Pediatric Surgery Update:
Current Management of Acute Appendicitis
And Pilonidal Disease

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Objectives

1. Basic understanding of the pathophysiology of appendicitis
2. Correlation of presenting timeline and imaging in appendicitis
3. Management algorithm for acute appendicitis
4. Differences in management between non-perforated and perforated appendicitis
5. Recurrent appendicitis after antibiotic management and the role of interval appendectomy
6. Recognition and treatment of pilonidal disease
7. Modern procedures and outcomes in pilonidal disease
I have no relevant disclosures

Appendicitis
Appendicitis

Clinical Presentation
Perforated vs Non-Perforated
Surgical Removal vs Interval Treatment
Post-op Recommendations

Approximate 10% lifetime risk – highest @8-18yrs
Common symptoms include:
- Anorexia – most specific
- Nausea/Vomiting
- Bloating/Constipation/Diarrhea
- Fever
- Abdominal pain - Peri-umbilical shifting to the RLQ
Generally 36 hours from initial pain before risk of perforation (7% at 24hrs, increases with time)
50% of kids < 6yo present with perforation
Appendicitis
Anatomy

- Extends off of cecum
- Has its own mesentery
- Small opening to colon to drain
- Contains goblet cells and bacteria
- Various locations of tip:
  - Retrocecal
  - Pelvic
  - Subcecal
  - Pre-ileal
  - Right paracolic

Appendicitis
Physiology

- Caused by blockage of the opening to cecum (2 common reasons):
  - Appendicolith
  - Lymphoid hyperplasia

Types of Pain
- Sympathetic
  - Peri-umbilical
- Somatic
  - Right Lower Quadrant (McBurney’s)
Appendicitis
Work up

Consistent history
Low grade fevers
Mild elevated WBC (12-14,000)
Other associated symptoms
These findings coupled with tenderness at McBurney’s point generally enough to make the diagnosis

Adjunct tests

Ultrasound *Operator Dependent, less sensitive for perforation*
CT scan *IV Contrast only*
Appendicitis
CT Scan

Perforated Appendicitis
CT scan
Appendicitis
When to Operate

If the diagnosis of acute non-perforated appendicitis is made, once the patient receives antibiotics, the surgery should be performed within 24 hours.

24 hour dosing antibiotics (per protocol)
- Ceftriaxone 50 mg/kg/dose IV q24h (max: 2 g/dose)
- Metronidazole 30 mg/kg/dose IV q24 (max: 1.5 g/dose)
- Ciprofloxacin 15 mg/kg/dose IV q12h (max: 2 g/dose)

severe allergy (anaphylaxis, angioedema, respiratory distress)

Appendicitis
Perforated

Perforated appendicitis with a well developed phlegmon or is treated on the interval pathway
Admit to floor unless critically ill
Antibiotics as previously described
IR Consult if there is a drainable collection
Elective Laparoscopic Appendectomy (Interval) performed in 6-8 weeks
25-30% recurrence rate at 1 year
Interval Appendectomy

Efficacy and Safety of Nonoperative Treatment for Acute Appendicitis: A Meta-analysis


A systematic review and individual patient data meta-analysis of published randomized clinical trials comparing early versus interval appendectomy for children with perforated appendicitis

Eileen M Duggan, Andre P Marshall, Katinka L Weaver, Shaun D St Peter, Jamie Tice, Li Weng, Leena Choi, Martin L Bakey.

Laparoscopic Appendectomy

Antibiotic Treatment and Appendectomy for Uncomplicated Acute Appendicitis in Adults and Children: A Systematic Review and Meta-analysis

Mauro Podd, Chiara Gerardi, Nicola Cillara, Nicola Fearnhead, Carlos Augusto Gomes, Arianna Birindelli, Andrea Muller, Richard Justin Davies, Salomone Di Saverio.

Northern Light Health
Laparoscopic Appendectomy Post-Operative Course
Non-perforated

Must meet discharge criteria for discharge (no further antibiotic treatment)
  - Ambulating, voiding, tolerating a regular diet
  - Pain controlled with oral NSAIDs and Tylenol
  - Implementing an ERAS protocol where all patients >12yo go home the same day

Discharge Instructions
  - Follow up in 2-3 weeks
  - Do not submerge incision for 1 week (may shower the night of surgery)
  - No sports or gym for 2 weeks
  - Return to school when no longer needing pain medication (2-3 days)

Perforated Appendicitis

Continue IV antibiotics

Discharge Criteria
  - Afebrile > 24 hours
  - Normal bowel function
  - Tolerating regular diet
  - Pain controlled with NSAIDs and Tylenol

If discharged to home prior to 4 days of IV antibiotics
  - Augmentin (amoxicillin/clavulanate): 22.5 mg/kg/dose (amoxicillin component) q12hrs (max: 875 mg q 12hrs)

Follow up in 2-3 weeks
No restrictions
Questions?

Pilonidal Disease
Pilonidal Disease

Pathophysiology
Clinical Presentation
Possible Nonsurgical Interventions
Possible Surgical Interventions
Minimally Invasive Gips Procedure
Post-op Recommendations

Pilonidal Pathophysiology

[Image showing cross-section of skin, hair, fat, and bone with an opening on the skin surface and a labeled area where sinuses may form.]
Pilonidal Disease
Clinical Presentation

Teens and young adults
4:1 male predominance

Presentations include:
- Infection = acute severe pain
- Chronic drainage = sinus tract
- Asymptomatic = pits/sinuses

Acute infection most common
- Abx for cellulitis
- Drainage for abscess

Sx referral for
- Acute infection, chronic drainage
- Non-healing sinus with non-Sx treatment

Pilonidal Disease
Non-surgical Management

Recognition is most important
Visible pits or history of Pilonidal with residual pits

Non-surgical recommendation
- Weekly hair clipping
- Manual removal of hair in pits
- Aggressive hygiene:
  - Twice Daily showers
  - Manual exfoliation

Good evidence for laser hair removal, but $$$

50% have resolution of disease
50% require surgical intervention
Pilonidal Disease
Wide Excision

Historical approach = complete excision including:
- Open packing and secondary healing
- Primary closure
- Z-Plasty Closure
- Off-midline excision and primary closure
- Off Midline excision with Z-Plasty closure

Outcomes
- 30-40% dehiscence/recurrence rates
- 1-2d hospital stay, 3-6 weeks of healing

Aggressive resection with flap closure
- 1-30% failure rate
- 3-14d hospital stay with drains, 18-26 weeks of healing

Minimally Invasive Pilonidal Excision (Gips or MIPE)

Excise each sinus opening
  4-5mm Punch biopsy trephine

Excise of hair, tract, pseudocyst
  hemostats
  1-2d hospital stay, 3-6 weeks of healing

Cauterize remaining lining
  H2O2 irrigation
  4-5 times with 30-60sec dwell time

Clean area
  saline irrigation

Rare packing removed in 48hrs

Northern Light Health.
Post-operative Care for Pilonidal Procedures

Post-op Care
Outpatient procedure
Motrin/Tylenol for pain control
remove any packing in 48hrs
no re-packing
sitz baths bid till 2 week follow up
sitz bath daily until healed

Total healing time 3-4 weeks
20% failure/recurrence rate
Consider Gips for:
pt s/p I&D with residual sinuses
failure/recurrence

Minimally Invasive Pilonidal Excision (Gips or MIPE)

Advantages of Minimally Invasive Pilonidal Excision (MIPE)

Technically Fast and Easy
Skin punch biopsy for pit excision
Removal of hair and granulation tissue
Irrigation with peroxide, open healing

Low Recurrence/SSI Rates

Rapid Recovery/Better QoL
Back to school sooner
Fewer analgesics
Back to activities/sports sooner

Recurrent/Persistent disease?
Failure of conservative treatment (including limited excision/sinusectomy)
Wide/En bloc excision (options)
1. Off-midline closure (Karydakis, Limberg, Bascom)
2. Tension-free midline closure
3. Open/secondary healing

Northern Light Health.
Questions?

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Thank you
Maine AAP