Abdominal Pain in Childhood - an overview

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Background

- Abdominal pain in childhood is common
- Most can be treated in the community
- Even those treated in a hospital setting mostly recover without a diagnosis
- Disconcerting experience for most clinicians
Background

• Signs are often subtle and non-specific

• Children do not possess an adult’s ability to explain what is wrong with them

• Much has been written on the subject – much controversy
History

- Obtained from parents / guardians – they know their child best!!
- Ask how the child’s behaviour compares to normal
- Where possible involve the child
- Be sympathetic
- Take time to build rapport and interact with them – history and examination must be informal and playful – use concepts the child understands
• **Birth / Perinatal history:**
  - Important to assess repercussions of trauma/illnesses/congenital abnormalities – eg preterm / NEC / early UTIs
  - Problems in pregnancy and perinatally incl admission to NPICU
  - Gestational age at delivery
  - Mode of delivery
  - Birth weight
  - Location of birth (hereditary illnesses)
History (cont)

- **History of presenting complaint:**
  - Pain onset, duration, location, nature, radiation, relieving and exacerbating factors (e.g. Non specific abdominal pain is usually vague, central and colicky; Appendicitis is unilateral and well localised)
  - Nausea and vomiting. Is vomiting bilious? – always ominous in children
  - Good appetite / Feeding well
  - Irritability / Crying
  - Passage of blood and mucus rectally/ with stool
  - Bowel habit
  - Dysuria / Urinary frequency
  - Recent URTIs, GI upsets
  - Wetting nappies / passing adequate/large amount of urine
  - Menstrual / sexual history in older girls
  - Polydypsia
Alarm symptoms

• Unintentional weight loss
• Failure to thrive
• Unexplained fever
• Severe diarrhoea and vomiting
• GIT bleeding
• Family history of IBD
• Chronic RIF or RUQ pain
Examination

- Observe child while you are chatting and taking history – behaviour, dynamics with carers
- Abdominal examination must be done methodically, calmly without upsetting the child
- Be gentle / use toys to distract / examine on parent’s lap if necessary
Examination

- Ask child to show you with one finger the area of maximal pain
- Ask child to protrude and then suck in their abdomen and to cough and jump on the spot – unable to do if peritoneal irritation existent. NO ASSESSMENT OF REBOUND
- Palpate all quadrants
- Hernial orifices
- External genitalia
- ENT examination
- Rectal examination rarely needed
- Signs of hydration – mucous membranes / sunken eyes / decreased skin turgor / capillary refill time>2sec / decreased temperature / sunken fontanelle
Differential diagnosis

**EMERGENCY/LIFE THREATENING**
- DKA
- IBD/Crohn’s
- Ladd’s bands/Malrotation/volvulus
- Appendicitis
- Intestinal obstruction
- Meckel’s diverticulum
- Intussusception
- Incarcerated inguinal hernia
- Testicular torsion
- Trauma
- Food/drug poisoning
- Ectopic pregnancy / ovarian torsion

**OTHERS**
- NSAP
- Porphyria
- UTIs and calculi
- Constipation
- Mesenteric adenitis (adenoviral infection)
- Pneumonia
- Peptic ulcer disease
- Sickle cell crisis/anaemia
- Gallstones
- Pancreatitis (choledochal cysts)
- Pica
- Tonsillitis
- Otitis media
- Gynae pathology
- Infective enteritis
- Child abuse
- Attention seeking behaviour
## Differential diagnosis

<table>
<thead>
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<th>&lt;2 yrs</th>
<th>2-12 yrs</th>
<th>12-16 yrs</th>
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<tr>
<td>Gastroenteritis</td>
<td>Gastroenteritis</td>
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<td>Constipation</td>
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<td>Acute appendicitis</td>
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<td>Intussusception</td>
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<td>Menstruation / Mittelschmerz</td>
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<td>Ovarian cyst torsion</td>
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<td>Incarcerated inguinal hernia</td>
<td>Onset of menstruation</td>
<td>Pregnancy / ectopic pregnancy</td>
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<td>Trauma</td>
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Investigations

- **Laboratory studies:**
  - Complete blood count:
    - peritonitis
    - suspected perforated appendicitis
    - toxic appearance
  - U&Es, Creat:
    - >10% dehydration
    - significant history of vomiting and diarrhoea
  - Amylase +/- LFTs:
    - RUQ/epigastric pain
    - suspected gallstones
  - Blood cultures:
    - Toxic child
    - Temperature >103
  - TFTs
  - Drug levels
  - ESR, CRP
  - H. pylori antibodies
  - RAST, Tissue transglutaminases etc
Investigations:

- Urinalysis:
  - all patients
  - look for red/white cells, ketones, glucose, metabolites
  - stone analysis

- Urine culture:
  - UTI if >100000 organisms/mm$^3$

- Stool culture / O,C,P:
  - if diarrhoea present
Investigations:

- **Radiological studies:**
  - AXR: use sparingly
    - suspected pneumoperitoneum
    - diffuse peritonitis
    - suspected intestinal obstruction
    - palpable mass
    - past history of cholelithiasis/urolithiasis
  - Ultrasound
    - Pelvic pain (girls)
    - abdominal/pelvic mass eg intussusception
    - past history of cholelithiasis/urolithiasis
    - testicular problems
  - CT: use sparingly
    - trauma
    - large BMIs
    - Equivocal / complicated cases

- **Others:**
  - Laparoscopy
Investigations

• THE MOST USEFUL TOOL IS REGULAR ACTIVE OBSERVATION IN THE WARD

• If sent home to the care of the family physician or under the care of the A&E doctor – pts need re-evaluation after 8-12hrs if symptoms persist
Appendicitis

- 4 in 1000 children aged 5-14yrs yearly
- 70,000 paediatric cases per year in the USA
- Extremely rare in neonates
- Incidence of 1-2 cases per 10,000 children per year between birth and 4 years
- Increases to 25 cases per 10,000 children per year between 10 and 17 years of age
Appendicitis

- Rate of perforation is 80-100% for children younger than 3 years vs <10-20% of children aged 10-17 years

- Mortality rate – 0.1-1%

- M:F – 1.4:1
Evaluation algorithms

• **Kharbanda et al:**
  - based on *6-part* scoring system: nausea (2pts), history of focal RLQ pain (2 pts), migration of pain (1pt), difficulty walking (1pt), rebound/percussion tenderness (2 pts), absolute neutrophil count of >6.75x10^3/µl (6 pts)
  - score of <5 had sensitivity of 96.3%, negative predictive value of 95.6% and negative likelihood ration of 0.102 in the validation set

• **Samuel or Paediatric Appendicitis Score**
  - based on *8 variables* – migration of pain to RLQ, anorexia, nausea/vomiting, tenderness in RLQ, cough, hopping, percussion tenderness in RLQ, elevated temperature, leucocytosis, left shift.
  - score of <5 observe ; score of >6 surgical consultation

• **Alvarado or MANTRELS score**
  - derived from adult data
  - based on *7 variables* – migration of pain to RLQ, anorexia, nausea/vomiting, tenderness in RLQ, rebound, elevated temperature, leucocytosis, left shift
  - Score>7 – sensitivity of 73% and specificity of 80%
  - limited to risk stratification of suspected appendicitis in children
Appendicitis

- Vague central abdominal pain preceded by anorexia and vomiting. Pain shifts and settles in right lower quadrant.
- <48hrs’ duration – if longer ?retrocaecal/pelvic appendicitis – rectal exam diagnostic
- Mild pyrexia – high fever uncommon unless perforated
- Tachycardia
- Child reluctant to move as pain worsens
- Only 1/3 of children with appendicitis have classic symptoms
- The appendix DOES NOT grumble – it screams or remains silent
- Particular diagnostic problem in the extremes of age range – in the younger child often presents late with rupture
WCC in Appendicitis

- WCC neither sensitive nor specific for appendicitis
- Elevated in 70-90% of pts with acute appendicitis – also elevated in other abdo conditions
- Predictive value limited – 10% of pts have normal WCC
- WCC >15,000 cells/mm3 – suggestive of perforation – but Cardall et al (2004) found no significant difference between simple and perforated appendicitis as regards WCC
Ultrasound in Appendicitis

- Overall sensitivity of 85% and specificity of 94% in experienced hands for paediatric pts
- Noncompressible dilated appendix
- Periappendiceal abscess
- Fluid in appendiceal lumen
- Transverse diameter of 6mm or more
Functional abdominal pain or nonspecific abdominal pain

- 15% of school age children
- Most common symptom in childhood worldwide
- Considerable morbidity / missed school days / high use of health resources
- Characterized by diagnostic uncertainty and parental anxiety
Definitions

• Apley and Naish 1958:
  - waxes and wanes
  - occurs with 3 episodes within 3 month period
  - severe enough to affect child’s activities

• Subcommittee on chronic abdominal pain, 2005:
  - Chronic abdominal pain
  - Longstanding intermittent or constant abdominal pain
  - functional in most children
Definitions

• **Rome III criteria, 2006:**
  Each of the following subtypes:
  - without evidence of inflammatory, anatomical, metabolic or neoplastic processes to explain the pain
  - all criteria fulfilled for at least 1 a wk per 2 mths before diagnosis

• **Functional dyspepsia:**
  - persistent or recurrent pain centred upper abdomen (above umbilicus)
  - not relieved by defaecation or associated with change in form or frequency of bowel action
Definitions

• **Irritable bowel syndrome:**
  - Abdominal discomfort or pain associated for 25% of the time or more with 2 or more of:
    - improvement with defaecation
    - change in frequency of stool
    - change in form or appearance of stool

• **Functional abdominal pain:**
  - Episodic or continuous abdominal pain
  - Insufficient criteria for other functional GI disorders
Definitions

• Functional abdominal pain syndrome:
  - Functional abdominal pain with one or more of:
    - some loss of daily functioning
    - additional somatic symptoms (headache, limb pain, sleep difficulty)

• Abdominal migraine:
  - Paroxysmal episodes of intense periumbilical pain lasting 1 or more hours (2 or more times in the preceding 12mths)
  - Healthy in between for weeks or months
  - Pain interferes with normal activities
  - Pain associated with 2 or more of:
    nausea, anorexia, vomiting, headache, photophobia, pallor
Cause

- Multifactorial
- Enhanced sensitivity of the enteric nervous system, diet and stress play a role in causation
- Paucity of organic cause
- Biopsychosocial model proposed
- Girls > Boys
Management

• Reassurance, supportive therapy, education of patient and carer to prevent abdo pain taking over lives
• Prognosis good and remits spontaneously
• Parental factors rather than psychological characteristics of the child are more important when predicting persistence of abdominal pain – parents accepting situation strongly associated with recovery
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