Tracheoesophageal Fistula

• E F Post
• Presentation
• 26 January 2007
Causes

• Congenital
• Acquired
  – Malignant
  – Benign
Congenital

- TEF +/- Esophageal Atresia
- Associated anomalies
Embryology

- Derived from primitive foregut
- 4th week of gestation tracheoesophageal diverticulum forms from the laryngotracheal groove
- Tracheoesophageal septum develops during 4th-5th weeks – muscular + submucosal layer of T + E formed
- Elongates with descent of heart and lung
- 7th week reaches final length
Gross-Vogt classification
Tracheoesophageal Fistula
Presentation/Diagnosis

- Prenatal ultrasound
  - Polyhydramnios (1 in 12)
  - Small or absent stomach
  - Distended blind esophageal pouch
- Prenatal MRI
  - Blind esophageal pouch
Diagnosis

• Prenatal
  – Ultrasound = polihydramnios, absent stomach,
  – MRI = blind distended esophageal pouch

• Postnatal / clinical picture
Clinical

• Drooling, regurgitation, coughing, choking
• Scaphoid abdomen = EA
• Distented abdomen = TEF
• Cyanotic episodes
• Inability to pass OGT
• Pneumonia, atelectasis (abdomen P)
Clinical

• Isolated H-type TEF (E)
  – Subtle, weeks before Dx
  – Triad: Choking when feed
    Gaseous distention of bowel
    Recurrent aspiration pneumonia
  Contrast Xray to Dx
Plain CXR / AXR

- Confirms diagnosis
- OGT in esophageal pouch
- ↑/ absent gas in abdomen
- Assess gap length
- Anomalies – VACTERL
Coiled OGT
Other SI

- Ultravist swallow
- Bronchoscopy
  - Level of fistula
  - Exclude upper pouch fistula
  - Identify laryngoesophageal cleft
- Gastroscopy
- CT / MRI
Associated anomalies

- VACTERL
  - Vertebral, Anorectal, Cardiac, Tracheoesophageal, Radial, Renal, Limb
- Trisomy 18 + 21
- Laryngotracheal esophageal cleft
  - Failure of fusion of laryngotracheal groove
Management

- Minimal handling to minimize gastric distention and regurgitation
- NPO!!
- Avoid bag-mask ventilation
- Maintain in partial upright position 45°
- Repeated upper esophageal pouch suctioning minimum q10min or low continuous
- Transfer to tertiary pediatric institution for management and definitive care
Management medical

• NPO
• Avoid bag-mask ventilation
• 45° head up
• Low continuous suctioning of esophageal pouch
• Pediatric centre transfer
• IVF, Abx
• VitK, TPN as needed
Management surgical

• Preop investigations:
  • CXR / AXR
  • Echocardiography
  • Renal ultrasonography
  • Bronchoscopy / Esophagoscopy (EUA)
Surgical Therapy

- EA and TEF
  - Fistula division with primary esophageal anastomosis
  - Right thoracotomy via 4th ICS
  - Fistula divided close to trachea with air-tight ligation
  - Mobilization of proximal segment with circular myotomy if extra length required
  - Single layer closure with absorbable suture knots internal
  - Feeding tube placed across anastomosis
Surgery

- ® thoracotomy 4th ICS (retropleural)
- Fistula division with ° esophageal anastomosis
- Fistula divided close to trahea with air-tight ligation
- Mobilise proximal segment / anastomose with lower esophagus – NGT across
- Gastrostomy, suction pouch, delay repair if pt unstable for surgery / pure EA (pouch elongate)
Surgery

• Extralength needed to repair esophagus
  – Colon
  – jejunum
Complications

- GER 40- 70%
- Esophageal stricture 40%
- Anastomotic leak 14- 21%
- Also tracheomalacia / fistula recurrence/ esophageal dysmotility
Summary

• Once a death sentence EA / TEF close to 100% survival
Acquired

• Malignant
  – Esophagus Ca 77%
  – Bronchus Ca 16%
  – Others eg larynx, trachea, HL, etc

  – Mx: palliative mostly, SEMS/ nutrition
    • Also silastic / Z stents
    • Seldom Chemo / RoRx / surgery
  – Prx: median 6 weeks survival due to sepsis
Acquired

- **Benign** = chronic cough/ pneumonia
  - Sharp
  - Post CT surgery
  - Mediastinal inflammation - TB
  - FB ingestion
  - Cuff related (ventilated)
    - Gastric content / feeds suction out tube
    - Aspiration pneumonia
    - CXR: dilate air filled esophagus
    - CT, ultravist swallow
    - Bronchoscopy / Esophagoscopy: id site (methylene blue)
Cuff related TEF

Cuff erosion 0.5% tracheostomy (↓ with low P)
Risk factors:  NGT,
infections,
steroids,
DM
Hypotension,
Tube: too small, needing ↑ P to ventilate
:excess motion
Mortality 3%,
Management of BTEF

- **Supportive** –
  - Stop contamination: gastrostomy, lower tube, head up
  - Nutrition: jejunostomy
  - Wean

- **Surgery**
  - Not close spontaneously
  - Only after wean: PPV dehiscence / stenose
  - 1° fistula repair; +/- resect and repair trachea
Surgery BTEF

- Principles (Grillo-transcervical approach)
  - Lateral incision, watch RLN
  - Dissect fistula
  - Trachea close – interrupted sutures (outside lumen)
  - Esophagus close – 2 layers (mucosa/ muscle)
  - Buttredd esophagus with pedicled flap (SCM)

- If large: tracheal resect and reanastomose
<table>
<thead>
<tr>
<th>One day, he was walking</th>
<th>he saw a woman sleeping</th>
<th>he felt desire burning inside him</th>
<th>his adrenaline started pumping</th>
<th>he took the plunge</th>
<th>he invited her to have a coffee</th>
<th>then to the restaurant</th>
<th>they went on a trip</th>
</tr>
</thead>
<tbody>
<tr>
<td>they did different activities</td>
<td>he took her to his house</td>
<td>she told him she was on the pill</td>
<td>and she laid down on the bed</td>
<td>she spreaded one leg</td>
<td>then the other</td>
<td>then both</td>
<td></td>
</tr>
<tr>
<td>he reaction was immediate</td>
<td>he penetrated her</td>
<td>he went in and out</td>
<td>he discovered that she wasn't a virgin</td>
<td>he suggested some other positions</td>
<td>she refused</td>
<td>but she asked him to go faster</td>
<td></td>
</tr>
<tr>
<td>she made comments on his equipment</td>
<td>When she saw all the colours of the rainbow,</td>
<td>she shouted Stop!</td>
<td>She hadn't told him the truth:</td>
<td>she wasn't on the pill</td>
<td>But he lost his self-control</td>
<td>and reached the point of no return</td>
<td></td>
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<tr>
<td>she called him 9 months later</td>
<td>from the hospital</td>
<td>he had 2 children!</td>
<td>his world crumbled</td>
<td>he wanted to die</td>
<td>The morale:</td>
<td>for not making a woman pregnant</td>
<td></td>
</tr>
<tr>
<td>wear protection</td>
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