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Case presentation #1

- 4 yo male presents w/ acute rt scrotal swelling noted by the parents due to the child's c/o discomfort
- Exam w/ unilateral mild scrotal erythema, inguinal and scrotal swelling and signif discomfort on exam
- Abd exam is benign

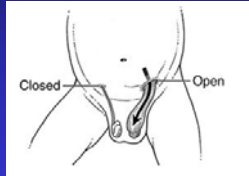


Case Presentation #1

- Cause of acute inguinal/scrotal swelling
 - A) Incarcerated Hernia
 - B) Acute Hydrocele
 - C) Testicular Torsion
 - D) Torsion of Appendix Testis
 - E) Inguinal Lymphadenitis

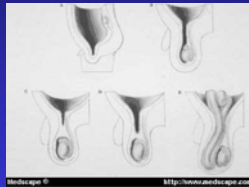
Inguinal Hernia

- 7-8% of population
- M>>F 8:1
- Failure of closure of Patent Process Vaginalis
- Present at any age



Inguinal Hernia

- Hydrocele
 - Communicating
 - Non-communicating
- Hernia
- Reactive hydrocele



Inguinal Hernia

- Diagnosis
 - History
 - Exam
 - X-ray
 - Ultrasound
 - Laproscopic
 - Contra-lateral side



Inguinal Hernia

- Laproscopic exploration
 - Age >1yo
 - 10-13yo
 - Umbilical h w/ history



Inguinal Hernia

- Patent process vaginalis
 - 30-50% of children >1yo
 - Common practice
 - Laproscopic repair



Case Presentation #2

- 4yo female pre-school
- Asymptomatic reducible umbilical bulge
- 2-3cm defect referred to you for evaluation and recommendations



Case Presentation #2

- Treatment of umbilical defect in 4yo child

- A) Expectant treatment
- B) Immediate/Urgent repair
- C) Return in 1yr
- D) Elective Repair
- E) Tape Silver (Bo) dollar on umbilicus



Umbilical Hernia

- 7-8% of population
- M:F equal
- African American
- Failed closure of umbil ring
- 80% will close by 3-4yo



Umbilical Hernia

- Increased intra-abd pressure
- Incarceration
- Giant defects
 - >5-6cm
 - Enlarging
 - Skin breakdown
 - Incarceration



Case Presentation #3

- 4yo w/ 1mo h/o Rt neck swelling and a persistent dry cough
- Exam – multiple semi-mobile, non-tender 2-3cm posterior cervical lymph nodes, clear chest exam, no other lymphadenopathy
- Scab on the back of her neck and scalp
- The pt is otherwise well w/ no other constitutional symptoms



Case Presentation #3

- Treatment of cervical lymphadenopathy in childhood
- A) Immediate Biopsy
B) PPD
C) Chest X-ray
D) Antibiotics
E) b, c & d



Lymphadenopathy

- Malignancy rare
- Supra clavicular > ant cervical ≥ axillary > posterior cervical >> inguinal
- Regional sarcoma or melanoma
- CXR, PPD, oral antibiotics, and +/- expectant
- Persistence based on location



Case presentation #4

- 2 yo presents with parents requesting circumcision.
- No difficulties w/ urination or swelling
- Exam – nl genitalia for age and unable to fully retract foreskin, no inflammation



Case Presentation #4

- Treatment of uncircumcised male
 - A) refuse to perform procedure
 - B) council against procedure
 - C) advocate for procedure
 - D) council and proceed based parental choice
 - E) refer to another physician



Circumcision

- Majority of males are uncircumcised
- <1% phimosis
- Parental preference



Case Presentation #5

- 3yo w/ 4mo h/o ant. neck swelling that fluctuates in size
- Exam – ant semi-mobile, non-tender 2-3cm anterior lesion that moves with swallowing and tongue protrusion. no other lymphadenopathy
- The pt is otherwise well w/ no constitutional symptoms



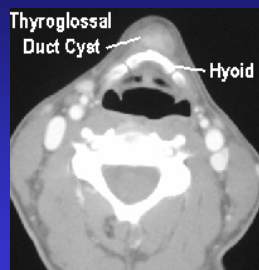
Case Presentation #5

- The most likely diagnosis is
- A) Benign lymphadenopathy
B) Thyroglossal Duct Cyst
C) Thyroid Cyst
D) Branchial Cleft Cyst
E) Strap Muscle Tumor



Thyroglossal Duct Cyst

- asymptomatic midline neck mass at or below the level of the hyoid bone
- moves with swallowing
- persistent duct or sinus (foramen cecum) can promote oral secretions, such cysts can become infected
- Infection sometimes causes transient appearance of a mass or enlargement of the cyst
- Spontaneous drainage occurs in some instances



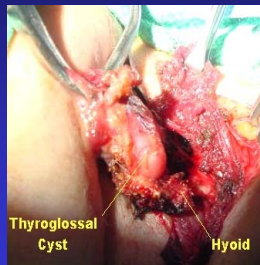
Thyroglossal Duct Cyst

- Diagnosis is usually made clinically
 - Ultrasound
- Antibiotics are indicated if there is infection
- Definitive surgical management requires excision not only of the cyst but also of the tract and branches
- Before a Thyroglossal duct cysts are excised, it is important to demonstrate that normally functioning thyroid tissue is in its usual location.
 - Thyroid scans
 - Thyroid function studies



Thyroglossal Duct Cyst

- intimate association of the tract with hyoid bone mandates simultaneous removal of the central portion of the hyoid bone to ensure complete removal of the tract (Sistrunk procedure)



Case Presentation #6

- 9yo male just returned from a Florida vacation w/ 8 day h/o recurrent emesis that has turned bilious , temp 101.5, diffuse abd pain and abd distention, w/ 48hrs of urgency and watery diarrhea
- WBC 3.5 /75% segs/15 bands
- U/A +wbc/ - LE
- Exam – diffuse abd tenderness/ dehydration
- X-ray – distended loops of bowel c/w ileus vs early PSBO



Case Presentation #6

- Cause of abdominal symptoms in 9yo child

- A) Gastroenteritis
- B) Parasite Infection
- C) IBD
- D) Appendicitis
- E) Malrotation



Appendicitis

- Classic presenting symptom(s) of appendicitis

- A) Anorexia
- B) Fever
- C) Leukocytosis
- D) RLQ Tenderness
- E) b, c & d



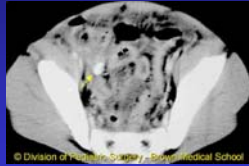
Appendicitis

- 7% of population
- 14-20 yo peak
- 50% < 7-10yo perforated at presentation
- Classic Triad
 - RLQ tenderness, fever, Leukocytosis <30%
 - RLQ tenderness most consistent feature



Appendicitis

- H&P
- Ultrasound
- CAT scan w/ oral, rectal and iv contrast



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Appendicitis

- Open vs Laproscopic
 - Degree of perforation
 - Bowel Obstruction
- Interval appendectomy



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Case Presentation #7

- 2yo female presents to your office with poor p.o. intake and excessive sleeping. 2 days ago had a night of trick or treating and the next morning had complaints of intermittent severe abd pain relieved in the fetal position. No bowel movement. One episode of non-bilious emesis the morning of presentation. Recent URI 1-2 weeks ago.
- Afebrile
- WBC 9.5
- U/A neg
- Exam – benign abdomen. lethargic
- X-ray – non-specific gas pattern



Case Presentation #7

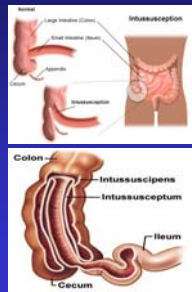
- Cause of these symptoms in 2yo child

- A) Gastroenteritis
- B) Food poisoning
- C) Intussusception
- D) Appendicitis
- E) Malrotation



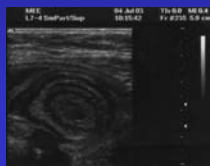
Intussusception

- 1.5-4 cases per 1000 live births
- 6-18mo peak
- Ileocolic
- Lead point
 - Mesenteric lymph nodes
 - Meckel's Diverticulum



Intussusception

- Clinical presentation
 - Crampy intermittent abdominal pain
 - Current Jelly stool
 - RUQ mass
 - Benign exam
 - Lethargy
- Diagnosis and Treatment
 - Contrast enema
 - Ultrasound
 - Operative reduction



Case Presentation #8

- 5wk male w/ 7 day h/o of increasing emesis that was initially spit-ups and has become projectile and consists of formula only
- Exam – lethargic child with depressed fontanel w/ benign abd exam



Case Presentation #8

- Most likely diagnosis in 5wk old infant
- A) Gastroenteritis
B) Dehydration
C) Pyloric Stenosis
D) A and B
E) B and C

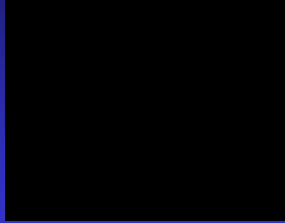


Hypertrophic Pyloric Stenosis

- Medical emergency
 - dehydration
- Differential Dx
 - Gastroenteritis
 - Intussusception
 - Malrotation
 - Reflux



Hypertrophic Pyloric Stenosis



Case Presentation #9

- 18mo male w/ 8hr h/o of increasing irritability and emesis that was initially formula that has become green by the mother's history
- Exam – lethargic child with mild abd distention. un-reactive to your exam. w/out a palpable mass.



Case Presentation #9

- Treatment of toddler with emesis and lethargy

- A) pedialyte and d/c home
- B) Admit for iv hydration and observation
- C) immediate exploration
- D) UGI and Barium enema
- E) CAT scan of the abdomen



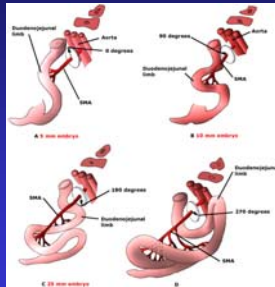
Malrotation

- Surgical emergency
 - Bilious emesis
- Differential Dx
 - Gastroenteritis
 - Intussusception
 - Malrotation
 - Perf appendicitis



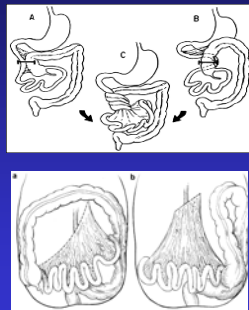
Frazer & Robbins

- Stage 1: Umbilical herniation
 - Wk 5-10
- Stage 2: Reduction of midgut loop back to abdomen
 - Wk 10-11
- Stage 3: Fixation
 - Until shortly after birth

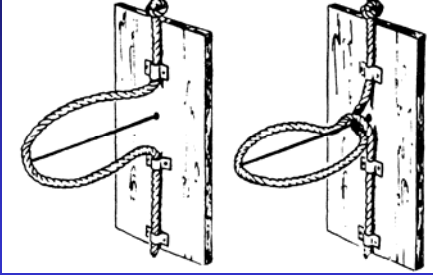


Malrotation

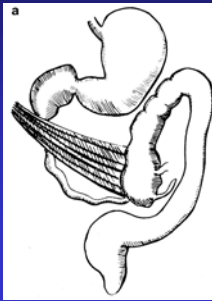
- Incomplete rotation
- Incomplete fixation
- Narrow pedicle based on SMA
- Ladd's Bands



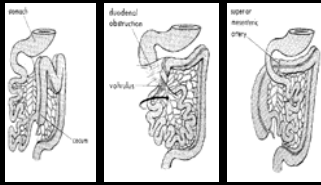
Snyder & Chaffin



Malrotation



“Non rotation” “Incomplete rotation” “Reversed rotation”



Radiography

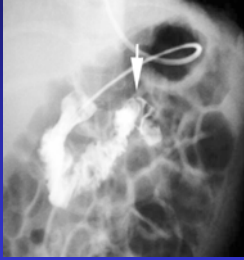


Ladd's Band



“Tubular Loops”

Radiography



Normal UGI



Malrotation

Malrotation

- Immediate exploration
- Resection of all non-viable bowel
- Second look
- Peak and shriek



Case Presentation #10

- 34wk G.A 2400 gm female presents choking at delivery but clears with APGAR of 6 and 10. Found to have increase secretions, choking and spit ups with formula feeds. Difficulty passing NG tube.
- Afebrile
- WBC 15.5
- T. Bili 4.5
- Exam – unremarkable
- X-ray – RLL atelectasis and normal bowel gas pattern



Case Presentation #10

- The most likely diagnosis is

- A) Formula Intolerance
- B) GERD
- C) Esophageal atresia
- D) Esophageal atresia/ TEF
- E) Prematurity



Esophageal Atresia

- Incidence of approx 1:3000 births
- Presentation dependant on type
- Polyhydramios



Esophageal Atresia



Esophageal atresia with a distal fistula
87%



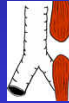
Proximal and distal fistulae
<1%



"H"-type fistula
4%



Proximal fistula with distal blind pouch
<1%

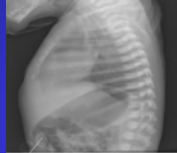


Pure Esophageal atresia
8%



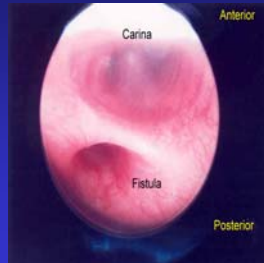
Esophageal Atresia

- Excessive secretions
- Choke, cough, or regurgitate if fed.
- Inability to place a gastric
- Upper esophagus and the pouch may be outlined by air.
- Abdominal distension



Esophageal Atresia

- Evaluation
 - Bronchoscopy
 - Associated anomalies
 - Position of the aortic arch
- Treatment
 - Primary
 - Staged



Case Presentation #11

- 1 day old female demonstrates intolerance of feeds with emesis that has turned bilious. Passed meconium after birth. No abdominal distension. Abdomen soft and non-tender on examination.
- A febrile
- WBC 12.5
- Exam – benign abdomen. lethargic
- X-ray – double gas bubble otherwise gasless abdomen.



Case Presentation #11

- The most likely diagnosis is
 - A) Esophageal Atresia
 - B) Duodenal Atresia
 - C) Ileal Atresia
 - D) Malrotation
 - E) None of the Above



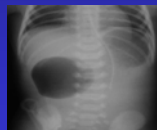
Case Presentation #11

- The best next step is
 - A) NG placement
 - B) Barium Enema
 - C) Abdominal Ultrasound
 - D) Upper GI
 - E) Observation and attempt refeed



Duodenal Atresia

- Presentation
 - Newborn
 - Obstruction
 - Bilious emesis
 - “Double bubble”
 - Etiology
 - Idopathic
 - Annular pancreas
 - Anterior portal vein
- Diagnosis
 - pre-natal
 - post-natal



Duodenal Atresia

- Associated Anomalies

- 30%

- Trisomy 21 (30%)
 - CHD (20%)
 - VACTERAL syndrome

- Treatment

- Direct primary repair

- Obstruction/ toxic
 - Bilious emesis

- Bypass



Case Presentation #12

- 1wk old male w/ difficulty passing bowel movement since birth. Passed a smear of meconium at 24hours of life. He has had increasing irritability, emesis and abdominal distention with assoc fever
- Exam – lethargic child with severe abd distention and diffuse tenderness
- WBC – 22.5K/ 70% segs/ 20% bands



Case Presentation #12

- Most likely diagnosis is

- A) Malrotation
 - B) Intestinal Atresia
 - C) Hirschsprung's Disease
 - D) Constipation
 - E) B and D



Case Presentation #12

- Treatment of this infant

- A) pedialyte and d/c home on oral Flagyl
- B) Admit for iv hydration, Antibx and saline enemas
- C) immediate exploration
- D) Barium enema
- E) B and D

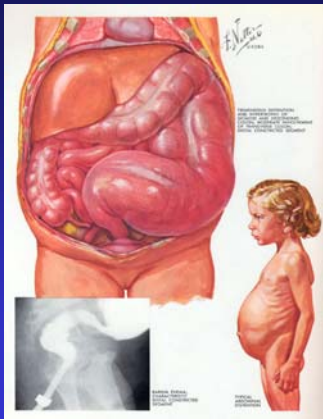


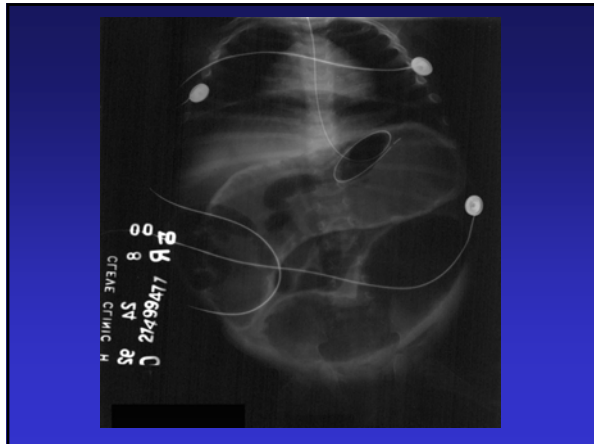
Hirschsprung's Disease

- Presentation

- Newborn
 - Obstruction/ toxic
 - Bilious emesis
- Infant/ toddler
- Preschool
 - High index of suspicion







Hirschsprung's Disease

- Diagnosis
 - Suction rectal biopsy
 - Newborn
 - Full thickness rectal biopsy
 - 2cm proximal to dentate line
 - Colostomy/ rectal biopsy

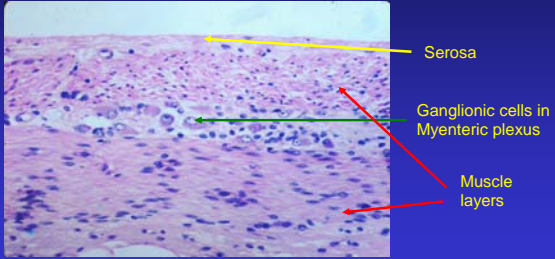


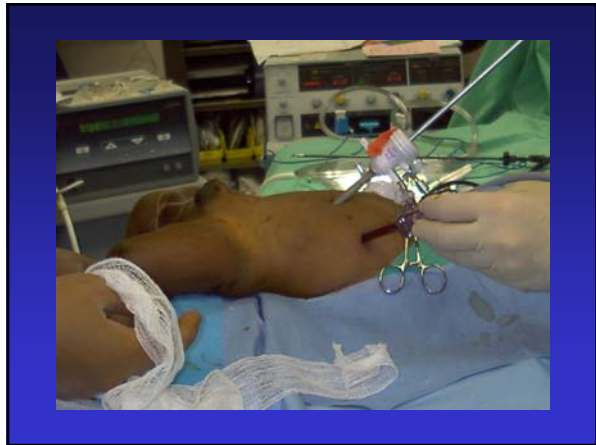
Hirschsprung's Disease

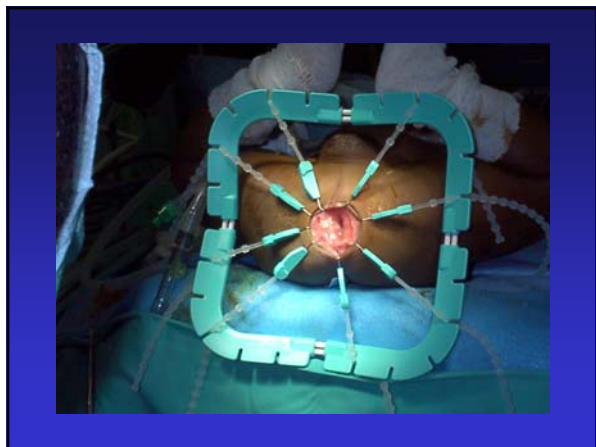
- Diagnosis
 - Lack of ganglion cells in Meissner's and Auerbach's plexus
 - Proliferation of nerve trunks
 - Acetylcholinesterase Stain

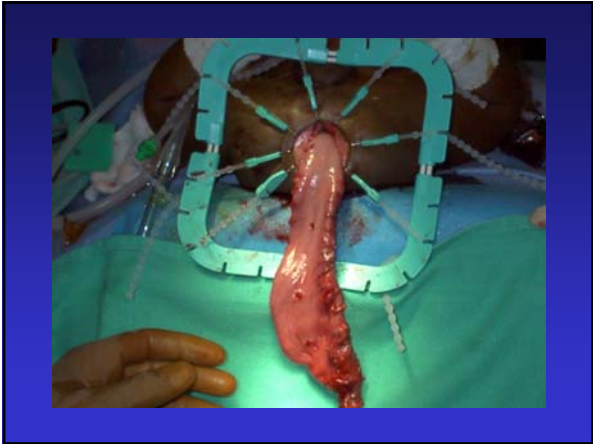


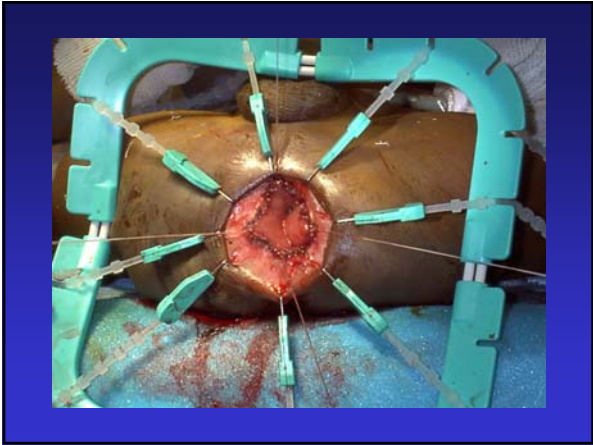
Normal Control
Myenteric Plexus












Case Presentation #13

- 1 hour old infant girl with contained protrusion of the abdominal wall containing liver, small bowel and the stomach. Meconium stained amniotic fluid. APGARS 7 and 9.
- Exam – vigorous, pink. Systolic murmur. Large abdominal wall defect.



Case Presentation #13

- Management of this patient includes
 - A) IV fluids, antibiotics and NG decompression
 - B) Cardiac Echo
 - C) Renal Ultrasound
 - D) GU exam
 - E) All of the above



Abdominal Wall Defects

- Described as early as the 1500's
- 1 in 2000 live births
- Associated with advanced maternal age
- Multiple modalities for treatment




Abdominal Wall Defects

- Malrotation
- Associated congenital anomalies
- Genetics
- Generally good prognosis




Abdominal Wall Defects

- Antenatal
 - Ultrasound – presence of sac and/or liver in the defect
 - 75% sensitivity for omphalocele
 - First dx 18 +/- 6wks gestation
 - 85% sensitivity for gastroschisis
 - First dx 20 +/- 7wks gestation
 - » *Note: no correlation w/ outcome*




Abdominal Wall Defects

- Antenatal
 - Elevated amniotic fluid and serum Alpha fetoprotein (AFP) and Acetylcholinesterase (AChE)
 - 4-10x greater than normal in 2nd tri



Abdominal Wall Defects

- Embryology Omphalocele
 - 3 weeks develops 4 folds
 - 2 lateral
 - Cranial
 - Caudal



Abdominal Wall Defects

- >4cm
- Covered w/ sac
- Occurs at the umbilicus
- Abnl insertion rectus m.
- Midgut, liver and freq gonads and spleen
- 1-2 per 5000 births
- Associated anomalies



Abdominal Wall Defects

- Embryology of Gastroschisis
 - Failure of umbilical coelom to develop
 - Intestinal elongation
 - Lateral abdominal wall rupture



Abdominal Wall Defects

- <4cm defect
- No sac
- Right of the umbilicus
- Associated prematurity and resp distress
- 2-3 per 5000 births
- Associated midgut anomalies - atresia



Abdominal Wall Defects

Defect	Site	Sac	Contents	Freq	Anomalies	Outcome
<i>Omphal</i>	Umbilicus	Yes	Liver, Int	Common	Chromo, Cardiac, Midline	Fair-Good
<i>Gastroschisis</i>	Rt Umbil	No	Int	Common	Atresia	Good
<i>U Cord II</i>	Umbilicus	Yes/No	Int	Uncomm	Uncomm	Good



Abdominal Wall Defects

- Delivery
 - Vaginal vs Elective C-section
 - Immediate repair
 - Avoid venous congestion
 - Post delivery bowel changes
 - Greater success of Primary closure



Abdominal Wall Defects

- Initial care
 - Nasogastric decompression
 - Protection of bowel
 - Thermoregulation
 - Volume resuscitation
 - Ventilatory support
 - Antibiotics
 - Cardiac echo
 - Abdominal Ultrasound
 - CXR



Abdominal Wall Defects

- Operative Treatment
 - Central venous catheter
 - Primary Closure
 - Intra-abdominal pressure
 - Bladder
 - Gastric
 - Patch
 - Skin



Abdominal Wall Defects

- Staged repair
 - Hand sewn silo
 - Prefashioned
 - Serial reduction
 - Sedation
 - Reduction of edema
 - Closure at 7-10days



Abdominal Wall Defects

- Post-Operative Treatment
 - Primary Closure/ Staged Repair
 - Intra-abdominal pressure
 - Bladder
 - Gastric
 - Volume resuscitation
 - The gut takes priority
 - Ventilatory support
 - Sedation
 - Ileus



Case Presentation #14

- 14 y.o. male with progressive anterior chest wall depression. He is a competitive cross country runner since the 6th grade. Now unable to keep up with his peers that demonstrate decreasing times.
- ROS – reveals occasional anterior chest pain
- Exam – asymmetric anterior central chest wall depression. No murmurs with PMI displaced to the left. Equal breath sounds bilaterally



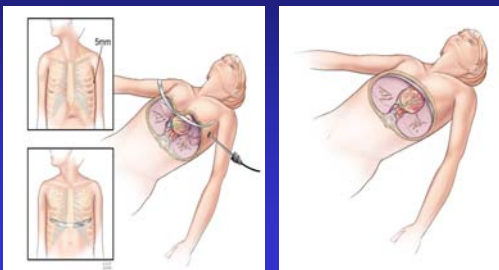
Case Presentation #14

- Management of this patient includes

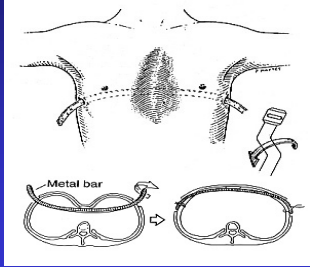
- A) Pulmonary Function Tests
- B) Cardiac Echo
- C) CT scan of the chest
- D) PA and Lat CXR
- E) All of the above



Pectus Excavatum Children's Hospital Center of Excellence



Pectus Excavatum
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Common Problems in Pediatric Surgery

Questions?