Endoscopic Surgery in the Paediatric Airway

David Albert
Great Ormond Street Hospital
London
History of paediatric stenosis

• 60’s  Premature infants survive
  – Acquired Subglottic Stenosis
  – Tracheostomy

• 70’s  Open laryngeal surgery, Rib graft repair

• 80’s  Cricoid split to deal with early cases

• 90’s  Single stage laryngeal reconstruction
  •  Partial cricotracheal resection

• 2000+  Endoscopic techniques
Why endoscopic rather than open?

• Concerns with existing techniques
  • Tracheostomy
  • Poor vocal outcome
  • LASER

• Initially encouraging results
  • Convergent thinking: not alone
  • Concepts fit with my animal work

• New techniques available
  • Sharp division
  • Radial dilatation
  • 12+ Bar without shearing
  • Microdebrider
  • Mitomycin
  • Steroids
  • Stents
  • Lateralisation sutures
Minimally invasive techniques in the literature

• Surgeons using advanced endoscopic techniques in the airway
  – Rutter
  – Froehlich
  – Rothera

• Endoscopic balloon dilatation of subglottic stenosis

• Endoscopic posterior cricoid split and rib grafting in 10 children
  – Inglis and Manning
    Laryngoscope 2003
Conditions now treated endoscopically

– Laryngomalacia  division/resection
– Cysts  sharp avulsion
– Soft early stenosis  cricoid split
– Restenosis after LTR T-tube
– Established stenosis  grafts
– High tracheal stenosis  stents
– Webs  keel
– Vocal cord palsy  lateralisation suture
– Interarytenoid scar  lateralisation suture
Basic Endoscopic Techniques

• Anaesthesia
• Adrenaline
• FESS style 2 handed surgery

• Initial Techniques
  • Cut/divide/shave
  • Balloon
  • Injection

• Later Techniques
  • Stent
  • Suture
  • Graft
Anaesthesia

- Spontaneous respiration
  - Halothane/Sevoflurane
- Topical anaesthesia
  - Intramuscular Atropine
- Topical Epinephrine

- OR

- Total Intravenous anaesthesia
Initial Techniques

• Sharp division in stenosis or even laryngomalacia
• Sharp removal granulations and cysts
• Sharp division of stenosis and webs
• Radial balloon dilatation
• Microdebrider
• Inject steroids
• Apply Mitomycin
Laryngomalacia
Sharp Removal Of Cysts
Endoscopic Decompression Of Edematous Larynx
Balloon radial dilatation
Microdebrider
Mitomycin C

- Antineoplastic antibiotic - acts as an alkylating agent by inhibiting DNA and protein synthesis

- Dose 0.4 to 4 mg/ml

- 2 mg/ml
Triamcinolone Injection

- 40 mg in 1 ml
Later Techniques

• Repeat radial dilatation
• Mitomycin/Steroids

• Lateralisation sutures

• Montgomery T-Tube
  • silastic keels
  • tube stents

• Wedge resection
• Endoscopic grafts
AZ: 8 years, anterior web following laser for papilloma

• Division with insertion of silastic stent
CW 12 years-
Endoscopic Insertion of Endolaryngeal Stent
EJ: 12 years old, failed laser division of web stenosis
RC: 12 years skiing accident
CN: 10 years 

- Division of interarytenoid scar, anterior web and subglottic stenosis
MK: Downs, microtrachea

- Cricotracheal resection
- Multiple stents
- Thin stenosis
MK: Downs, microtrachea

- Repeated:

  - Sharp division

- Balloon

- Steroid injection
EB: ex prem with stridor
ES 8, years, Larsens syndrome
T tube to prevent restenosis
N.A 6 years, vocal cord palsy
Lateralisation suture
BB, 12 years, posterior scar
Endoscopic posterior graft
Summary

• Advanced endoscopic procedures may reduce the need for open surgery.
• The indications, risks and benefits need to be determined
• My experience has been mostly positive
  – No major complications
  – A few notable success stories
  – Time and cost a consideration
Thank you
eSpo 2012

11th International Congress of the European Society of Pediatric Otorhinolaryngology

20 - 23 May 2012

www.espo2012.com

Pediatric Otorhinolaryngology: From experience-based to evidence-based practice
DATE FOR YOUR DIARY

Saturday 31st May – Tuesday 3rd June 2014
The Convention Centre, Dublin, Ireland

12th INTERNATIONAL CONGRESS OF THE EUROPEAN SOCIETY
OF PEDIATRIC OTORHINOLARYNGOLOGY