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Appendectomy ABSOLUTELY Indicated in the Management of Acute Appendicitis

Sofia Naz, MD

History of Appendicitis

- First Appendectomy 1735 Claud Amyand
- Complications of Appendicitis
  - Death from Uncontrolled Sepsis
  - Abscess
  - Bowel Obstruction
  - Enterocutaneous Fistula
  - Necrotizing Soft Tissue Infections
  - Chronic Abdominal Pain
  - Chronic Appendicitis

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Does the Data Correlate with Clinical Practice?

- Surgeons do embrace change
  - Trauma Surgery
  - Laparoscopic Surgery
  - Surgical Oncology
  - Robotic Surgery
  - NOTES

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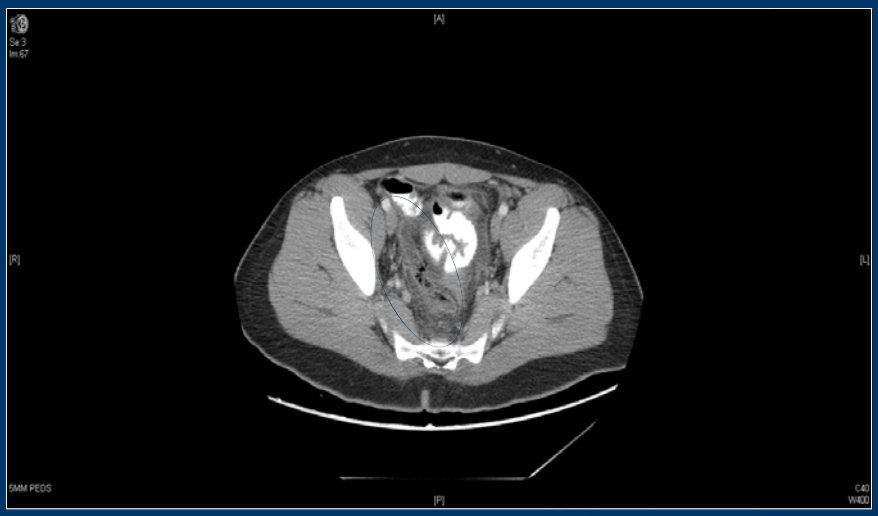
19yo Male with appendicitis



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19yo Male with appendicitis

- LOS 24 Days
- 17 Imaging Studies
- Surgical Intervention-Lap Appy with Drainage of IAAx2 HD#7
- Sepsis
- Bacteremia
- Acute lung Injury with ICU admission
- Prolonged Antibiotic Use
- Surgery, Pediatric, ID and CCM consults
- Multiple outpatient visits
- Re-admissiom to the ED
- Cost
  - The most expensive appendix I have ever taken out

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Current Status of Appendectomy-

- Bliss et al 2014
  - Restrospective review >1.6M appendectomies 2003-2011
    - Morbidity 3.2 to 3.8%
    - Mortality 0.14 to 0.09%
    - LOS 3.1 to 2.6d
    - LA increased 40 to 80%
    - Demographic change
      - Increased age
      - Increased comorbidities

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Current Status of Appendectomy-

- Sporn et al 2009
  - 2000 to 2005
  - 132K appendectomies
  - Uncomplicated
    - LA $5223 in 2001
    - LA $6241 in 2005
      - When adjusted $4369 for LA
      - 22% higher than for OA but decreased in Complicated Appendicitis to 9%
- Litz et al 2013
  - No difference in total direct cost because decreased LOS

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Current Status of Appendetomy

- Masoomi et al 2012
- NIS database with >200K less than 18yrs
  - Uncomplicated LA vs OA
    - Comparable complication rate 2.5%
    - Shorter LOS
    - Similar mortality 0.01 vs 0.02
    - Higher Hospital Charge
  - Complicated Appendicitis
    - LA results superior to OA in all aspects

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Current Status of Appendectomy

- Ingraham et al 2010
  - NSQIP Database
    - 32K patients
    - Overall morbidity 4.5-8.8%
    - SSI 3.3-6.7%
    - Mortality 0.09%
    - Morbidity and mortality higher in Complicated disease
    - Decreased IAA with LA in Uncomplicated disease and Complicated Disease

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Complicated Appendicitis

- Laparoscopic Appendectomy
  - Superior outcomes to open
  - Decreased SSI
  - Comparable/less IAA
  - Decreased LOS
    - Cost reduction
- Increasingly used for Perforated Appendicitis

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Complicated Appendicitis

- Myers et al 2011
  - Randomised prospective trial complicated appendicits
  - Hospital cost $5000 more in the non-operative group
  - Increased number of readmissions
  - Cost doubled for patients with adverse events
  - Nonoperative group with 34% failure rate

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Complicated Appendicitis

- Rice-Townsend et al 2012
  - Readmission rates in both CA and UA
    - Appendectomy 12%
    - Drainage with out appendectomy 22%
    - Antbiotic alone 24%
- Total Hospital Cost d/t Readmissions
  - Appendectomy $6355
  - Complicated Appendectomy $12300
  - Drainage with out Appy $14319
  - Abx only $10090
- Increased LOS

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Consequences of Failed Non-operative Mx

- Edelsberg et al 2008
  - cIAI s/p Surgical and Non-operative Mx
  - 6000 patients
  - 22% failed initial abx therapy
    - Prolonged Abx use
    - Prolonged Hospitalization
    - Increased in cost by $6000
    - Increased likelihood of death 9.5% vs 1.3%

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Current Status of Appendectomy

- Malpractice Data
  - Choudhry et al 2013
    - 234 malpractice cases
      - Diagnostic Delay 67%
      - Delay in Definitive Treatment
      - Surgical Negligence 16%
        - » Iatrogenic injury
        - » Failure to Remove the Entire Appendix
    - Plaintiff won 24% with average $800K
    - Settlement 5.5% average 1.5M

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Current Status of Appendectomy

- Malpractice
  - Mosedale et al 2013 UK
    - Successful litigation in 66%
    - Total Payout 8M
      - Delay in diagnosis
      - Misdiagnosis
      - Surgical negligence

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Non-operative Mx

- Uncomplicated Appendicitis
  - Likely Lower disease severity
  - Most studies chose less 'sicker' patients
- One interesting point
  - Overall the Negative Appendectomy rate is going down
  - Are these researchers preselecting for the patients who originally would have had a negative appendectomy

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Non-operative Mx

- Lower Rate of Complications in Non Surgical Group
  - That's because they didn't have SURGERY
  - What would you call a Failure rate of 20%
  - Delayed Appendectomy known risk factor for surgical complications

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Break down the data-

- Wilms et al 2011
  - 27% non-op failed in 1yr
  - 97.4% Success with surgery at 1yr
- Liu et al 2011
  - 7% Failed
  - 14% Recurrent Sx
- Svensson
  - 10% Failed
  - 17% Recurrent Sx at 1yr

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Break Down the Data

- Salamone et al 2014
  - 159 patients
    - 88 US findings
    - 21 had CT
    - The rest based on Sx and clinical dx
    - Short term failure 17%
    - NOM 20 further recurrent episodes requiring treatment
    - 24mth follow up

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Break Down the Data

- McCucheon et al 2014
  - Retrospective
  - 7yr f/u
  - 10% Failure
  - No indication as to why Non-Operative management was chosen in the first place
  - NOM 51pts died in house
  - No idea how the patients ended up in this arm
  - No details about how the diagnosis made

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Break Down the Data

- Mason et al 2011
  - Meta-analysis RTCs 980 pts
  - 40% Failure
- Varadhan et al 2012
  - 37% Failure
- Ansaloni et al 2011
  - Meta-analysis RCTs
  - 741 patients
  - Odd Ratio 6 efficacy of Surgery

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Why would you want this-

- Implication of Non-operative Mx Uncomplicated appendicitis
  - Evaluate pt in ED
  - Admit for serial exams
  - Serial blood work and possible repeat imaging
  - NPO
  - IV abx and prolonged use
  - Increased LOS
  - 20% failure rate (7% immediate and 14-25% late)
  - Ongoing pain

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When you can have this-

- Evaluate patient in ED
  - One set of labs/imaging
- OR
- Discharge home from PACU

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Final Thoughts

- Pathogenesis of Appendicitis
  - Transient Luminal Obstruction
  - Mechanical Luminal Obstruction
  - Spectrum of the same Process
- Uncomplicated Appendicitis
  - Urgent not Emergent

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Final Thoughts

- Increased Options in the Management of Appendicitis
  - Prohibitive Surgical Risk
  - Similar to Acute Cholecystitis
  - 80% Success rate

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