PEDIATRIC ABDOMINAL EMERGENCIES

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This presentation will be available on 
http://radiology.utmb.edu/

For 30 days after the ASER meeting
ACUTE ABDOMEN
(Plain films – still valuable - focused)

— Appendicitis: scoliosis-but usually normal
— Perforated appendix: obstruction
— Pneumonia: Acute abdomen series
ENTITIES FOR DISCUSSION

- Appendicitis ( typical fecalith )
- Viral Appendicitis
- Mesenteric adenitis/enteritis
- Intussusception
- Transient intussusception
OUR PROTOCOL

- US first (if possible)
- CT (if necessary)
  - US not possible
  - US equivocal**
  - Body build
- IV Contrast only
CT PATIENT SELECTION

BODY BUILD

NOT POUNDS OR KILOGRAMS

JUST ASK

IS THE PATIENT THIN?
APPENDIX: VARIABLE APPEARANCE

- Normal (4mm and **collapsed**)
- Lymphoid hyperplasia (6-7mm, **round**)
- Purulent (6-7 + millimeters, fluid filled, **periappendiceal edema**).
PURULENT APPENDICITIS

- Swollen, fluid filled appendix
- Periappendiceal fat stranding, echogenicity
- Gangrenous
- Perforations, abscess, phlegmon
NOW A SIDE STEP
LYMPH NODES IN APPENDICITIS

— Long standing, perforation
— Not acute; uncomplicated
Now the Fecalith – Is it always there?

Well --- NO

Our Study: Purulent Appendicitis (Fecalith Present)

22/40 cases (50%)
APPENDICITIS: IF NO FECALITH

WHAT IS THE UNDERLYING CAUSE?
LYMPHOID HYPERPLASIA
(VIRAL INDUCED)
"LYMPHOID HYPERPLASIA OF THE APPENDIX IS VIRAL INDUCED AND SEEMS TO PLAY A KEY ROLE IN SOME CASES OF APPENDICITIS "

SO WHAT DOES IT LOOK LIKE ?
There was no histologic evidence of acute appendicitis in 116/610 (19%) of children who underwent appendectomy. The majority had enlarged lymphoid tissue in the appendix.
AND SO

VIRAL APPENDICITIS
IN THE FORM
OF LYMPHOID HYPERPLASIA
SEEMS TO EXIST
and results
IN THE
PINK APPENDIX
THE PINK APPENDIX

IMAGING FINDINGS
THE PINK APPENDIX

DOES NOT NEED TO BE REMOVED

USUALLY CONSIDERED NORMAL OR ? ON IMAGING
BUT NOW

THE PINK APPENDIX

WITH

A SWOLLEN TIP
LOW POWER LONGITUDINAL SECTION OF THE TIP
A DIFFERENT STORY

the other purulent appendicitis
THE APPENDIX IS SWOLLEN BUT THE TIP (ARROWS) IS MORE SWOLLEN AND SHOWS EXUDATE
PURULENT APPENDICITIS OF THE TIP

PROBABLY NOT SIMPLE OBSTRUCTION OF THE LUMEN OF THE APPENDIX
PROPOSED PATHOPHYSIOLOGY

- Lymphoid hyperplasia, swelling
- **Increased intraserosal pressures**
- Compromised blood supply
- Ischemia, hemorrhage, necrosis
- **Tip is most vulnerable**
- Bacterial invasion
- Purulent appendicitis of the tip
TOTAL DISORGANIZATION AND BREAKDOWN OF FOLLICLES WITH SUPERIMPOSED PURULENT APPENDICITIS
PURULENT APPENDICITIS OF THE TIP (Imaging Findings)
PROXIMAL (BLACK ARROWS) T[P (WHITE ARROW) DISORGANIZED
ON COLOR FLOW ONLY THE TIP ( WHITE ARROWS ) LIGHTS UP
CT: The proximal appendix (upper arrow) looks like a pink appendix but the tip (lower arrow) is larger, less distinct and beginning to disorganize.
PURULENT APPENDICITIS OF THE TIP NEEDS TO BE REMOVED
BUT **EARLY CASES** OF APPENDICITIS OF THE TIP MAY NOT REQUIRE SURGERY

OBSERVATION
SPECTRUM OF THE VIRAL APPENDICITIS

- Pink Appendix (total appendix)
  - No Treatment – just watching
- Pink Appendix, tip a little swollen
  - Can be watched (antibiotics ?)
- Pink appendix, tip is purulent
  - Surgery
NOW LET’S LOOK AT MESENTERIC ADENITIS/ENTERITIS

more common than appendicitis
“lymph nodes and small bowel”
MESENTERIC ADENITIS/ENTERITIS

- Usually viral
- Small bowel mucosal thickening
  - Jejunum, terminal ileum
- Fluid filled bowel
- Hyperperistalsis intestines
- Adenopathy, mesentery
- Findings may be variable from epidemic to epidemic
MESENTERIC ADENITIS/ENTERITIS (PF IMAGING FINDINGS)

- Usually nonspecific
- May show many loops of bowel with fluid levels (non-obstructive)
- May show LUQ jejunal thickening*
MUCOSAL THICKENING US

—Tortuous - nodular
—Circumferential – thick wall
MUCOSAL THICKENING : CT

(1) Circumferential – thick wall

(2) Mild thickening + Fluid
MESENTERIC ADENITIS/ENTERITIS
ADENOPATHY

– Adenopathy along the mesentery
– Adenopathy in the right lower lower quadrant
– Cluster of grapes
WHERE AND WHAT TO MEASURE

Our Study 0.5-2.0 Cm
DON’T MEASURE
JUST LOOK FOR THE
CLUSTER OF GRAPES
LYMPHNODES IN THE ACUTE ABDOMEN (summary)

- Do not occur with uncomplicated appendicitis
- Occur with perforated appendicitis
- Are classic with mesenteric adenitis/enteritis
- Don’t measure
- Don’t say not enlarged by CT criteria
NOW A SIDELINE

MESENTERIC ADENITIS/ENTERITIS
AND COLITIS
CAMPYLOBACTER
INTUSSUSCEPTION

– Previously idiopathic
– Now related to mesenteric adenitis / enteritis
INTUSUSCEPTION
(PLAIN FILM FINDINGS)

- Most specific is interrupted TV colon sign
- Mass in the TV colon
- Other findings range from normal to obstruction
- Our study – 46% NORMAL
BUT MAYBE SUBTLE
THEREFORE

IF YOU OPEN YOUR MOUTH
WITH INTUSSUSCEPTION
CLOSE IT
WITH AN IMAGING STUDY
NOW

TRANSIENT INTUSSUSCEPTION

– Related to mesenteric adenitis/enteritis
  – Children and young adults
  – Usually no pathologic lead point
Cookie cutter
WE LOOKED AT OUR CASES OF TRANIENT INTUSSUSCEPTION OVER ALL AGE GROUPS

Viral mesenteric adenitis/enteritis was the most common predisposing factor in children and young adults.
TRANSIENT INTUSSUSCEPTION
Pathophysiology

Usually non-obstructive/merely transient
Most common in jejunum
– Why does obstruction not occur?
– No decompressive chamber such as the cecum
– Cecum decompressive chamber with terminal ileum involvement
INTUSSUSCEPTION
TRUE VS TRANSIENT
LOOK AT THE FILLING
CONCLUSION

Over the decades the concepts of appendicitis, viral appendicitis, mesenteric adenitis/enteritis and transient intussusception have changed. This has occurred primarily because of modern imaging. In this regard it is important that clinicians, surgeons and pathologists understand the findings as they relate to the various acute abdominal problems.
SUMMARY
Talking with our Infectious Disease – Immunology Expert

The **Appendix** is just another **Lymph node**

Seen Alone or with mesenteric adenitis