



# **Abdominal Pain in Childhood - an overview**

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A decorative graphic on the left side of the slide features three balloons: a light green one at the top, a light blue one in the middle, and a light purple one at the bottom. Each balloon has a string and several small yellow triangular flags attached to it. The balloons are arranged vertically and slightly overlap.


# 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
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# History

- **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 (eg. Non specific abdo 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

<2 yrs	2-12 yrs	12-16 yrs
Gastroenteritis	Gastroenteritis	Mesenteric adenitis
Constipation	Mesenteric adenitis	Acute appendicitis
Intussusception	Acute appendicitis	Menstruation / Mittelschmerz
Infantile colic	Constipation	Ovarian cyst torsion
UTI	UTI	UTI
Incarcerated inguinal hernia	Onset of menstruation	Pregnancy / ectopic pregnancy
Trauma	Psychogenic	Testicular torsion
Pneumonia	Trauma	Psychogenic
DM	Pneumonia	Trauma
Volvulus	DM	Pneumonia
Hirschprung's	HSP	DM
	Sickle cell crises	Constipation
	NSAP	Gynae pathology



# 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<sup>3</sup>

- 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  $>6.75 \times 10^3/\mu\text{l}$  (6 pts)

- score of  $<5$  had sensitivity of 96.3%, negative predictive value of 95.6% and negative likelihood ratio 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
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# 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/mm<sup>3</sup> – 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

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# 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



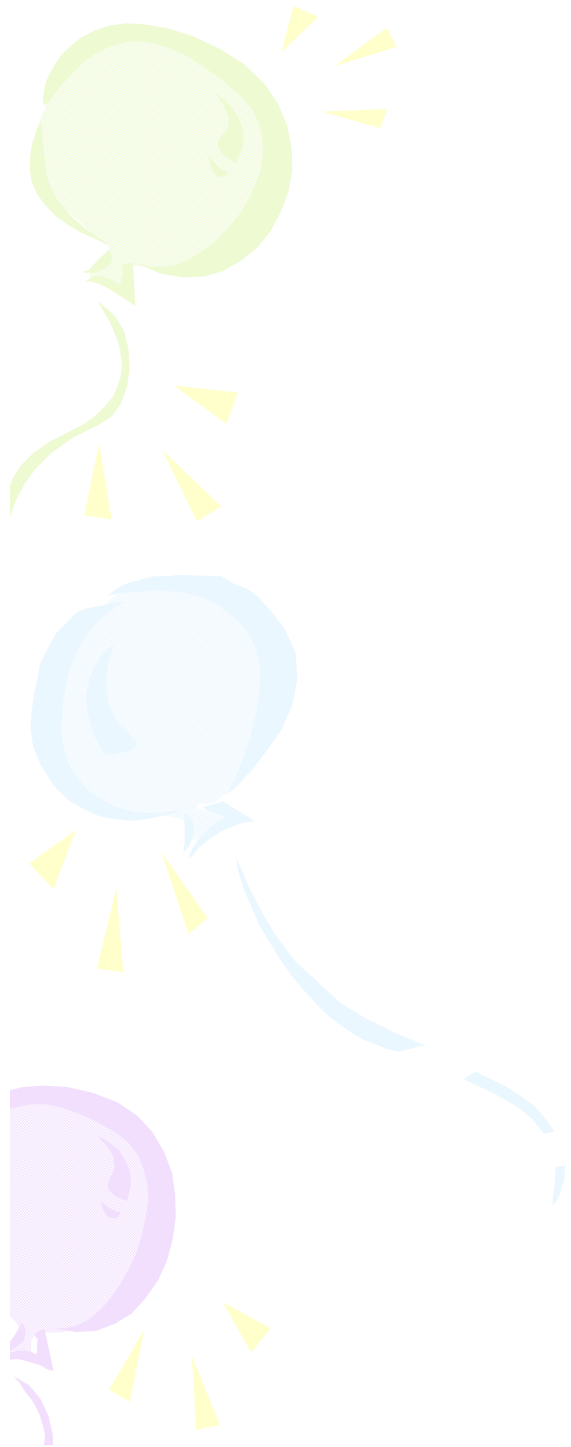
# Cause

- 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

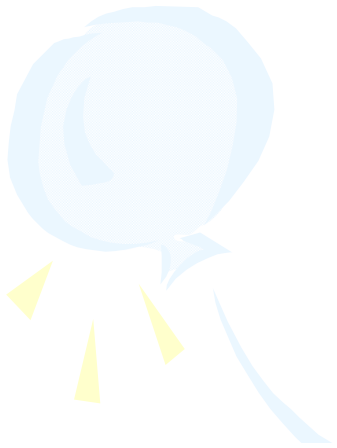


# Management

- 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



THANKYOU



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