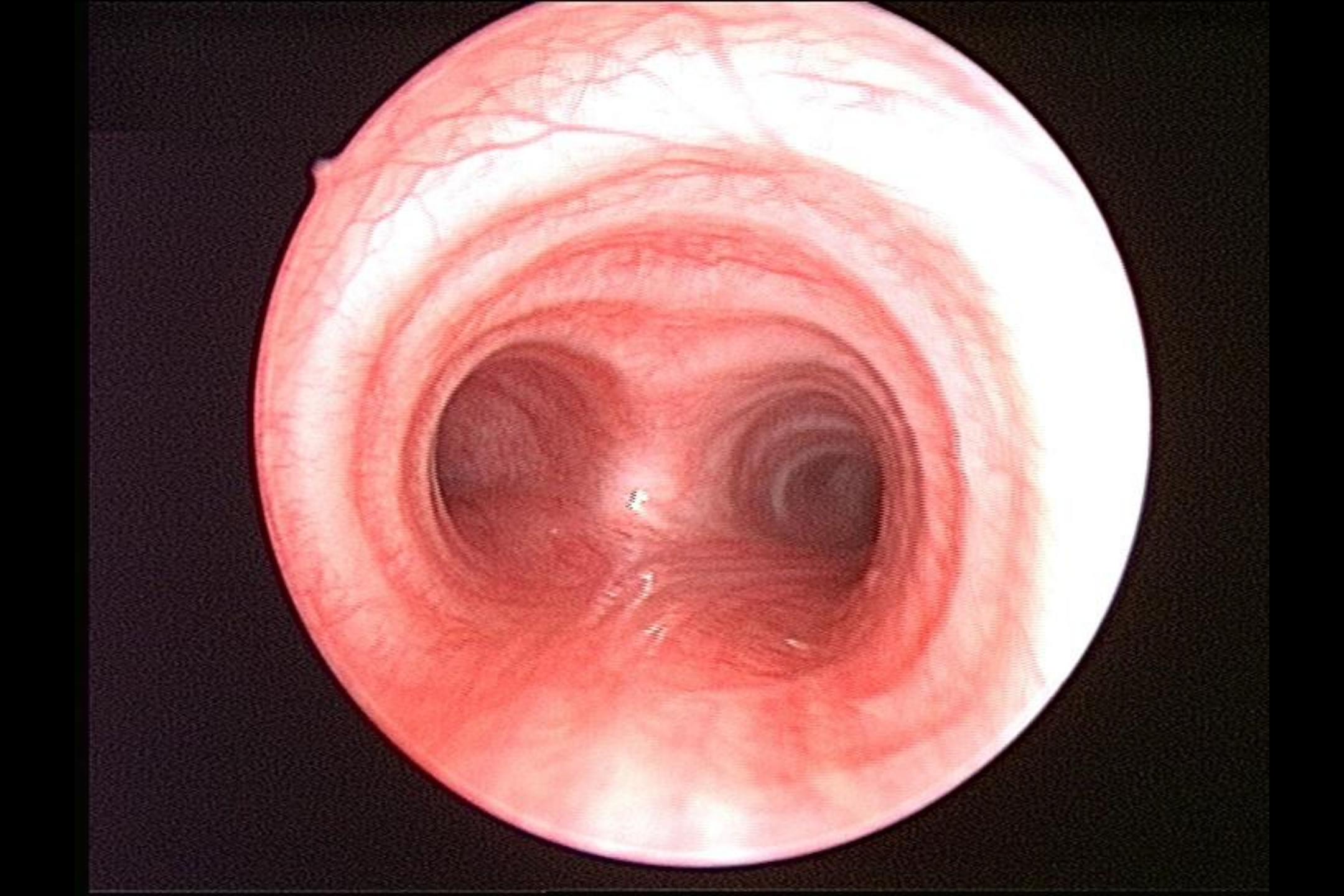
- Systematic sequence for endoscopy

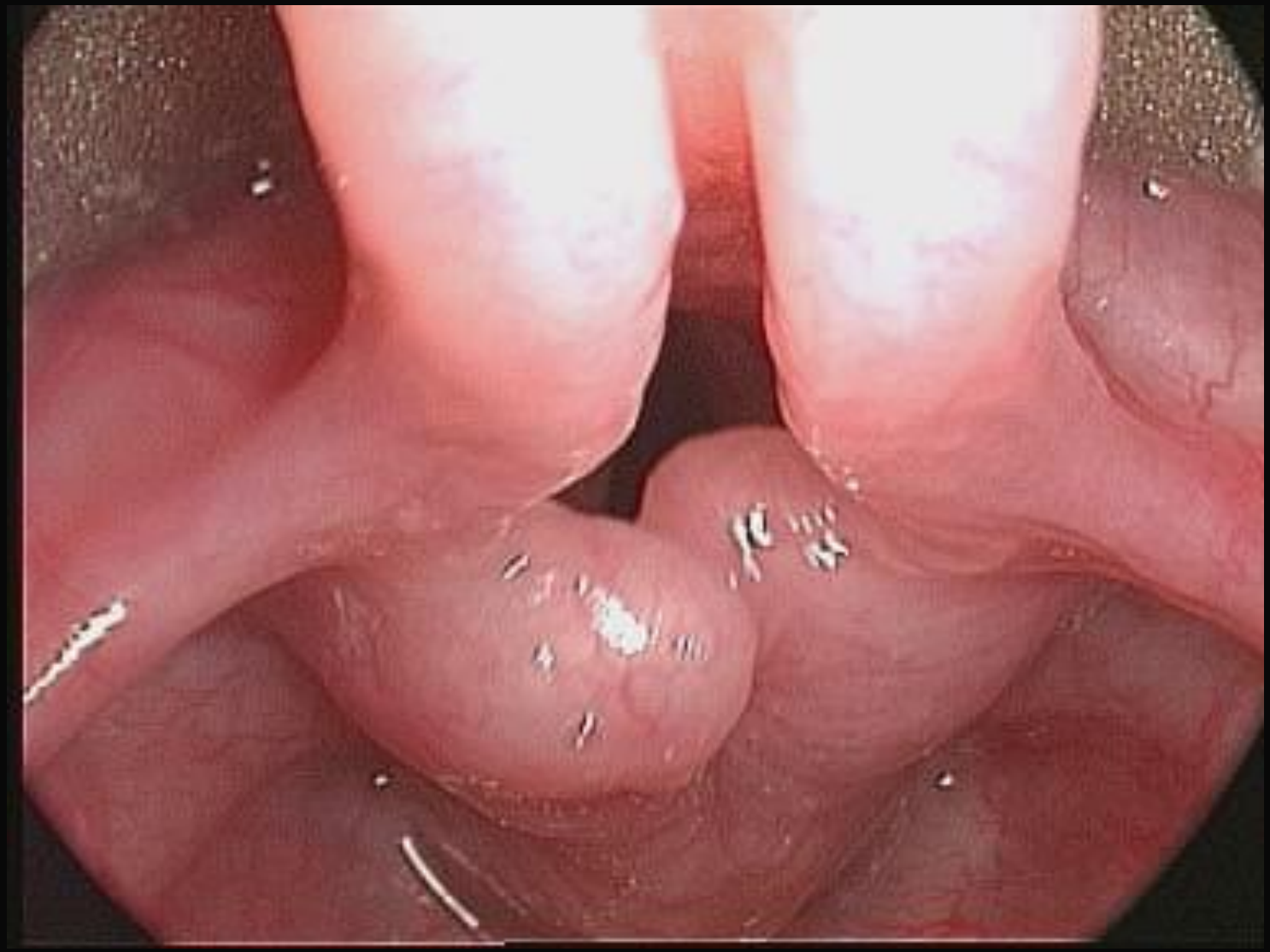
- Suspension microlaryngoscopy:
  - probe for cleft and C/A joint mobility
- 0^0 telescope examination:
  - larynx including subglottis, and trachea
- Ventilating bronchoscope if appropriate
- Observe larynx as anaesthesia lightens:
  - hand-held laryngoscope, ? 30^0 telescope







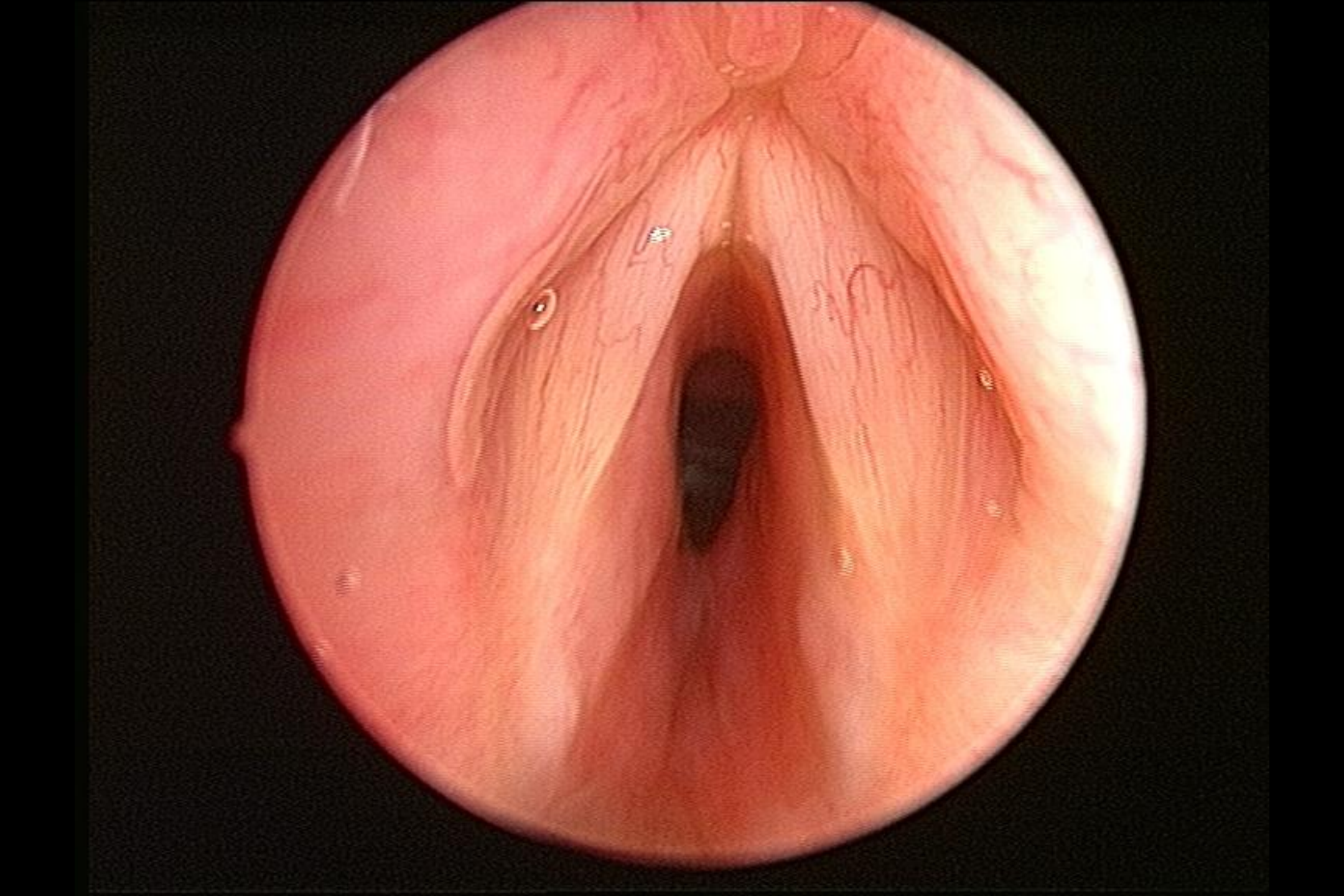




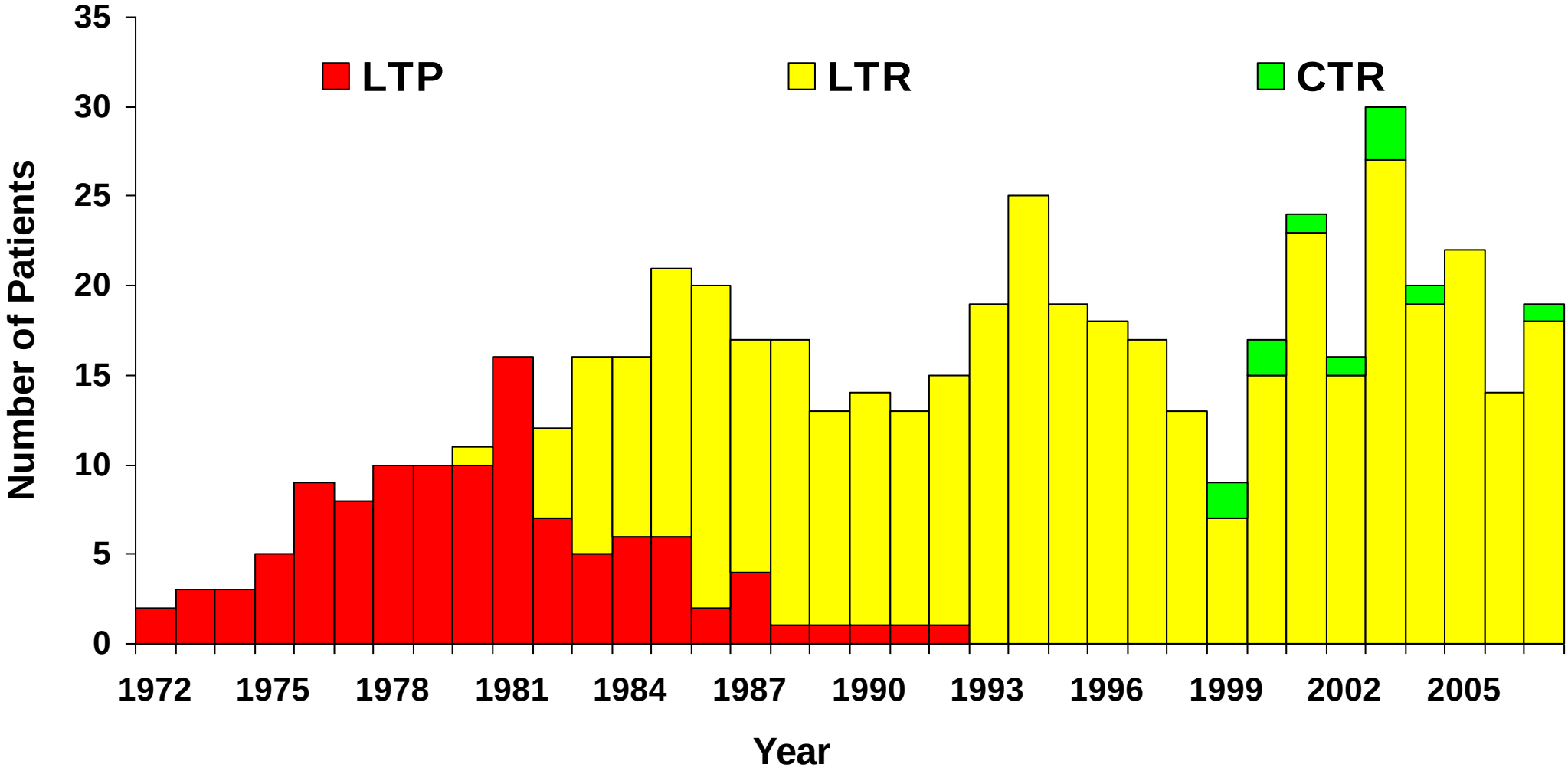
New patient endoscopies at GOS

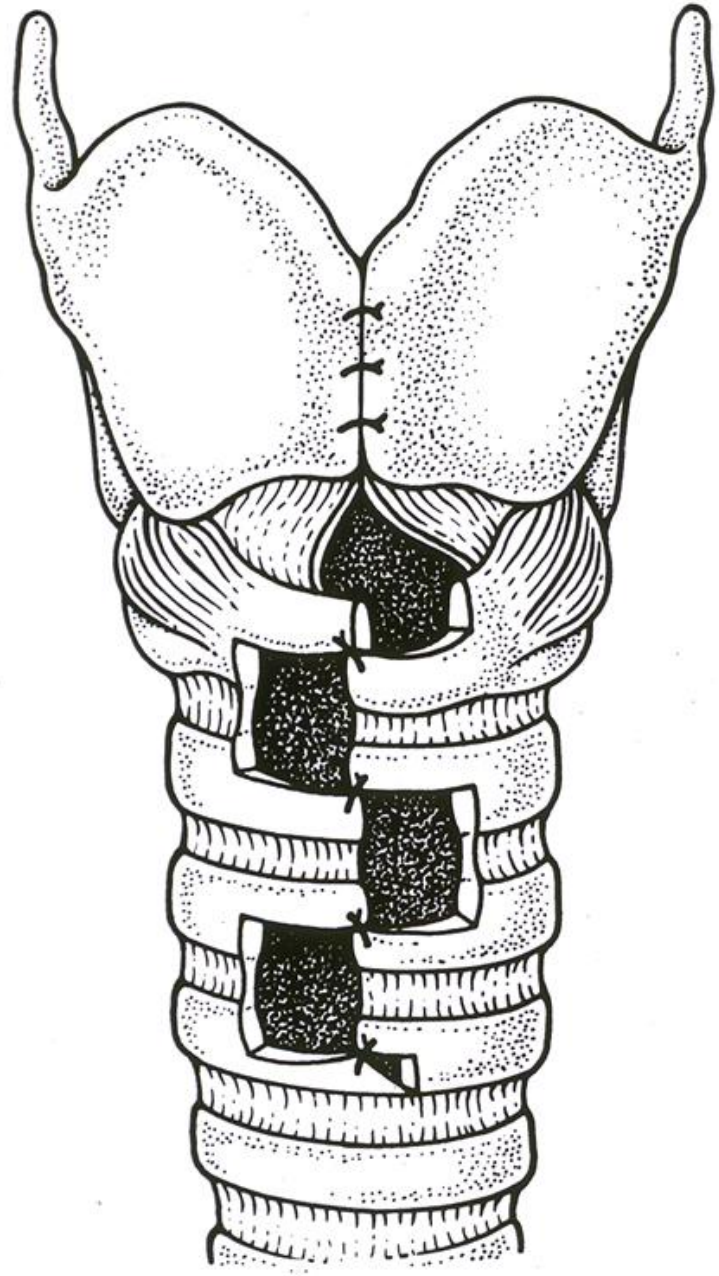
- (752 in 5 years)

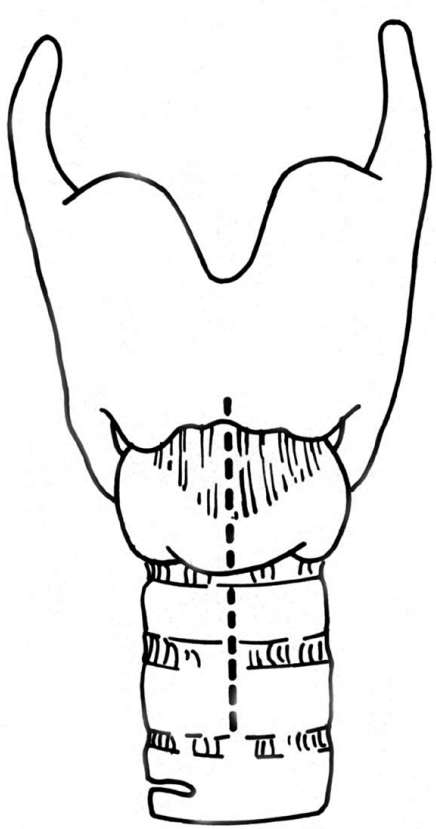
• Subglottic stenosis	158	
• Laryngomalacia		125
• Vocal cord palsy	44	
• Tracheomalacia		36
• Foreign body	29	
• Subglottic haemangioma	28	
• Respiratory papillomatosis		28

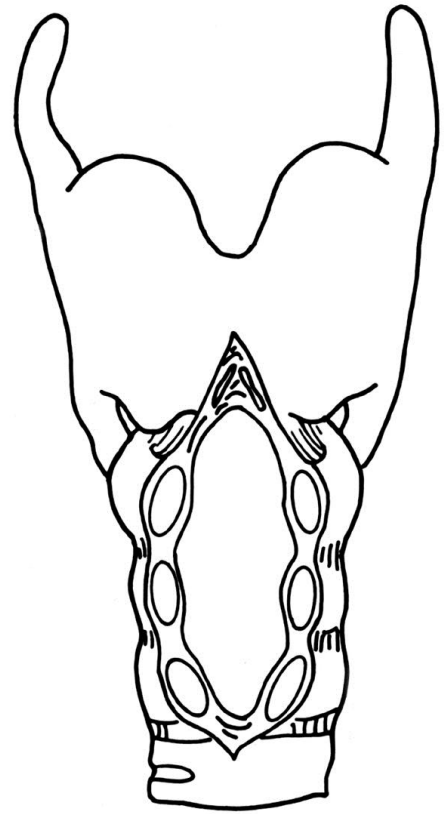


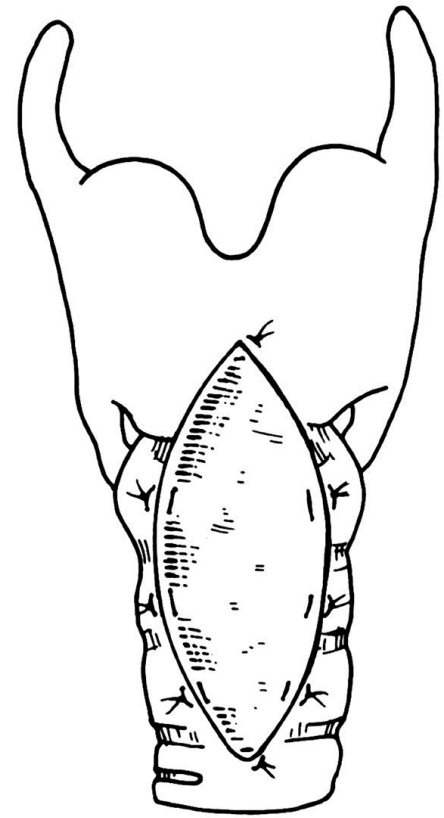
Airway Reconstruction at GOS

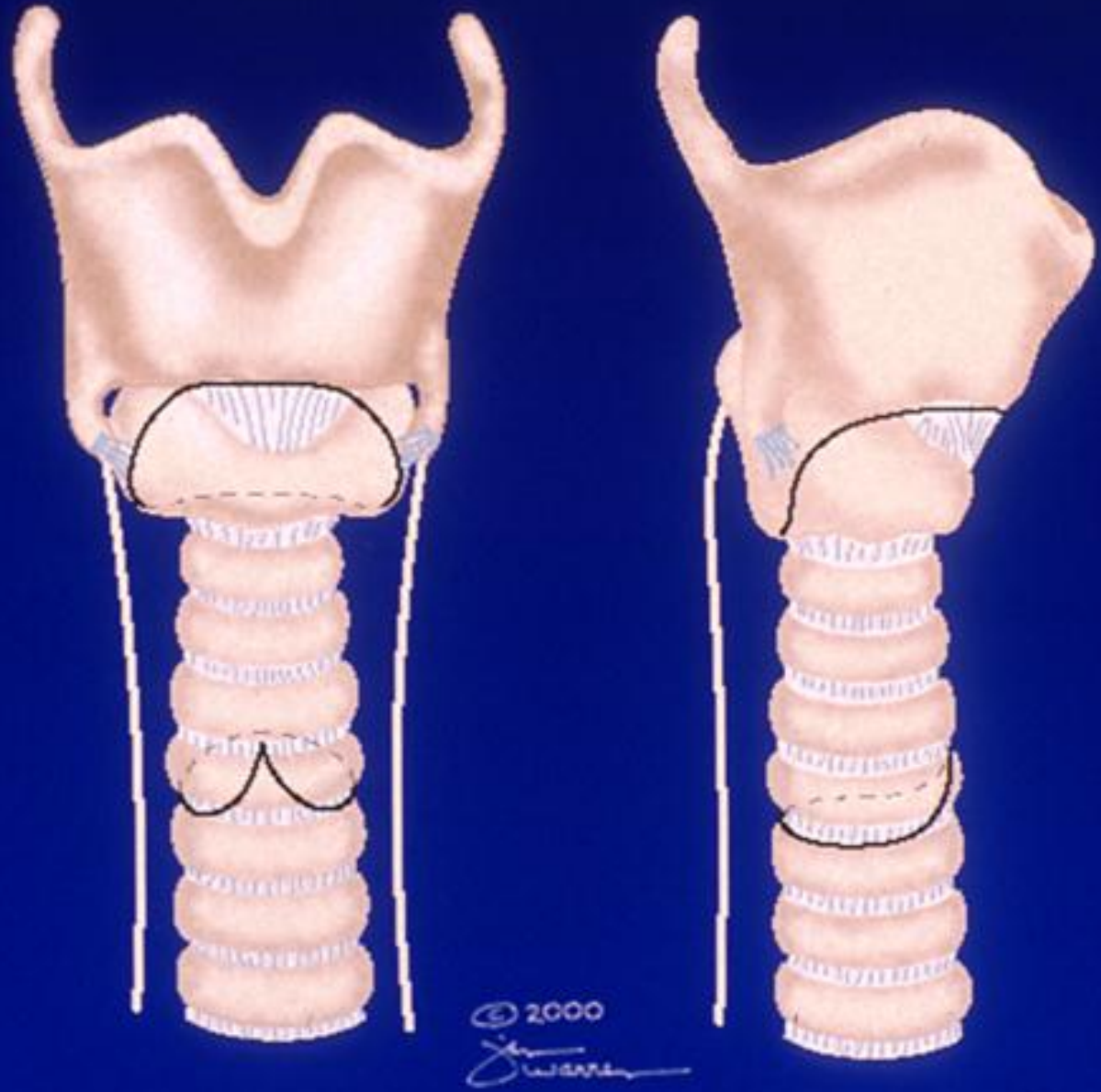








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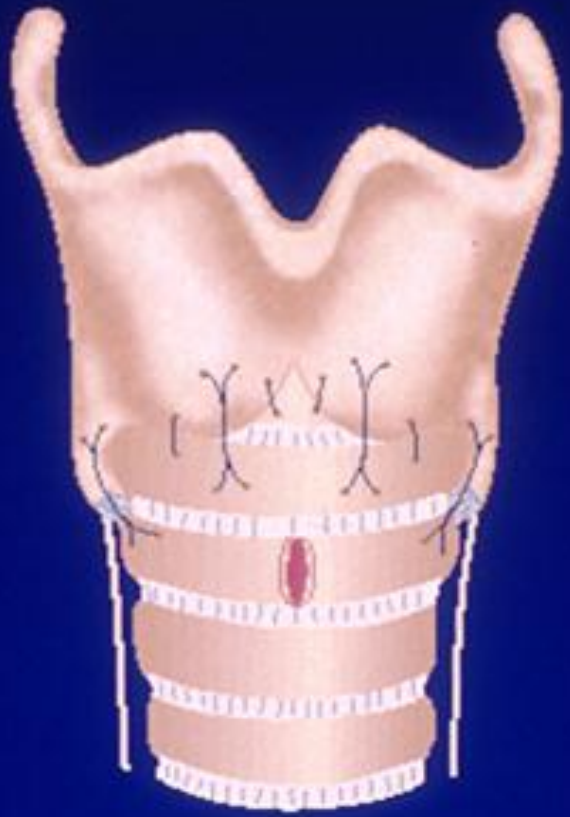
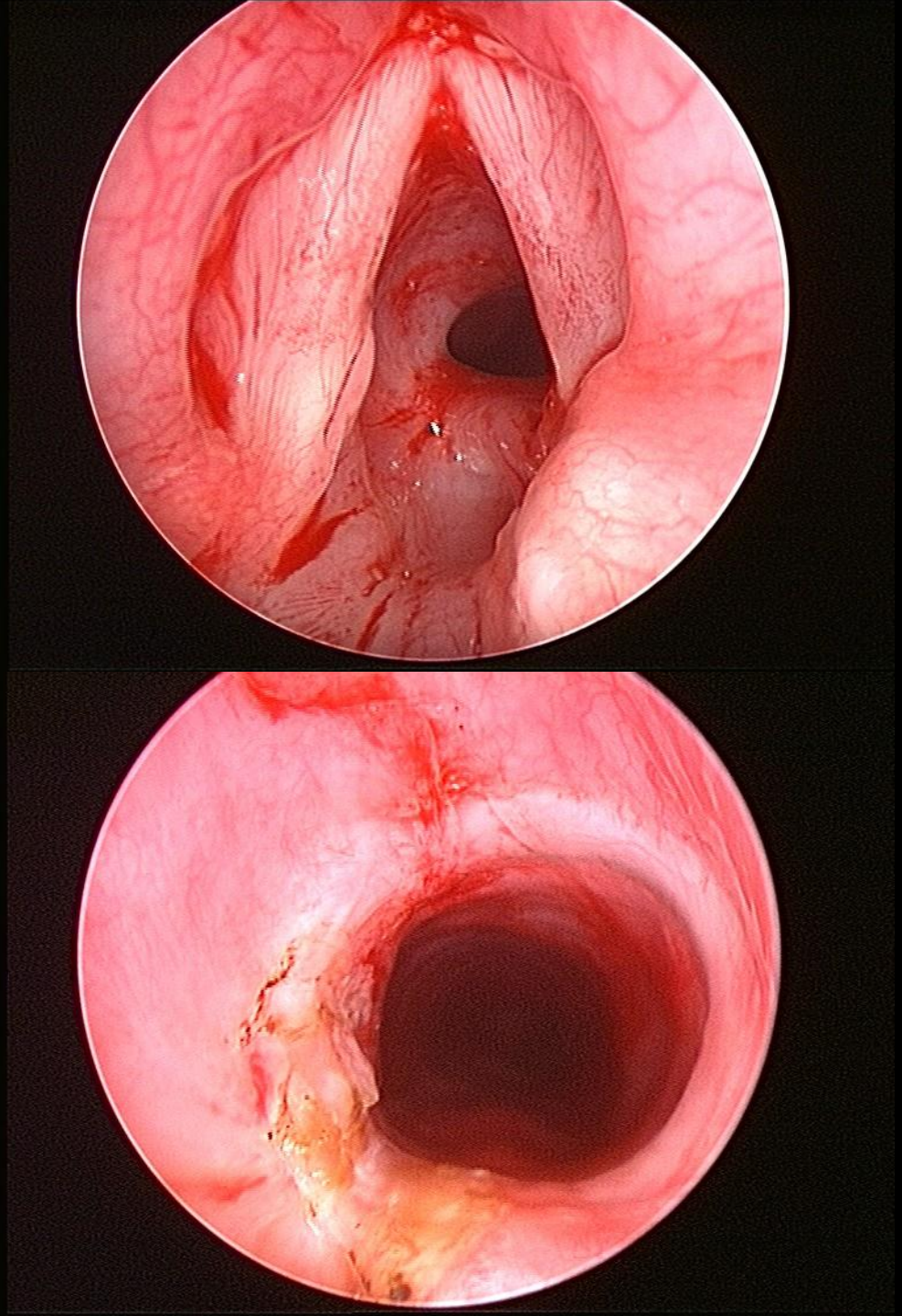
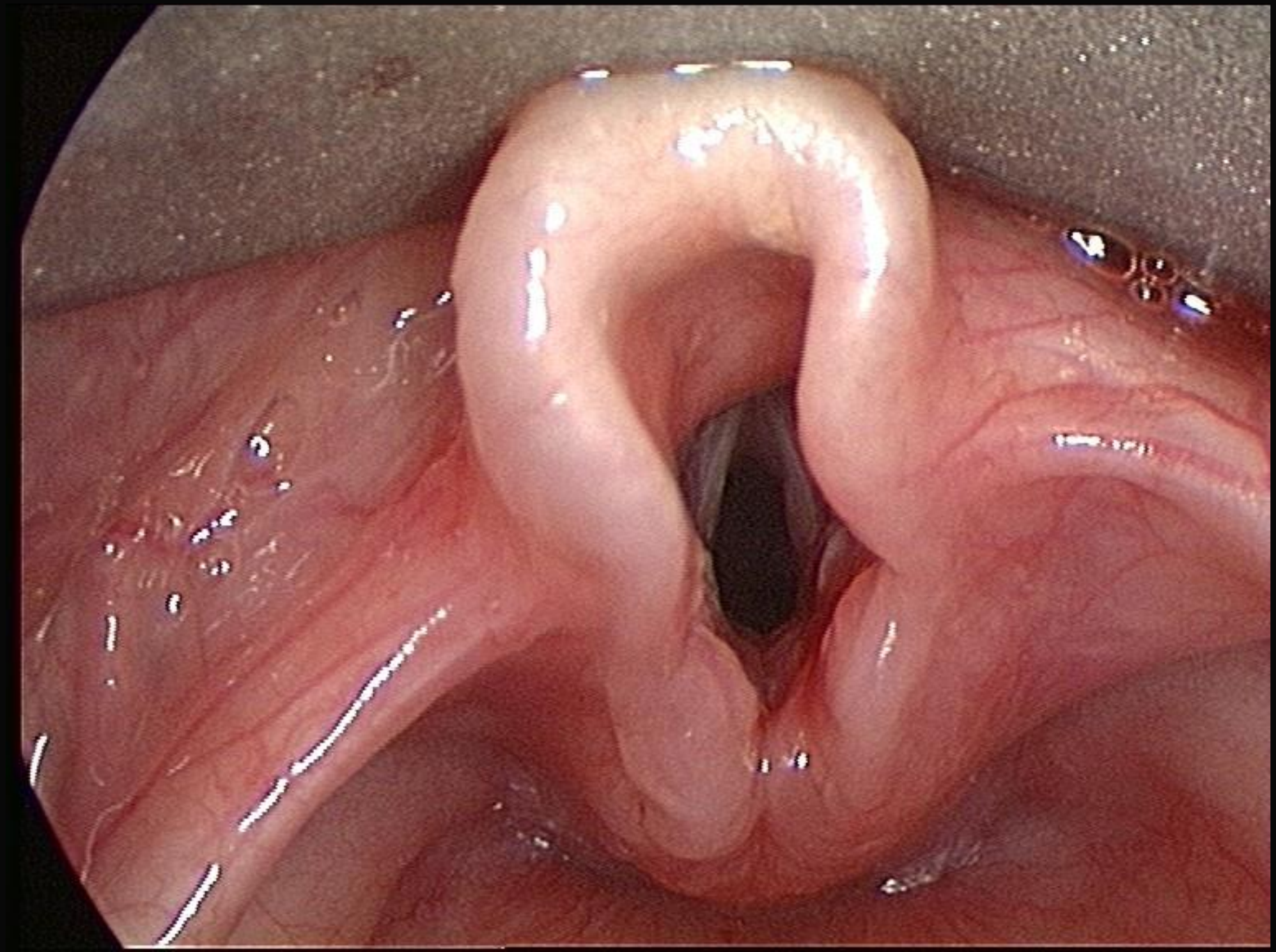


Laryngotracheal stenosis

- Array of reconstructive techniques available
- Surgery tailored to individual case
- >80% overall decannulation rate in special centres



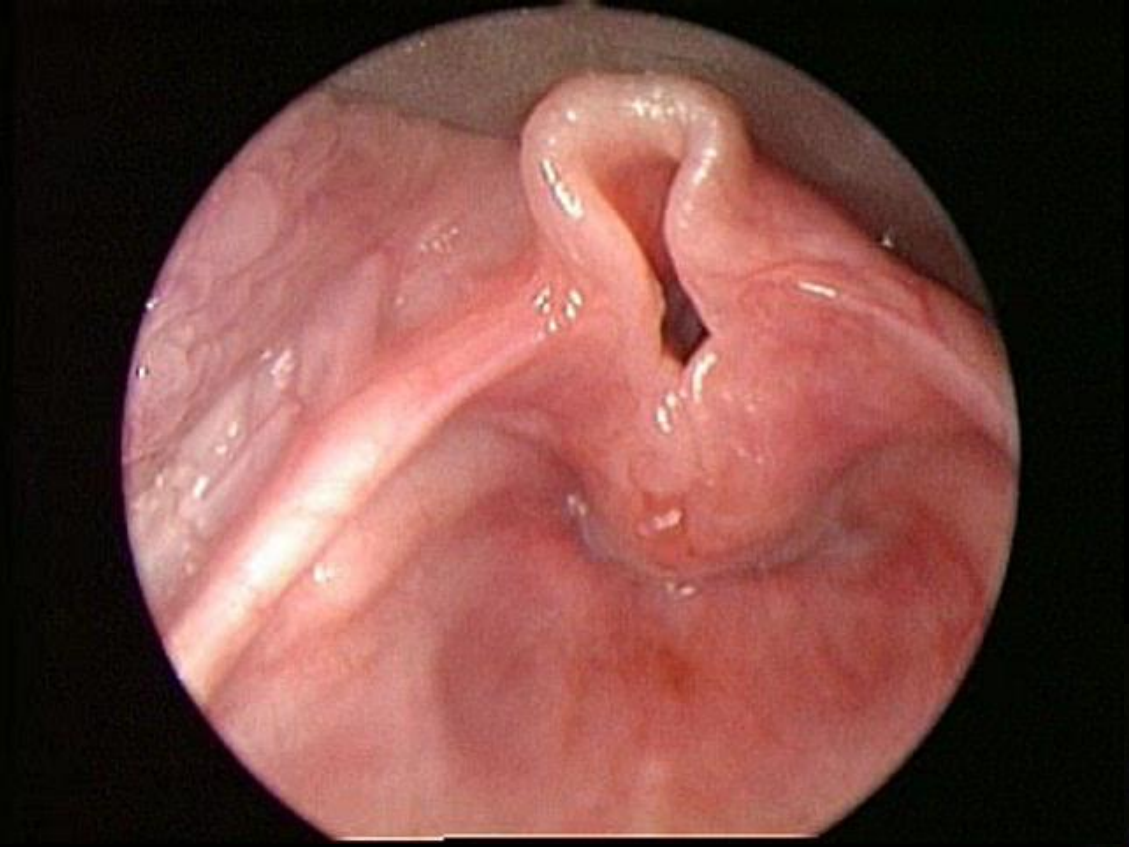


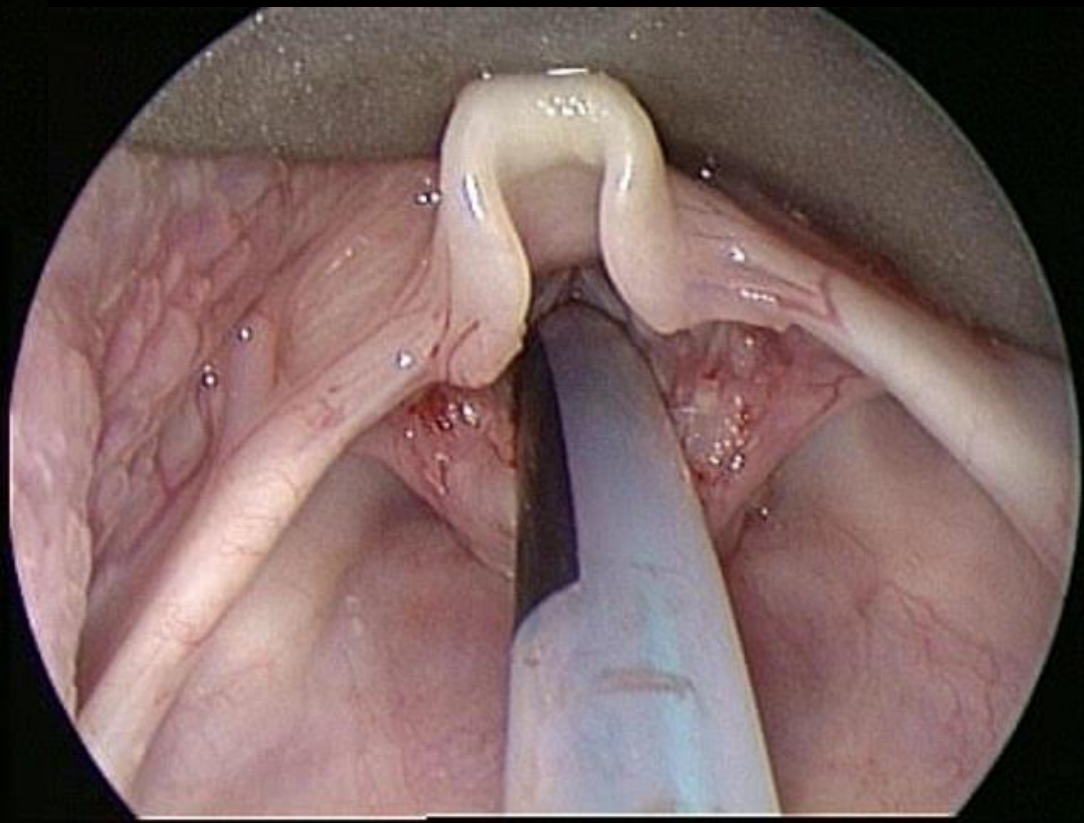
Laryngomalacia

- Natural History

- *Mild* (90-95%) require no intervention:
- - normal feeding and weight gain
- - stridor resolves by age of 2 years

- *Severe* (5-10%) require treatment:
- - reflux, failure to thrive
- - pectus excavatum, cor pulmonale



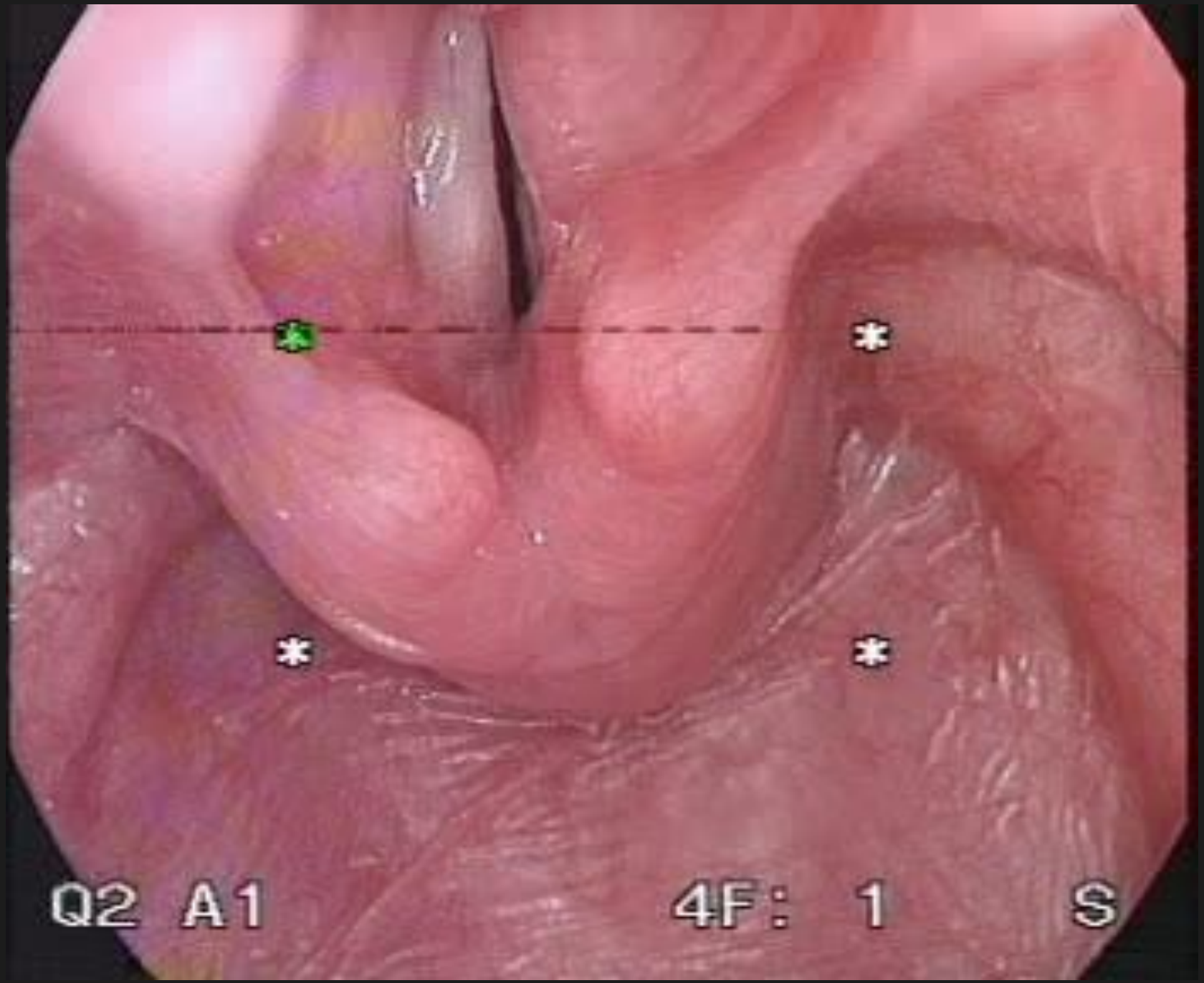


Laryngomalacia

Results of aryepiglottoplasty at GOS (100 consecutive cases)

- Stridor improved 95%
- Stridor abolished 55%
- Stridor persisted 5%
  (all had neurological disease)

- Feeding improved 72%
  - Early aspiration 6%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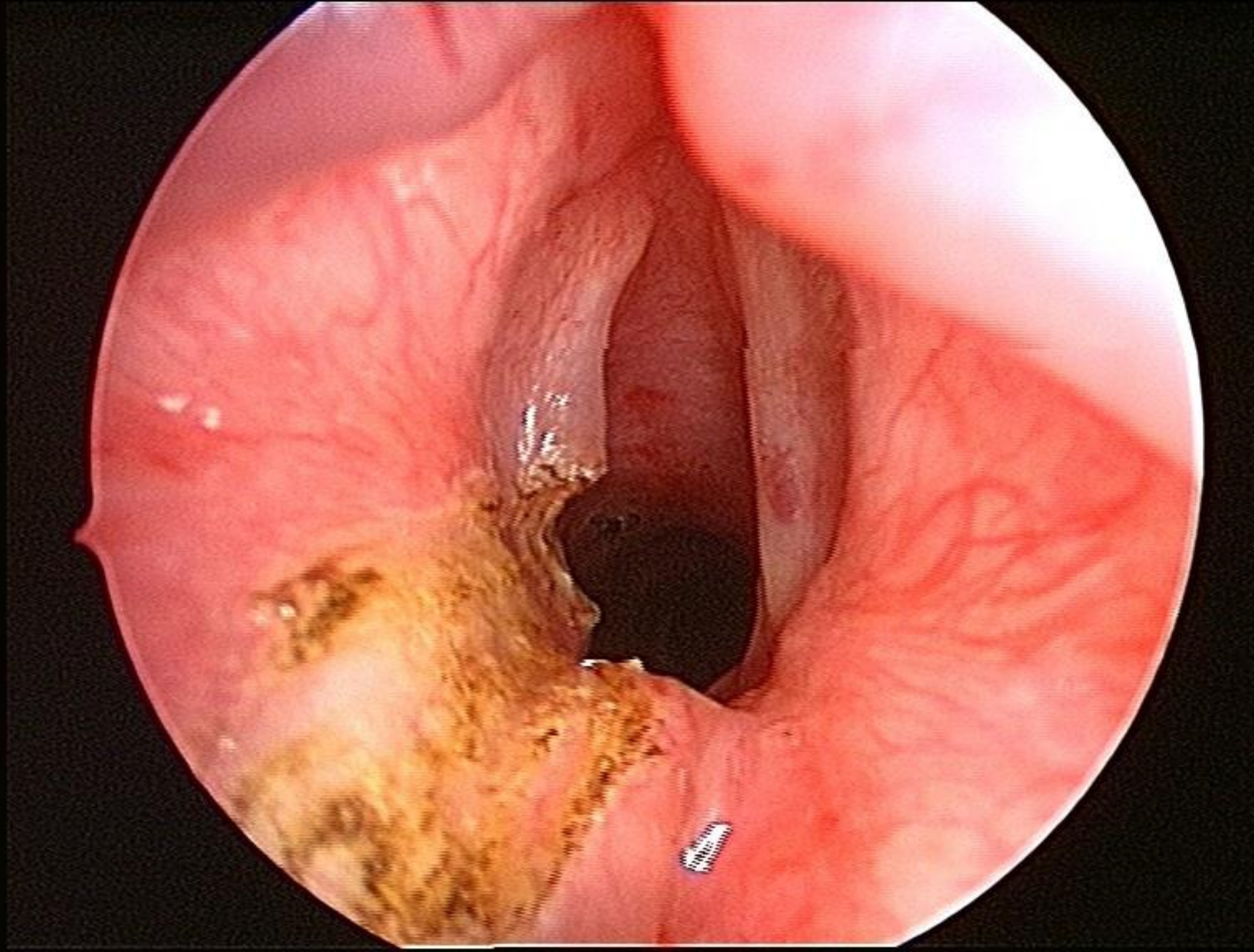
Bilateral Vocal Cord Paralysis

- Great Ormond Street series (n=49)

- Tracheostomy necessary in 57% of cases
- 58% ‘recover’ (10% after more than 5 years)
- The airway may eventually become adequate with laryngeal growth alone
- Glottic enlargement surgery may result in a trade-off between airway and voice

Daya, Hosni, Bejar-Solar, Evans & Bailey, 2000



Bilateral Vocal Cord Paralysis

- Laser arytenoidectomy at GOS
  (n=6, age 9-16)

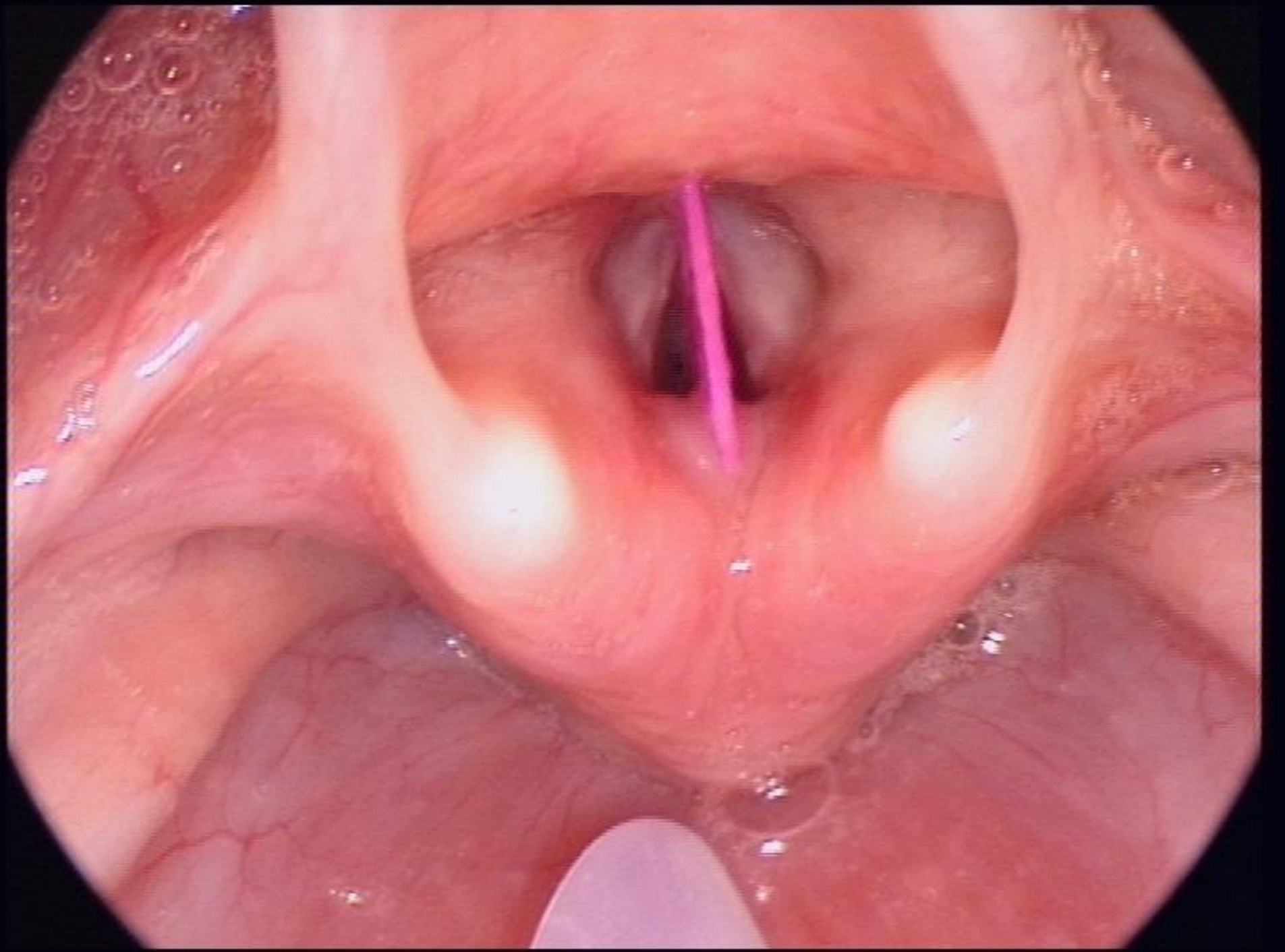
- All had adequate airway post-op.
- 4 with pre-op. trachy were decannulated
- All 6 rated their post-op. voice as better:
  - principally due to increased loudness
  - associated with increased airflow
  - particularly after trachy decannulation

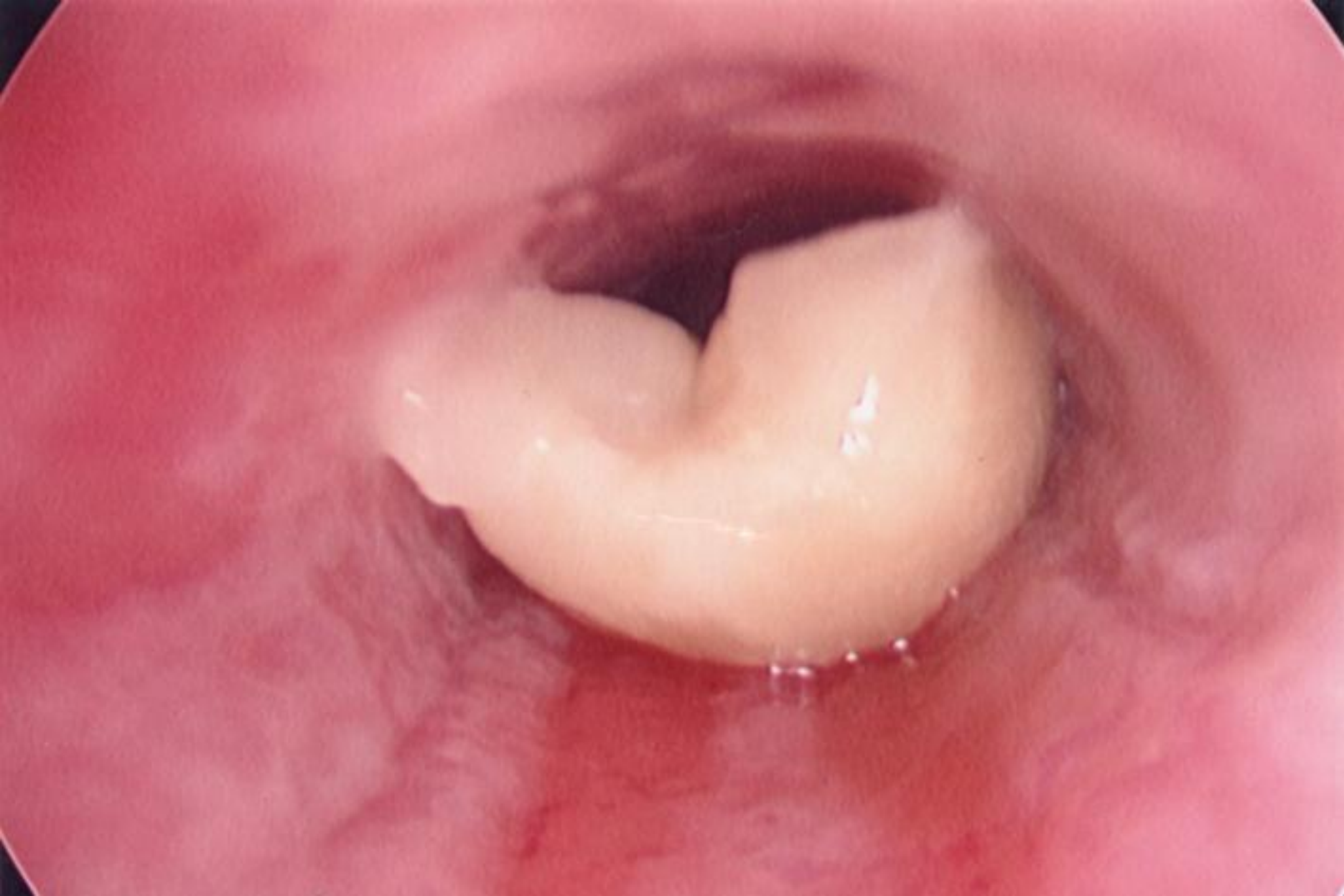
Tracheomalacia

- Treatment

- *Mild* (<75% collapse) require no intervention:
- - stridor will gradually resolve by age 2 years

- *Severe* (>75% collapse) require treatment:
- - correct vascular anomaly
- - consider aortopexy
- - tracheostomy with extended tube or CPAP
- - consider tracheal stent

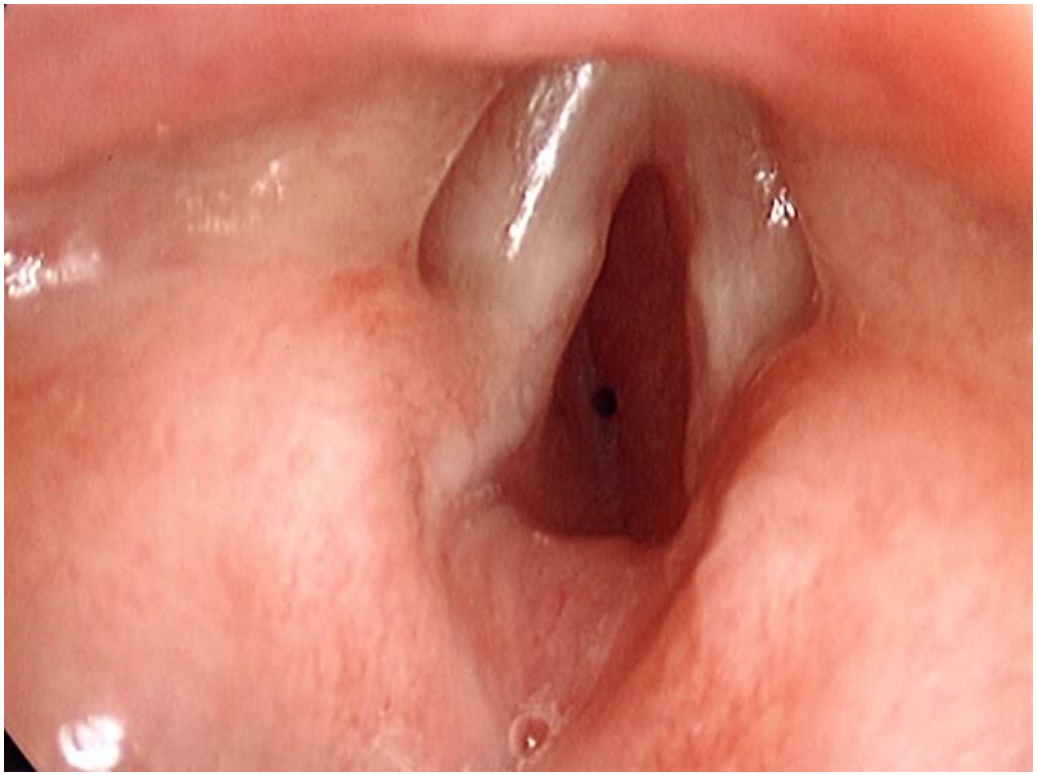


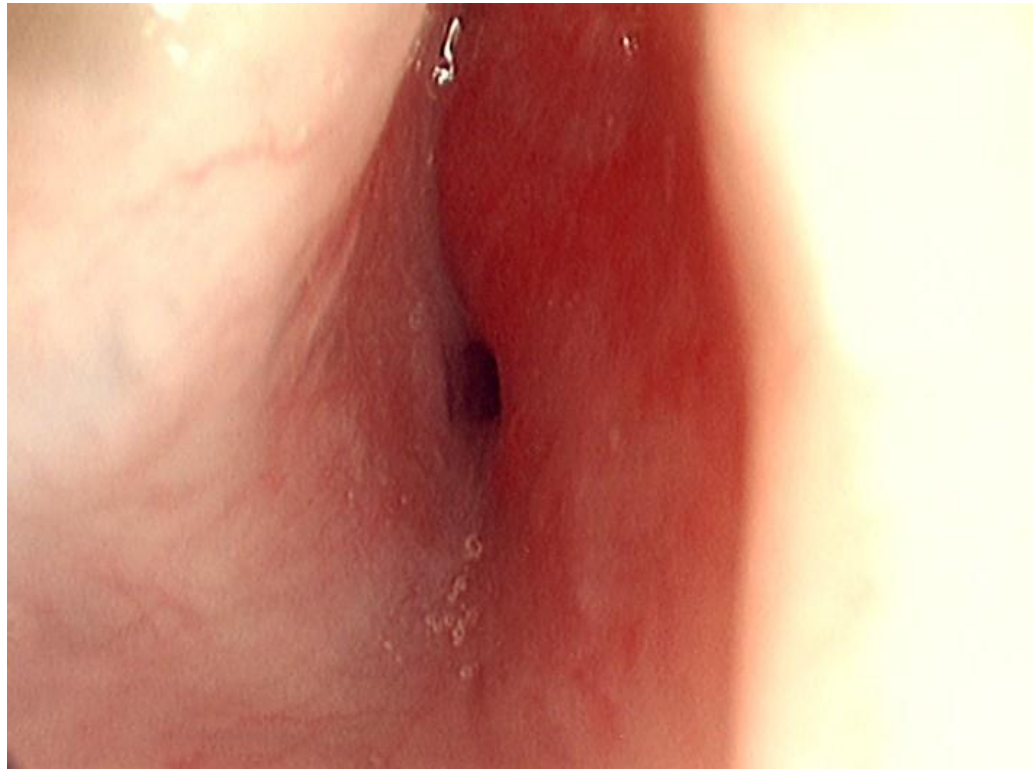


Subglottic haemangioma

- Treatment options

- Tracheostomy
- (Radiotherapy with gold grain implants)
- CO_2 or KTP laser
- Systemic steroids
- (Interferon alfa-2a)
- Intralesional steroid injection + intubation
- Submucosal excision *(Evans 1974 - 3 cases)*



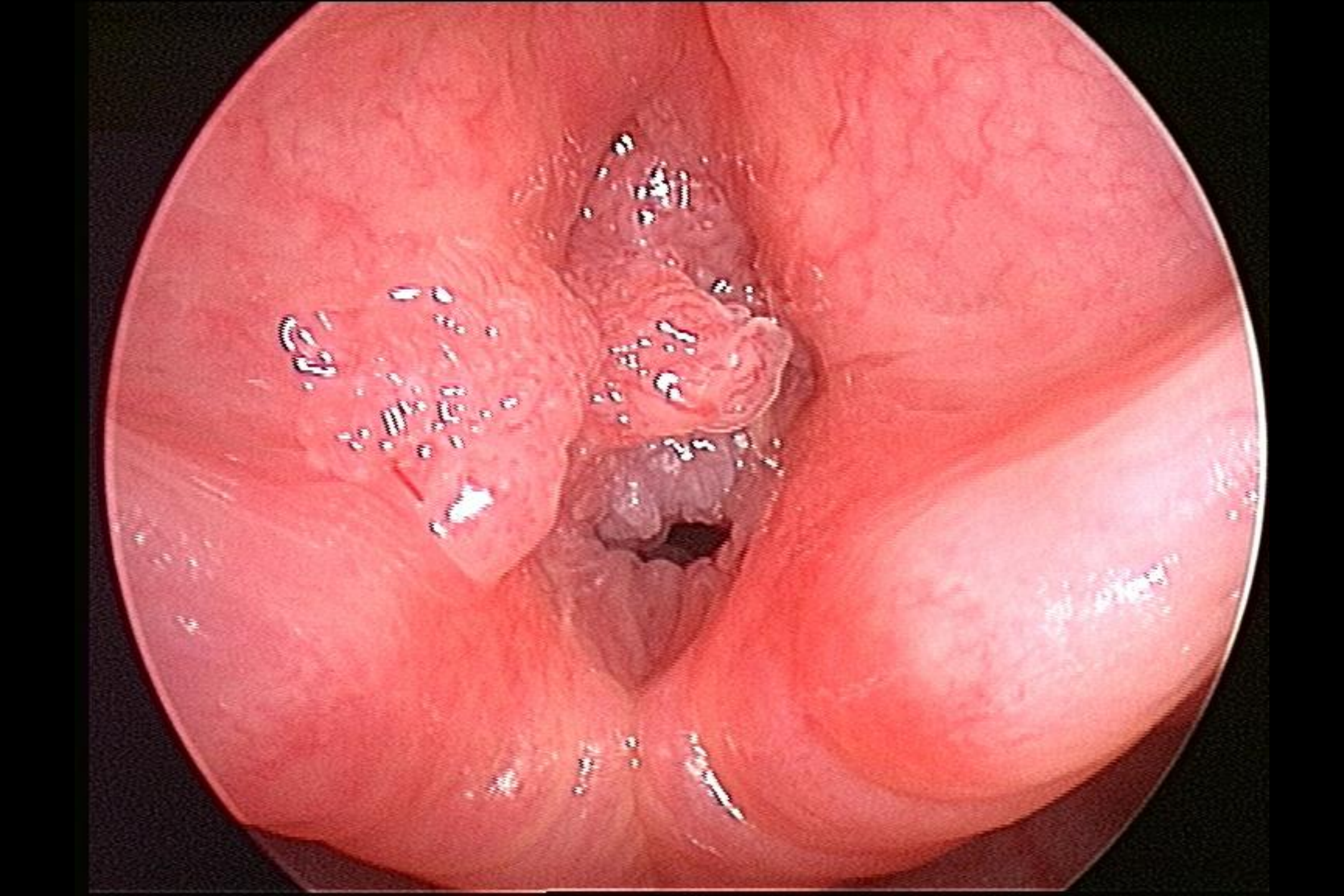


Subglottic haemangioma

- Results of open surgical excision at GOS
  - 17 patients in 5 years (1999 - 2004)

- 14 done as a single-stage procedure:
  - average duration of intubation 7 days
- 3 had a pre-existing tracheostomy:
  - all decannulated after average of 7 weeks
- One recurrence required trachy for 13 months

Bajaj, Hartley, Wyatt, Albert & Bailey, in press



Recurrent respiratory papillomatosis

- Treatment options

- Microlaryngeal cup forcep removal
- Suction-diathermy
- CO_2 laser (KTP laser in trachea & bronchi)
- Laryngeal microdebrider
- Adjuvant therapy:
  - intralesional cidofovir (systemic interferon)
- *Avoid tracheostomy if at all possible*

Requirements for successful paediatric airway endoscopy

- Skills
- Instrumentation
- Systematic technique
- Good judgement