Tracheo-Esophageal Fistula

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Presentation

- xx weeker bom NSVD. APGAR 9 and 9. 2,435g.
- Prenatal US showed dilated coronary sinus which prompted planned NICU admission for cardiopulmonary monitoring.
- Baby immediately noted to have retractions
Presentation

HEENT: WNL.
CV: RRR, s1, s2.
Chest: Good air entry b/l.
Abd: soft nontender, nondistended. +bowel sounds.
Ext: FROM. No deformaties.
GU: Normal male.
Back: WNL.
Presentation

- DOL#1 Placed on CPAP. NPO
- DOL #2 TTE showed mesocardia with bilateral SVC. Left sided aortic arch.
- DOL #2 OGT was attempted and would not pass.
OR

- Chest entered via 5th intercostal space.
- Extrapleural Approach.
- Azygous vein divided.
- TEF fistula ligated.
- Esophageal pouch freed. Opening made and single layer anastamosis between upper esophageal pouch and lower esophagus.
Post op

- POD #4 Extubated
- POD #5 Feeds via OGT
- POD #6 PO feeds
- POD #7 CT removed inadvertently
- POD #8 Tolerating PO, +BM, cleared for D/C home by Pediatric Surgery service
Discussion
Epidemiology


25-40% premature or low birthweight

50% have associated defects. Cardiac 35%, GI 24%, GU 20%, Vertebral and Radial 15% VACTERL.
History

Thomas Gibson 1697
The Anatomy of the Humane Bodies Epitomized

Harry Richter 1913
Transpleural approach. Ligation and gastrostomy

Thomas Lanman 1936
Extrapleural approach. Ligation and anastamosis

William Ladd 1939
Extrapleural 4 stage

Cameron Haight 1941
Extrapleural. Ligation and anastamosis

Embryology

- Primitive foregut
- Week 4-6: Caudal part of the foregut forms a ventral diverticulum that evolves into trachea
- The longitudinal tracheoesophageal fold fuses to form a septum dividing the foregut into a ventral laryngotracheal tube and a dorsal esophagus.
- Posterior deviation of the septum causes incomplete separation of the esophagus from the laryngotracheal tube.
Embryology

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Science

- Multifactorial
- Sonic Hedgehog Signaling Pathway absent
- Defective FGF Signaling pathway
- Environmental:
  - Contraceptives
  - Methimazole
  - Benectin


Presentation

- Respiratory Distress (coughing, choking, regurgitation with first feeding)
- Polyhydramnios: TEF 33%. EA 100%.
- Gastric distention
- Desaturation with nippling
- Inability to pass OGT
- Radiographs show OGT in upper esophagus with air in stomach (except in proximal fistula).
Prognosis

- Category A patients > 5.5 lb (2.5 kg) at birth and who are otherwise well
- Category B patients 4-5.5 lb (1.8-2.5 kg) and are well or have higher birth weight and moderate pneumonia and other congenital anomaly;
- Category C patients < 4 lb (1.8 kg) or have higher birth weight and severe pneumonia and severe congenital anomaly.

- Category A (98%), immediate primary repair
- Category B (82%), delayed repair
- Category C (50%), staged repair

Preoperatively

- Head elevation
- OGT suction
- Repeated suctioning
- H2 blockers
- NPO
- Avoid bag mask ventilation
Preoperatively

• **Echocardiogram**
  - Must assess for Right sided aortic arch. Found in 2.5% of children with EA.
  - PDA

• **Renal US**
  - Bilateral renal agenesis
  - Multicystic dysplastic kidneys
  - May need to follow with renal scan

• **Bronchoscopy**
  - Detection of upper pouch fistula
  - Localization of distal fistula
  - Detection of a aberrant RUL bronchus
Repair

- Right thoracotomy via 4th/5th intercostal space
- Fistula division close to trachea
- Mobilization of proximal esophagus
- Feeding tube across anastamosis
- Single layer anastamosis
  - Tension free
Complications Early

• **Anastomotic leak:** 15%.
  - 3 or 4 days post-op. Saliva in chest tube. +/- sepsis

• **Anastomotic stricture:** 50%.
  - Functionally significant?
  - Balloon dilation under fluoroscopic control. 6 weeks old and at least 4 weeks post surgery

Complications Late

• **Gastroesophageal Reflux**  
  - Congenital distal dysmotility  
  - Dysfunction of physiologic antireflux barrier  
  - Vagal injury/dysfunction leading to gastric dysmotility.  
  - H2 blockers post op for 6 months  
  - Nissen fundiplication

• **Esophageal dysmotility**  
  - Domperidone

• **Tracheomalacia**  
  - Bronchoscopy reveals trachea that significantly collapses, flattens, or closes on expiration.

Complications

Complications

Long Gap

• A) Gap length exceeding 4 cm.
  B) Gap length greater than 2 vertebral bodies.
• 2-6 vertebral bodies. Delayed repair 8-12 weeks.
• >6 vertebral bodies will need to replace esophagus at 3-4 months.

Treatment/Lengthening

- Gastrostomy.
  - Gapogram.

- Bougienage

- Traction sutures

- Myotomy
  - Between muscularis propria and serosa
  - 1 cm

- Stomach mobilization
Treatment/Replacement

• Colon
  - Good length
  - 3 anastomosis
  - Dilates and becomes redundant

• Gastric tube
  - Does not become redundant

• Gastric Transposition

• Jejunum
  - Peristaltic