Common Pediatric Gastrointestinal Conditions

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Disclosure Statement

I have the following financial relationship to disclose:

Astra-Zeneca - Consultant

No products or services produced by this company is relevant to my presentation.

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Common GI Conditions

Objectives

- Present a series of pediatric cases referred to Pediatric GI
- Highlight an abnormal lab test or finding in each case
- Discuss the significance of the lab test or finding
- Discuss an approach to the case

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Common GI Conditions

- **Case # 1.**
- 12 yr old WM
- Epigastric pain/retrosternal x 6 months
- Initially intermittent – now daily x 3-4 weeks
- No temporal relationships –occurs at night
- Duration ~ 10 minutes –relief with drinking water
- Occasional episodes of dysphagia with solid foods
- Denies N/V/D/C or any change in bowel habits
- Examination
  - WDWN
  - Epigastric tenderness – no guarding or masses

Common GI Conditions

- **Case # 1.**

Your approach to this case is

1. Diagnose probable GERD –trial of H2RA or PPI
2. Request additional testing (e.g. x-rays, blood work for amylase, H pylori)
3. Too many red flags – immediate punt to your friendly Peds GI!
4. Other?

Common GI Conditions

- **Case # 1.**

Points to consider in this case

1. Are there any red flags?
2. Can you localize the site of origin of this pain?
3. If you give empirical trial of acid reduction therapy – which drug and for how long?
4. What is optimal dose and timing for the PPI drugs?

Common GI Conditions

- **Case # 1.**

Subsequent course

- Empirical trial of PPI (PO lansoprazole 30 mg daily) x 2 weeks
- No change in symptoms – possibly even worse
- Labs – Hb 12 g/dl, WBC 9800, P37%, L43%, E13%. CMP, amylase – WNL.

Your next step would be

1. change the medication
2. increase the dose of current meds
3. add other meds (H2RA, Sucralfate)
4. punt to your friendly Peds GI

Common GI Conditions

- **Case # 1.**

Discussion points

1. what does failure to improve on therapy mean?
   - inadequate dose? – not GERD?
2. is there any reason to change PPI's?
3. what is the significance of 13% eos?
4. what additional tests will better define the problem?

Common GI Conditions

- **Eosinophilic esophagitis - features**
  - Eosinophilic infiltration isolated to the esophagus.
  - Generally unresponsive to acid blockade therapy
  - May be responsive to removal of dietary food allergens or treatment with topical or systemic corticosteroids

Common GI Conditions

- Eosinophilic esophagitis
- How common is it?
- In children
  - 3.4% of those with reflux symptoms
  - 6.8% of those with esophagitis
  - 20% of those with dysphagia
  - 50% of those with unexplained dysphagia
  - 68-94% of those with GERD symptoms unresponsive to PPI therapy.

Common GI Conditions

- Eosinophilic esophagitis
- What causes it?
- Allergic manifestation?
  - Role of eosinophil in allergies
  - Atopic family history
  - High rate of skin prick (73%), and patch test (81%) positivity
  - Response to elemental diet suggests food allergies
  - Role of aeroallergens?

Common GI Conditions

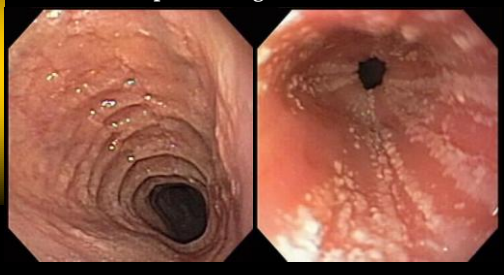
- Eosinophilic esophagitis.
- Clinical features
  - Male:female – 3:1
  - GERD symptoms in the young child
  - Dysphagia in older children
  - Atopic conditions
    - Pediatrics 50%-80%
    - Peripheral blood eosinophilia ~ 60%
    - Elevated IgE levels, skin prick test and RAST positivity in up to 70%

Common GI Conditions

- Eosinophilic esophagitis
- Diagnosis
- Upper GI endoscopy
  - Normal in 36% in a pediatric series
  - Adherent whitish plaques (micro abscess)
  - Ringed appearance (feline esophagus)
  - Linear furrowing – vertical lines
  - Crepe-paper mucosa

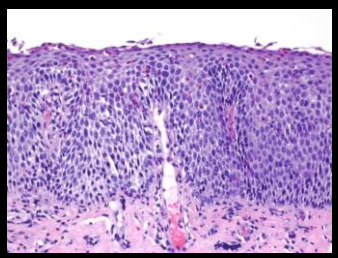
Common GI Conditions

- Eosinophilic esophagitis
  - Endoscopic findings



Common GI Conditions

- Eosinophilic esophagitis
  - Histology



Common GI Conditions

- Eosinophilic esophagitis
- Treatment
- Dietary manipulation
  - Targeted dietary elimination
    - Limited clinical success
  - Elemental diets
    - Very successful clinically & histologically
    - Poor patient acceptance
  - SFED
    - Acceptable response rate
    - Good patient acceptance
    - Simpler challenge protocol

Common GI Conditions

- Eosinophilic esophagitis
- Pharmacotherapy
- Glucocorticoids
  - Topical – fluticasone dipropionate
    - Symptomatic improvement
    - Relapse on withdrawal
    - Associated esophageal candidiasis
  - Topical – viscous budesonide
  - Systemic
    - Unsuitable for long term use

Common GI Conditions

- Eosinophilic esophagitis
- Pharmacotherapy cont.
- Non steroidal agents
  - Montelukast – Singulair
  - Sodium cromoglycate - Gastrocrom
    - Anecdotal reports of response
- Experimental
- Humanized IL-5 mAb
    - Dramatic response in HES and EE
  - Future biologic agents

Common GI Conditions

- Eosinophilic esophagitis
- Take home points
- Eosinophilic esophagitis is a relatively common entity
- Clinically presents with dysphagia or GERD like symptoms
- Diagnosis is based on histology – may require multiple biopsies
- Treatment not yet optimally defined

Common GI Conditions

- Eosinophilic esophagitis
- Information resources
  - www.CDHNF.org
    - Information for parents and patients
    - Links to consensus reports for medical professionals*
    - Links to reports from research symposia
    - Slide sets for talks

*Gastroenterology 2007;133:1342-1363

Common GI Conditions

- Case # 2.
- 10 yr old AAM
- Abdominal pain 4-5 x per week for 6 weeks
- Periumbilical – poorly localized
- Usually after meals – lasts 30 mins
- Never at night
- No N/V/D/C, LOA or LOW

Common GI Conditions

- Case # 2.
- Examination
  - WDWN – in no discomfort
  - No anemia, fever, edema, jaundice
  - Abdomen flat and soft
  - Mild discomfort across midline above umbilicus – no guarding/masses
- Are there any red flags?
- Would you order any lab tests/investigations? Which ones?

Common GI Conditions

- Case # 2.
- Your partner sends some lab tests
- H pylori antibodies are elevated
- Your response to this result is to
  - Ignore this result
  - Treat with antibiotics
  - Request additional tests
  - Punt to your friendly Pediatric GI

Common GI Conditions

- Case # 2
- Discussion points
  - Does H pylori cause abdominal pain?
  - In the absence of PUD why would you treat H pylori?
  - What is the value of H pylori serology?
  - What other tests confirm H pylori?
  - How would you treat H pylori?
  - Would you test for eradication?

H pylori guidelines – www.naspghan.org. Link through AAP website

Common GI Conditions

- Case # 3
- 3 week old male infant well check
  - Mother reports no concerns
  - Fully breast fed – takes feeds well
  - Birth weight 3400 gms.
- Examination.
  - Healthy, alert. Weight 3620 gms.
  - Scleral icterus – noticeable
  - All systems otherwise normal

Common GI Conditions

- Case # 3
- Your approach to this case is
  - Probable physiological jaundice – reassure mother and follow the infant
  - Probable breast milk jaundice – reassure mother and follow infant
  - Request lab tests (which ones?)
  - Punt to your friendly Peds GI

Common GI Conditions

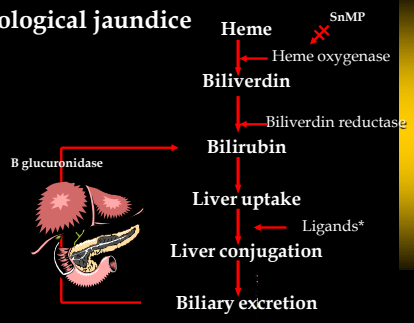
- Case # 3
- Lab test results
  - Hb – 14.2 g/dl, WBC 9800
  - TSB - 7.6 mg/dl, CB – 3.1 mg/dl
- Your approach is
  - diagnose breast milk jaundice, reassure the mother and follow labs
  - request additional lab tests (which?)
  - punt to your friendly Peds GI

Common GI Conditions

- Case # 3
- Discussion points
  - What constitutes physiological jaundice?
  - How do you diagnose breast milk jaundice?
  - What are the causes of conjugated hyperbilirubinemia?

Common GI Conditions

- Physiological jaundice



Common GI Conditions

- Physiological jaundice

Clinical features of jaundice
- first clinically apparent on day 2-3
- clinically peaks on day 5-7
- no longer apparent by day 10-14

Biochemical features
- cord bilirubin <3.5 mg/dl
- bilirubin rise < 5 mg/dl/24 hours
- peak bilirubin < 12 mg/dl

Absence of blood group incompatibility!

Common GI Conditions

- Non Physiological jaundice

Red flags

- jaundice in the first 24 hours of life
- jaundice that appears excessive for age
- bilirubin rise > 5 mg/dl/24 hours
- bilirubin total > 12 mg/dl
- jaundice persists beyond 2 weeks

AAP Clinical Practice Guideline. Pediatrics 2004;114:297-316.

Common GI Conditions

- Non Physiological jaundice

Non-Cholestatic Jaundice
vs.
Cholestatic Jaundice

Common GI Conditions

- Non-cholestatic type

Indirect Hyperbilirubinemia

* Hemolysis
* Breast-milk
Gilbert's
Crig-Najjar

Direct Hyperbilirubinemia

Dubin-Johnson
Rotor Syndrome

* The Biggies!

Common GI Conditions

- Cholestatic type

Intra-hepatic disorders

Infectious | Metabolic | Genetic | Toxins | Miscellan.

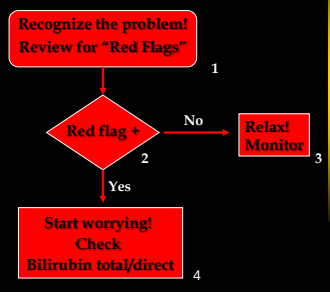
Idiopathic neonatal hepatitis

Extra-hepatic disorders

Biliary atresia | Choledochal cyst | Other disorders

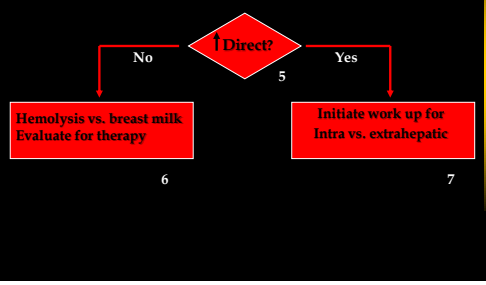
Common GI Conditions

- Clinical approach



Common GI Conditions

- Clinical approach



Common GI Conditions

- Work up – look for treatable causes

Infectious	Syphilis, Toxo, HSV, UTI (E coli), sepsis
Metabolic	Galactosemia, tyrosinemia – newborn screen
Genetic	CF, Alagille, A-1-Antitrypsin, PFIC
Miscellan.	Hypothyroidism, hypopit – new born screen
Obstructive	US, HIDA scan, liver biopsy

J Pediatr Gastroenterol Nutr 2004;39:115-128

Common GI Disorders

- Case # 4
  - 3 yr old WF, no PMH of note
  - 2 day history of puffy eyes
  - Strong family history of atopy

  Examination
  - WDWN, afebrile, in no distress
  - Puffiness of eyelids and feet
  - No anemia, jaundice
  - All other systems normal

Common GI Disorders

- Case # 4
- Your approach would be
  - reassure the mother and continue to observe
  - diagnose an allergic reaction and treat with Benadryl
  - request lab tests (which ones?)

Common GI Disorders

- Case # 4
- Lab test results
  - UA – normal (no protein or blood)
  - CBC – Hb 11.8 g/dl, WBC 7200, platelets and diff normal
  - CMP – normal electrolytes, BUN, Cr, and liver enzymes.
  - Total protein 4.2 g%, albumin 2.1 g%

Common GI Disorders

- Case # 4
- Your approach now is
  - diagnose nephrotic syndrome and treat with prednisone
  - diagnose "nutritional" hypoalbuminemia
  - diagnose liver disease and refer to Peds GI
  - request additional tests (which ones?)
  - Other?

Common GI Disorders

- Case # 4
- Discussion points
  - what are the causes of hypoproteinemia?
  - how do you diagnose protein losing enteropathy?
  - what are the causes of protein losing enteropathy?
  - how do you treat PLE?

Eur J Pediatr 2010;169:1179-1185
http://emedicine.medscape.com/article/931647-overview
Arch Dis Child 1987;62:1215-1219

Common GI Disorders

- Case # 5
- 2 yr old WF – well child check
- No concerns expressed by the parents

Examination

- healthy looking and active
- wt and ht on 5%tile, HC on 50%tile
- all other systems entirely normal

Common GI Disorders

- Case # 5
- Your approach to this child is
  - reassure the parents the child is healthy and continue to follow?
  - express concern about the child's small stature and consult a dietitian?
  - express concern about the child's small stature and order lab tests (which tests?)
  - refer to Peds endocrinology?

Common GI Disorders

- Case # 5
- Lab test results
  - UA – normal
  - TFT's normal
  - CBC – Hb 11.3 g/dl, WBC 5700
  - CMP – normal electrolytes, BUN, Cr, total protein and albumin, Ca, Phos, GPT and GOT
  - alkaline phosphatase 2350 units
- Refer to Peds GI or endocrinology?

Common GI Disorders

- Case # 5
- Discussion points
  - evaluation of small stature
    - dietary history, growth charts, lab tests
  - sources of alkaline phosphatase
  - entity of benign, transient hyper alkaline phosphatemia

Isolated elevation of serum alkaline phosphatase
J Pediatr 1984;105:773-775

Common GI Disorders

- Case # 6
  - 14 month old – acute D&V x 2 days (8-10 stools/day)
  - No significant PMH or FH
  - No preceding illness, sick contact, travel
- Examination
  - Healthy appearing, alert, no signs of dehydration.

Common GI Disorders

- Case # 6
- Your approach to this case is
  - Diagnose viral GE and advise on Rx.
  - Send stool to the lab (for what?)
  - Draw blood (for what?)
  - Other?

Common GI Disorders

- Case # 6

European Society for Paediatric Gastroenterology, Hepatology, and Nutrition/European Society for Paediatric Infectious Diseases Evidence-based Guidelines for the Management of Acute Gastroenteritis in Children in Europe

J Pediatr Gastroenterol Nutr 2008;46:S81-S184

- Is there a need?
  - Previous recs not evidenced based
  - Wide variations in current practices
- Disclaimer?

Common GI Disorders

- Case # 6
- Diagnostic workup
  - No routine stool cultures (V, D)
  - Consider cultures in cases with
    - Persistent diarrhea if antibiotics are considered (e.g. immunocompromised host or dysentery)
    - Exclude infection in IBD
    - Known outbreak

Common GI Disorders

- Case # 6
- Diagnostic workup
  - Biochemical tests
    - Serum bicarbonate (< 17 = > 5% dry) (III, C)
    - Electrolytes should be measured in (V, D)
      - Severe dehydration and some moderate dehydration
      - All receiving IV fluid therapy

Common GI Disorders

- Case # 6
  - Continued diarrhea – became bloody on day 7
  - Crampy abdominal pain with rectal prolapse
- Examination
  - Fussy and appears unwell
  - Abdominal distension and tenderness
  - Mild pedal edema
- Your concerns?
- Your approach?

Common GI Disorders

- Case # 6
  - CMP

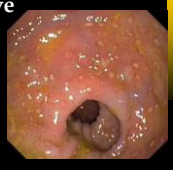
129	99	4
4.5	20	0.3

TP - 3.2, Alb – 1.5
GPT, GOT - nl

  - CBC – Hb - 12.1, WBC - 37 400, Pl – 478k
    S-38%, B-26%, L-11%, M-18%
  - CRP – 30.6 (0-10)
  - Stool – rotavirus, C diff toxin and culture – neg.
  - Air enema → CT scan
- Your next move?

Common GI Disorders

- Case # 6
  - Persistent profuse watery bloody diarrhea
  - Progressive edema and ascites
  - Endoscopy
    - Biopsies
  - Repeat C diff toxin - positive



Common GI Disorders

- Case # 6

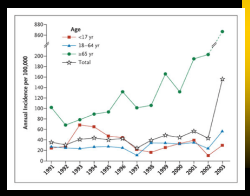
C difficile "outbreak"

- Canada
- Pittsburgh
- USA
- Europe

Features

- Severity
- Morbidity
- Mortality

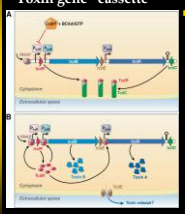
C difficile in Sherbrooke, Quebec



Common GI Disorders

- Case # 6

Toxin gene "cassette"



Anaerobic, Gm-positive, spore-forming, toxin - producing bacillus

- The organism
  - B1/NAP1/027
  - "Supertoxic" (Ax16, Bx23)
  - A/biotic resistance
    - Fluoroquinolones
  - Risk factors
    - A/biotics
    - Age
    - Hospitalization
  - New data
    - Community acquired
    - No antibiotics
    - Younger age group

Common GI Disorders

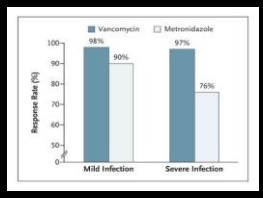
- Case # 6
- Diagnosis
  - Gold standard – toxin assay in tissue culture
  - Enzyme immunoassay (sens 88-93%, spec 94-100%)
  - Stool PCR (sens 93%, spec 97%)
  - Culture positive – toxin negative cases
  - Endoscopy

Common GI Disorders

- Case # 6
- Treatment – severity dependent
  - Severity predictors
    - WBC > 20 000 or rapid rise
    - Stool frequency >10/day
    - Elevated creatinine
    - Low serum albumin
    - Abd pain/distension
    - Pseudomembranes

Common GI Disorders

- Case # 6
- Mild cases
  - ? Observe in young
- Mild to moderate
  - Metronidazole
- Moderate to severe
  - Vancomycin
- Fulminant
  - PO Vanc + IV Metro
- Recurrent disease
  - Repeat course
  - Pulsed/Tapered dosing
  - Other meds
  - IVIG or fecal biotherapy



NEJM 360;3:244-56, 2009

Common GI Disorders

- Case # 6
  - Treatment and course
    - PO metronidazole
    - Continued bloody diarrhea
    - CVL – TPN initiated
    - PO Vancomycin
    - Resolution

Common GI Disorders

- A final thought!
- Screening tests can be very helpful for some GI disorders

BUT!!

- Ordering lab tests is like picking your nose in public!
- You need to know what you are going to do with the result before you start!

Questions?