American Pediatric Surgical Association

Standardized Toolbox of Education for Pediatric Surgery

Pyloric Stenosis

APSA Committee of Education
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STEPS
STANDARDIZED TOOLBOX OF EDUCATION FOR PEDIATRIC SURGERY

Pyloric Stenosis

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Objectives

At the end of this presentation, you will be able to:

- **Describe the pathophysiology of pyloric stenosis**
- **Discuss the appropriate pre-op evaluation and preparation of the patient**
- **List the basic steps of the operation, including common risks of the procedure**

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Pyloric Stenosis

- Occurs in 1.5-4 per 1000 children
- More common in boys, first-born
- Family history stronger in moms than dads
- Peak occurrence 3-5 weeks of life

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Pathophysiology

- Pyloric muscle hypertrophy and hyperplasia results in gradual complete obstruction of the pyloric channel
- Vomiting → loss of hydrochloric acid, Na^+, and K^+
  >> hypochloremic hypokalemic metabolic alkalosis
- Renal response
  - Preservation of acid/base balance: urine excretion of bicarb, Na^+, and K^+ with renal tubular resorption of H^+
  - Preservation of volume status: dehydration → aldosterone → Na^+ resorption and urinary excretion of K^+ → excretion of H^+ with paradoxic aciduria

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Case Study

4 week old boy presents with a one week history of vomiting

Lethargic baby
VS: 36.8°C, HR 165, BP 80/45, sat 98% on RA
HEENT: sunken fontanelle
ABD: epigastric distension, nontender
EXT: poor perfusion

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History Discussion Slide

- **What other points of the history do you want to know?**
  - Color of vomitus?
  - How much vomiting?
  - Force of emesis?
  - Fever?
  - Hydration status?
  - Weight loss?
  - Changes in formula?
  - Bilious versus Non-Bilious
  - Every feed? Percent of feed?
  - On face/bib or projectile?
  - Any signs of infection?
  - Number of wet diapers?
  - Lost or stopped gaining wt?
  - Any improvement with formula change?

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  - Bilious versus **Non-Bilious**
  - **Every** feed? **All** of feed?
  - On face/bib or **projectile**?
  - **No** signs of infection?
  - **Fewer** wet diapers?
  - **Lost** or stopped gaining wt?
  - **No** improvement with formula change?

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Differential Diagnosis

- gastro-esophageal reflux (GER)
- milk/formula allergy
- pylorospasm
- gastroenteritis
- increased ICP
- metabolic disorders
- antral web
- pyloric atresia
- antropyloric duplication cyst
- ectopic pancreatic tissue within pylorus

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Physical Exam

- hydration status
  - VS
  - level of consciousness
  - perfusion
  - fontanelle
- palpable abdominal “olive”

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Studies (Labs, Imaging)

- Labs
  - lytes: hypoCl^- hypoK^+ metabolic alkalosis
- US
  - Pylorus thickness > 4mm, length > 16mm
  - gastric hyperperistalsis
  - no passage of gastric contents through pyloric channel
- UGI

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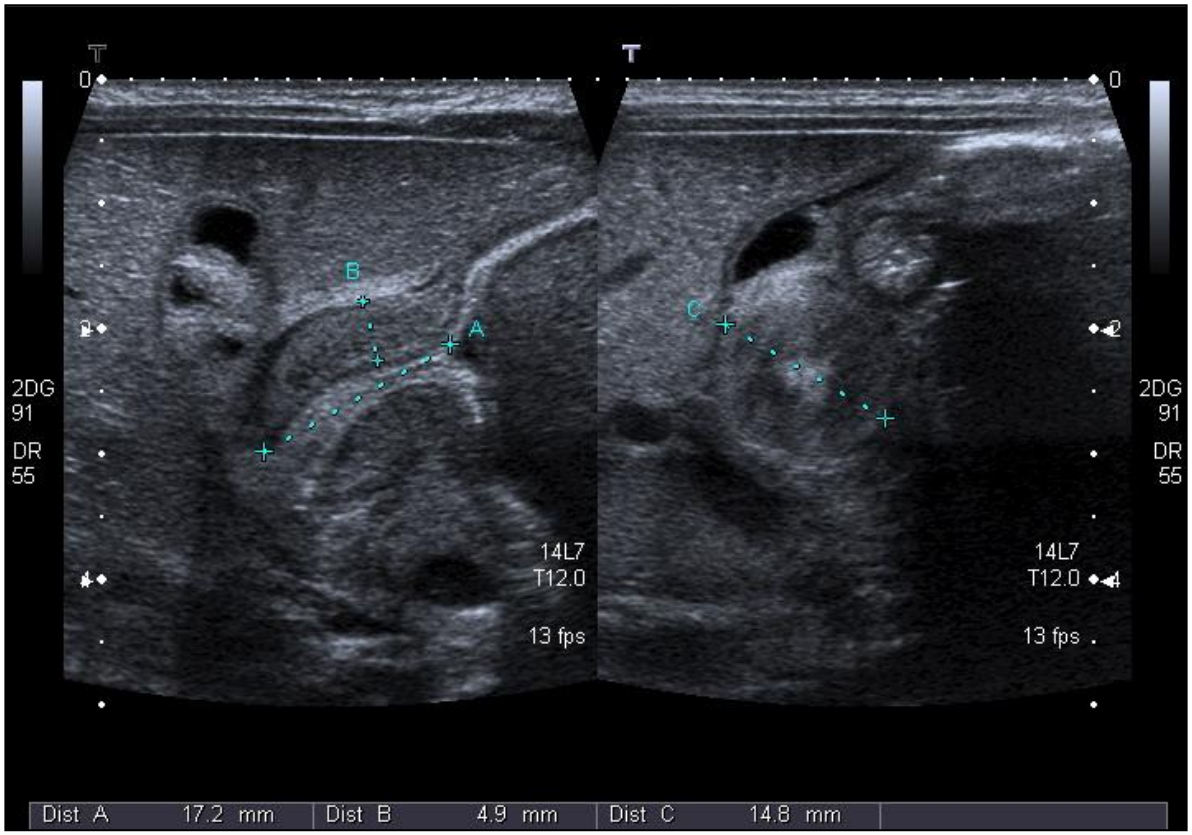
Study Results



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Management

- Pre-op
  - NPO, but no NG
  - Correction of metabolic alkalosis required for safe anesthesia
    - Compensation with respiratory acidosis → hypoventilation → apnea → inability to extubate
  - Crystalloid IVF bolus
  - D5/NS + 20meq KCl/l @ 1.5x maintenance until lytes normalized

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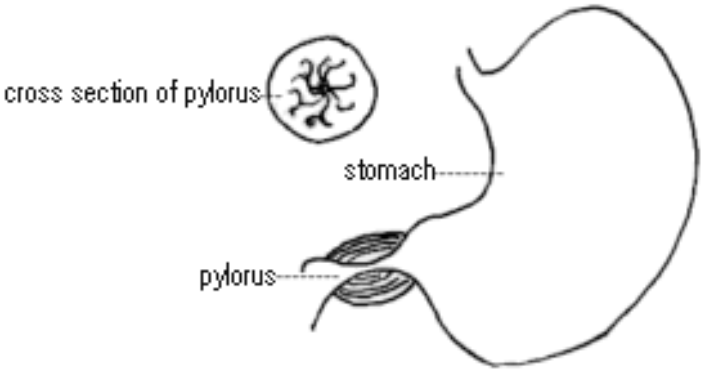
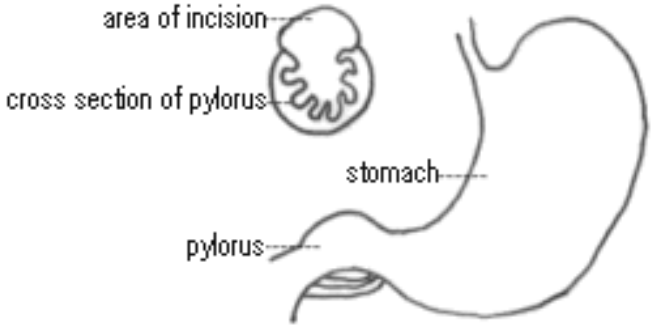
Operative Repair

- Open vs laparoscopic pyloromyotomy





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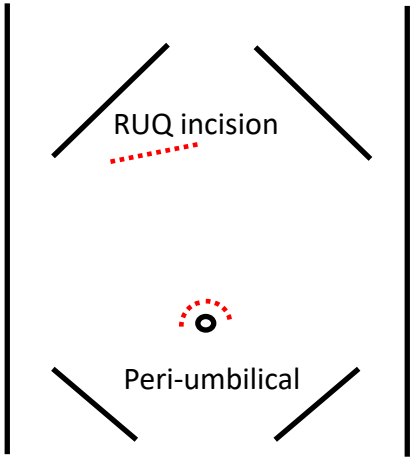
Operative Repair - Open



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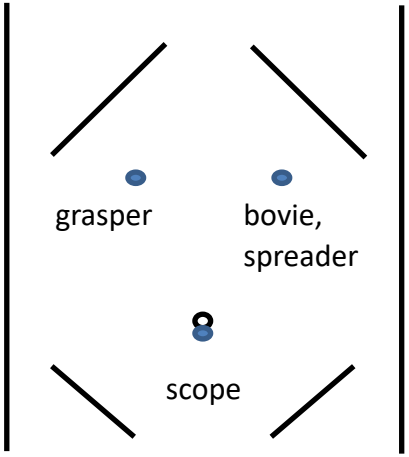
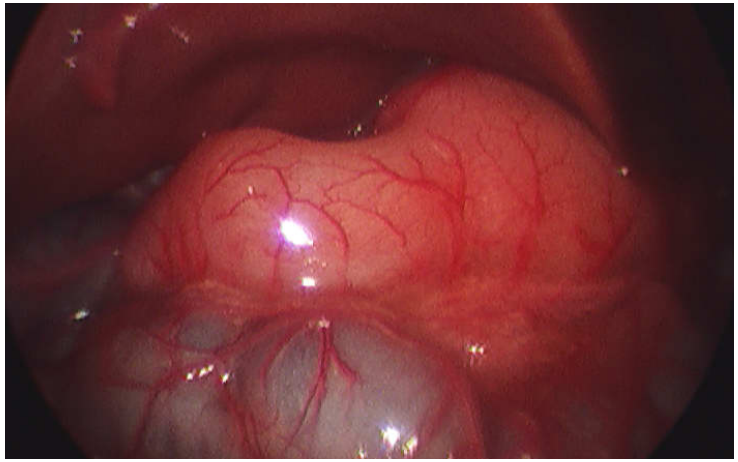
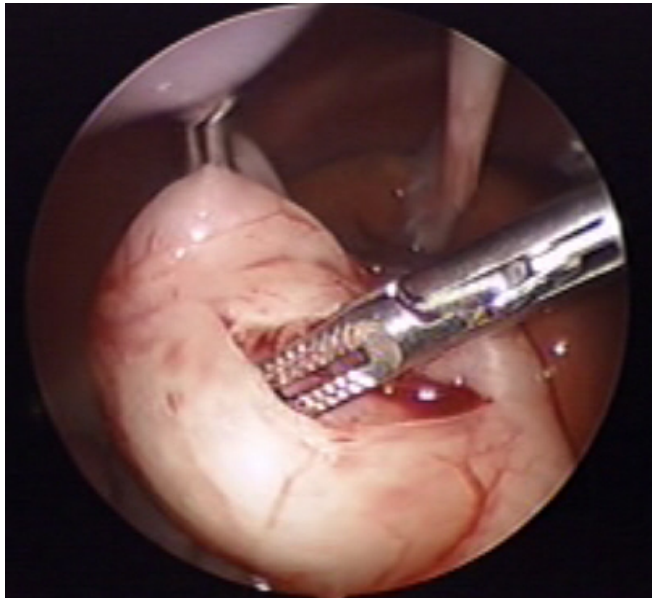
Operative Repair - Laparoscopic







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Post-Operative Management

- **Monitor for apneas/bradycardias x 24h**
- **Graduated vs ad lib feeding**

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Complications

- bleeding (<1%)
- infection (<1%)
- delayed feeding (up to 15%)
- incomplete myotomy (~2%)
- perforation (~2%), usually duodenal

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Questions

The metabolic defect caused by the vomiting from pyloric stenosis is:

a. metabolic acidosis
b. metabolic alkalosis
c. respiratory alkalosis
d. urinary alkalosis

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Questions

The diagnosis of pyloric stenosis is confirmed by:

a. **Physical exam only**
b. **Ultrasound**
c. **CT scan**
d. **None of the above**

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Questions

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a. Physical exam only
b. Ultrasound
c. CT scan
d. None of the above

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Questions

Surgery for pyloric stenosis should occur:

a. **Emergently, as soon as the diagnosis is made**
b. **Electively, within a month**
c. **As soon as the metabolic derangement is corrected**
d. **None of the above**

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Questions

Failure to correct the metabolic derangement in pyloric stenosis prior to surgical correction increases the risk of which complication:

a. Leak
b. Infection
c. Failure to extubate
d. Delayed tolerance of feeds

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Questions

Failure to correct the metabolic derangement in pyloric stenosis prior to surgical correction increases the risk of which complication:

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c. **Failure to extubate**
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Final Review

1. Pyloric stenosis is characterized by progressive projectile nonbilious vomiting in an infant 3-8 weeks of age without signs of infection
2. Severity of the dehydration is exhibited by metabolic alkalosis
3. Surgery should be delayed until correction of metabolic derangement

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Final Review

4. Surgical correction is a pyloromyotomy, which can be undertaken laparoscopically or open
5. Post-operative complications include infection, leak, and delayed tolerance of feeds
6. Feeding may resume as soon as recovery from anesthesia complete

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Acknowledgement Slide

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