Tracheoesophageal Fistula

- E F Post
- Presentation
- 26 January 2007

Causes

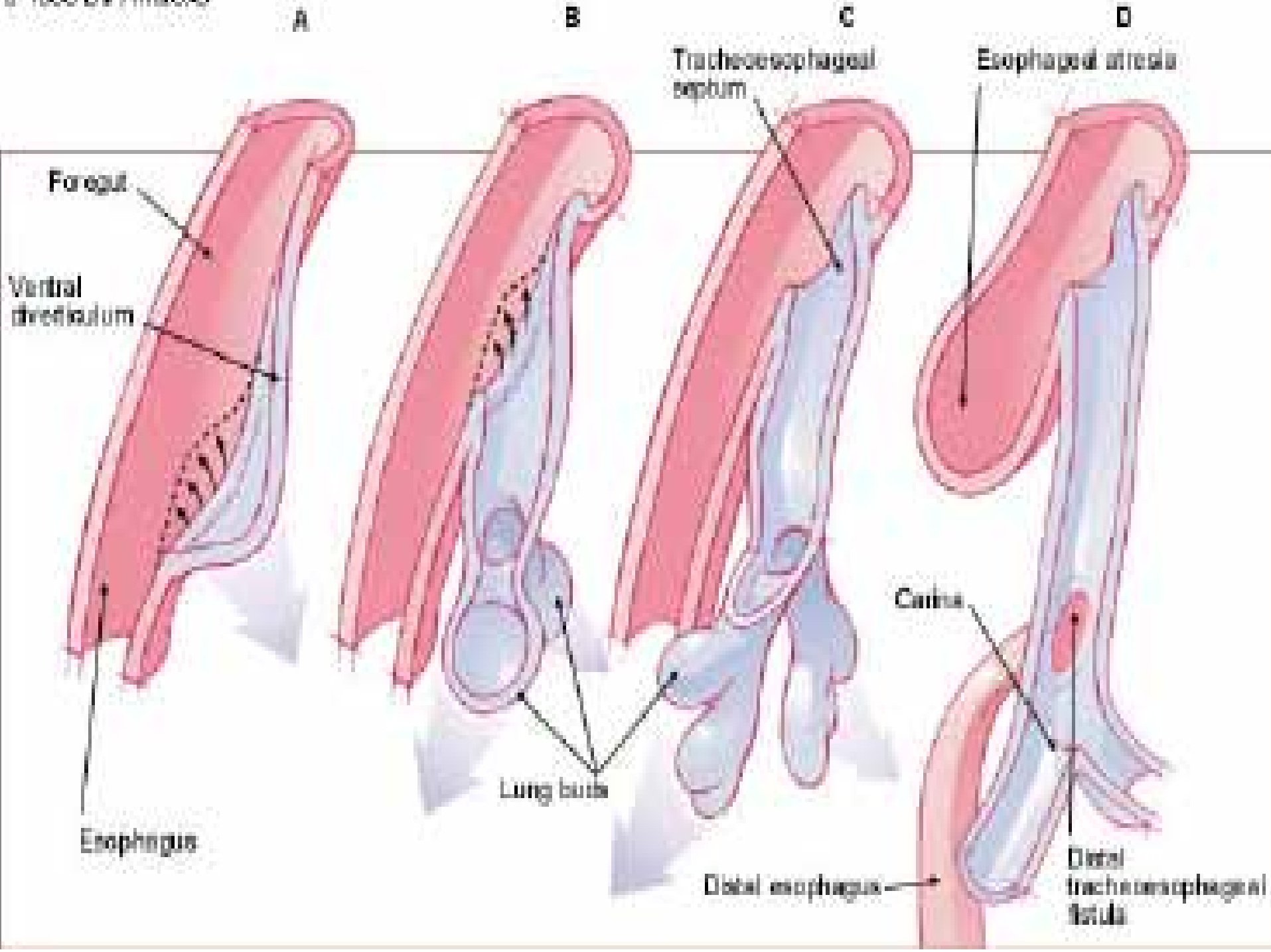
- Congenital
- Acquired
  - Malignant
  - Benign

Congenital

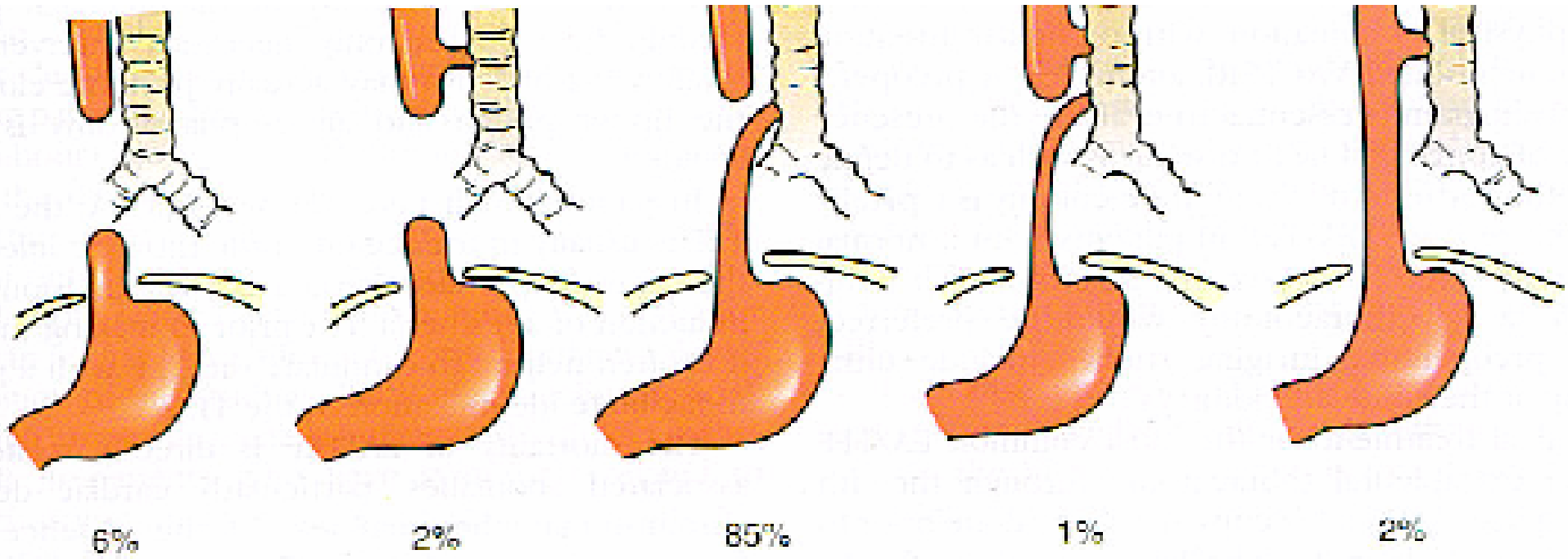
- TEF +/- Esophageal Atresia
- Associated anomalies

Embryology

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


A
B
C
D
Tracheoesophageal septum
Esophageal atresia
Foregut
Ventral diverticulum
Esophagus
Lung buds
Carina
Distal esophagus
Distal tracheoesophageal fistula

Gross-Vogt classification



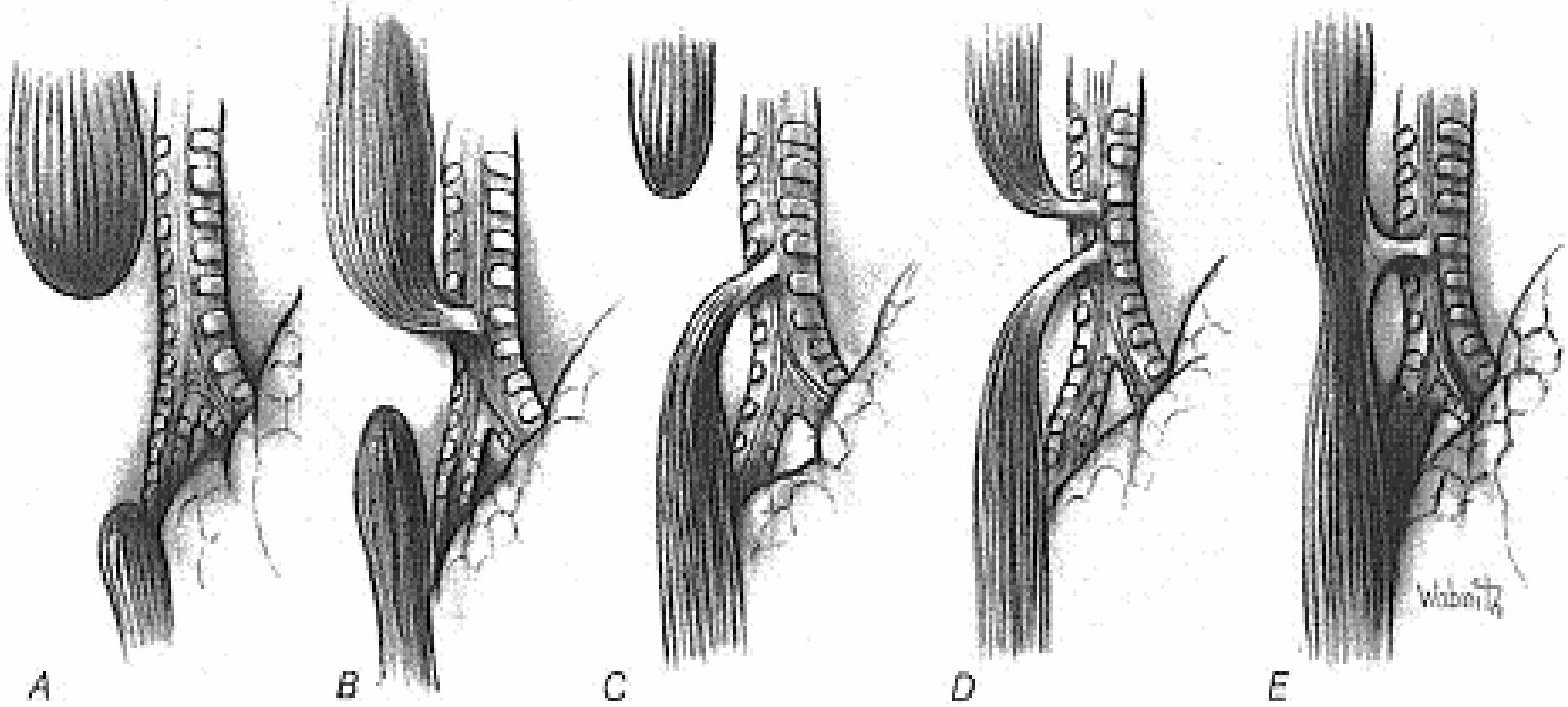
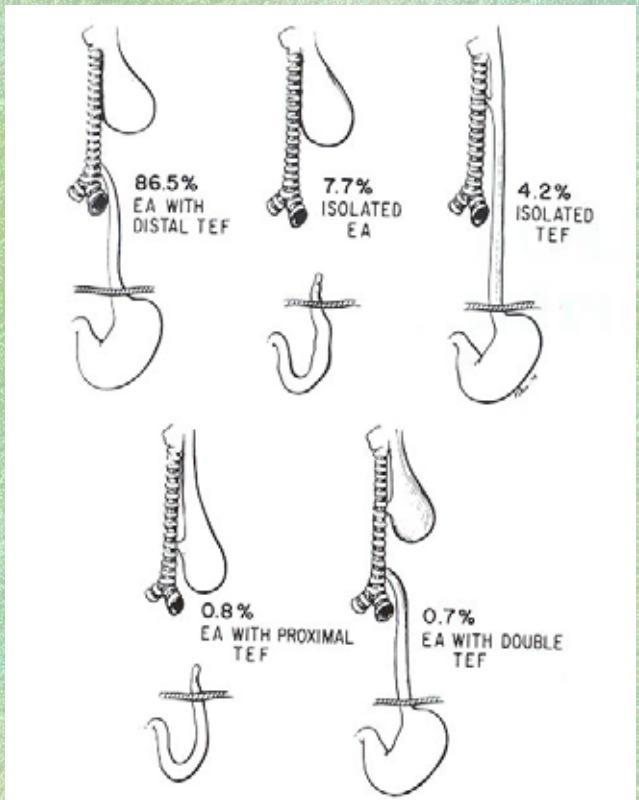
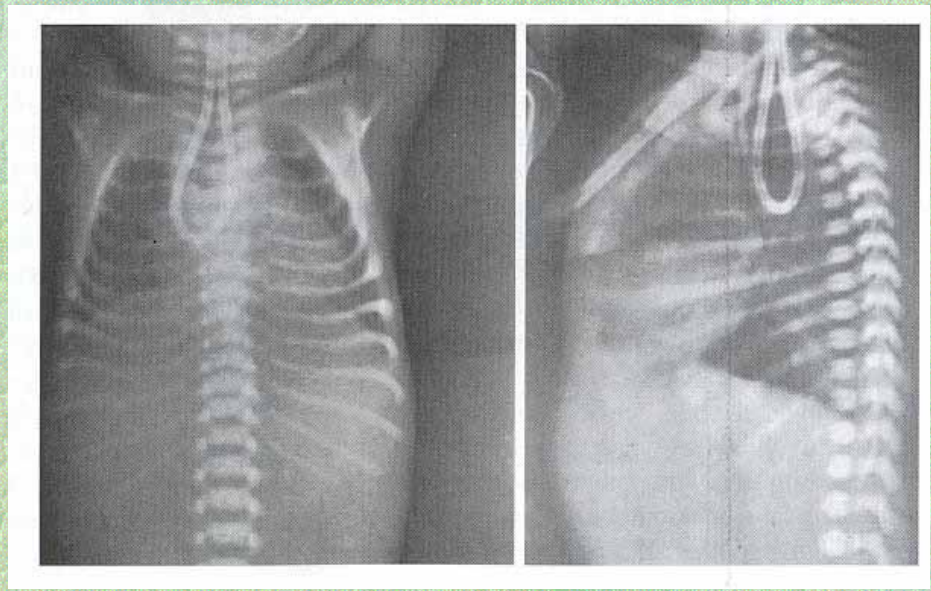


FIG. 37-12. *Five major varieties of esophageal atresia and tracheoesophageal fistula. A. Esophageal atresia without associated fistula. B. Esophageal atresia with tracheoesophageal fistula between proximal segment of esophagus and trachea. C. Esophageal atresia with tracheoesophageal fistula between distal esophagus and trachea. D. Esophageal atresia with fistula between both proximal and distal ends of esophagus and trachea. E. Tracheoesophageal fistula without esophageal atresia (H-type fistula).*

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

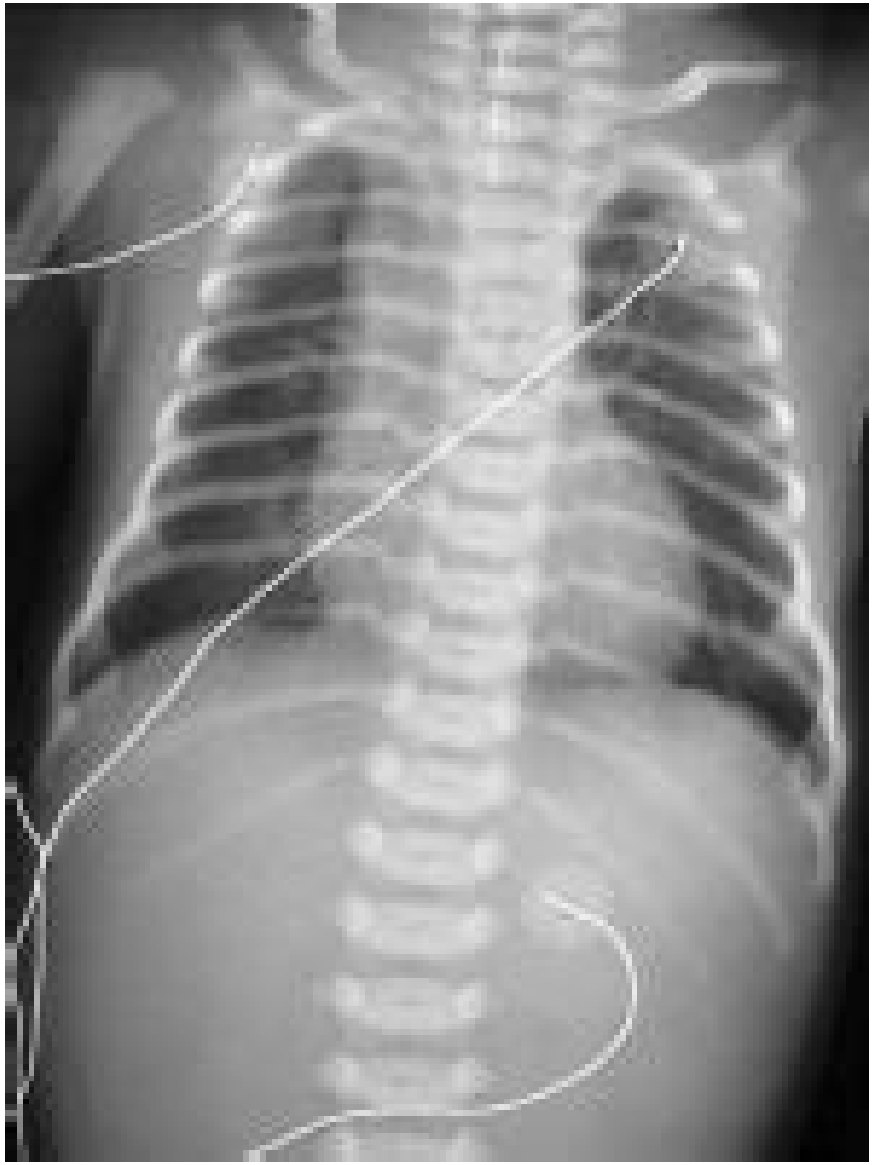
- Isolated H-type TEF (E)
  - Subtle, weeks before Dx
  - Triad: Choking when feed
    Gaseous distention of bowel
    Recurrent aspiration pneumonia

  Contrast Xray to Dx

Plain CXR / AXR

- Confirms diagnosis
- OGT in esophageal pouch
- ↑ / absent gas in abdomen
- Assess gap length
- Anomalies – VACTERRL

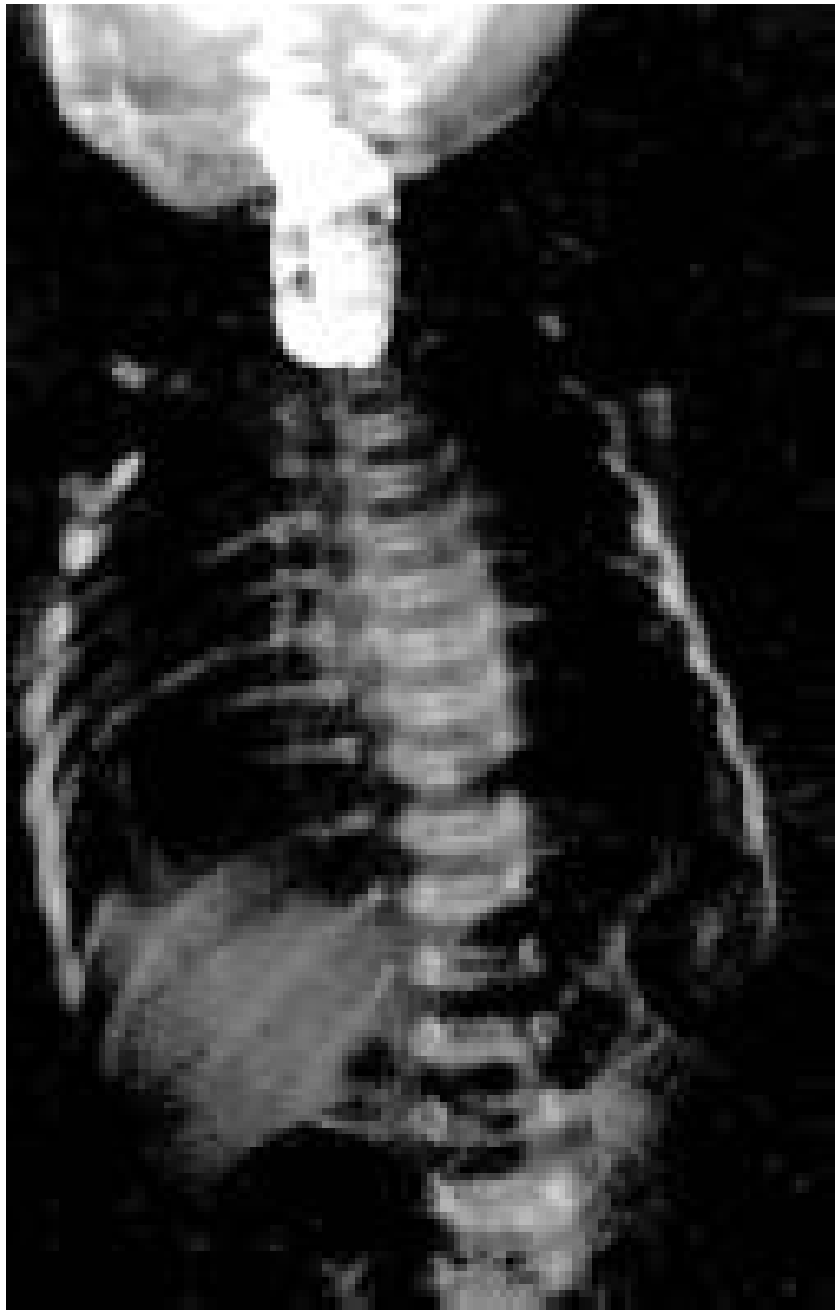
Coiled OGT



Gasless Abdomen

Other SI

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



Associated anomalies

- VACTERRL
  - Vertebral, Anorectal, Cardiac, Tracheoesophageal, Radial, Renal, Limb
- Trisomy 18 + 21
- Laryngotracheal esophageal cleft
  - Failure of fusion of laryngtracheal 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 suctionin 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

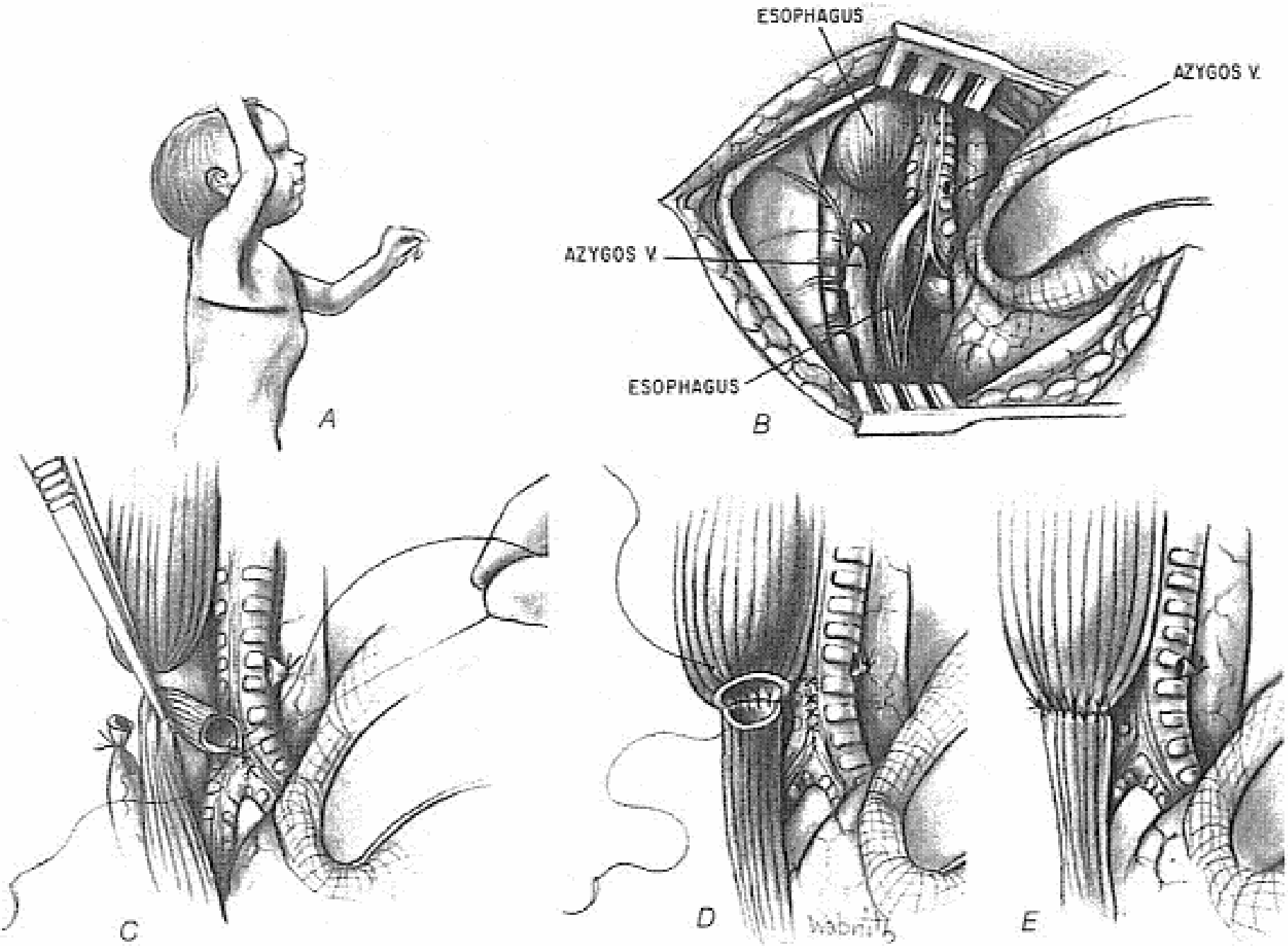
- EA and TEF
  - Fistula division with primary esophageal anastomosis
  - Right thoracotomy via 4th ICS
  - Fistula divided close to trachea with air-tight ligation
  - Mobilization of proximal segment with circular myotomy if extra length required
  - Single layer closure with absorbable suture knots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

Surgery

- ® thoracotomy 4th ICS (retropleural)
- Fistula division with 1° 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


ESOPHAGUS
AZYGOS V.
AZYGOS V
ESOPHAGUS
A
B
C
D
E

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: pallaitive 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: gastrrostomy, 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 – intrrupted sutures (outside lumen)
  - Esophagus close – 2 layers (mucosa/ muscle)
  - Butredd esophagus with pedicled flap (SCM)
- If large: tracheal resect and reanastomose

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