



Learning points

- Identifying paediatric appendicitis
- Risk stratifying these patients

The Case:

- An 11 year old girl is sent to ED by her GP ?appendicitis
- She reports 48 hours of central abdominal pain but now has pain in the RIF
- She is nauseous but has not vomited. 1 x episode 'diarrhoea' yesterday.
- No fever
- Reports some dysuria which is new
- Not started periods yet
- No significant PMH or surgical history. No medications, NKDA.
- Seen with her Mum. Rest of family well. No social worker involvement.
- Looks well. PAWS 0. Walked from WR no issue, can hop and jump without difficulty
- ENT NAD, chest clear
- Abdomen soft, tender around umbilicus and in RIF but can tolerate deep palpation

Initial thoughts:

- Well it could be appendicitis, but it's not 'barn door'
- What else could it be? And how can we differentiate?

- 'Classical Appendicitis' presents with central abdominal pain migrating to the RIF, with nausea, vomiting and fever
- Unfortunately less than half of patients will present with this, posing a diagnostic challenge and delayed diagnosis (risk of appendiceal perforation)
- Similarly overcalling it will lead to 'unnecessary' admissions and potentially surgery
- Previously the UK has had a negative appendectomy rate as high as 20% - this has improved in recent years with shifts in practice - [GIRFT Paediatric Abdominal Pain Pathway](#)

Initial investigations:

- FBC, CRP
- Urine dip, PT
- USS if access
- Glucose (DKA!)

Urine:

- [This paper](#) quotes 40% of children with appendicitis have leukocyte in urine, 5% nitrites.
- No difference between appendicitis and non appendicitis groups in urinalysis

And how good are bloods at identifying appendicitis?

- Well, not great
- [This paper](#) does a deep dive on WCC, Neutrophils and CRP as markers of appendicitis. Unsurprisingly if inflammatory markers are raised the chance of appendicitis is higher than if not raised, but critically no combination of results on bloods alone could safely exclude appendicitis.
- Estimates vary across studies (and vary depending on age of the child, length of history at presentation etc) but up to 20% of children with appendicitis may have normal blood tests



Ultrasound

- [This paper in RCS](#) suggests a sensitivity of 90% and specificity of 95%.
- This means roughly 10% of children would still be missed, and 5% have an incorrect diagnosis - and in this study 77.5% of the scans were done by a consultant radiologist
- Authors do concede there is significant inter-operator variability

Putting it all together

- Well we have seen there is no perfect test, or even combination of tests, and negative appendicectomy rates of 20% suggest just how difficult (even to surgical colleagues) correctly identifying paediatric appendicitis can be.
- Most trusts utilise a scoring system to risk stratify these patients, typically [Alvarado score](#) or [Paediatric appendicitis score](#)
- CHFT use the PAS score as incorporated in the guideline on [EMbeds](#)
- Remember children <5 will be referred to Paediatric surgery at the LGI

Differentials?

- [RCEM learning](#) discusses some of the more common mimics and differentials

Back to our Case:

- Urine dip 3+ leukocytes. PU again in ED and reported dysuria. MSU sent.
- WCC, neutrophils, CRP all normal
- PAS score of 4
- She had some analgesia, a repeat set of observations and was re examined
- Pain had improved a bit and so she was discharged with trimethoprim for UTI, safety netting advice if the pain worsens, vomiting or fever to return to ED for subsequent review

Summary

- Most children presenting to ED with abdominal pain do not have a surgical cause
- There is no single way to identify appendicitis, it is notoriously tricky and utilising objective scoring systems such as the PAS score can aid us in decision making
- Consider mimics such as mesenteric adenitis
- If in doubt, I view our role in ED to be 'sensitive' i.e. to not miss important diagnoses and we should refer for specialist opinion. They add the 'specificity' to the process and with the benefit of time and imaging can rule in / out other diagnoses.

Other resources:

- [DFTB Great overview article](#)
- [A nice video overview for those interested in US](#)