world class expertise local care

NHS Royal Free London NHS Foundation Trust

The Role of Ultrasound and Paediatric Appendicitis Score (PAS) in the Diagnosis of Appendicitis in Children

Gudka K, Khurram R, Halim H, Hagh S, Suliman I
Barnet Hospital, Royal Free London NHS Foundation Trust, London, UK

Background

- Appendicitis is the most common cause of abdominal surgery in children.
- There are many challenges when diagnosing appendicitis: imaging is used to complement clinical judgement.
- CT has high sensitivity and is commonly used in adults, but radiation safety concerns limit its use in children.
- Ultrasound is the preferred imaging modality in children as it does not use ionising radiation and is an accurate point of care test.
- Delaying surgical intervention increases complication rates.

Aim

- To evaluate the role of clinical scoring tools such as **Paediatric Appendicitis Score (PAS)** and **ultrasound** in facilitating the diagnosis of appendicitis in the paediatric population in Barnet Hospital who underwent an emergency appendicectomy.

Clinical variable	*Pediatric Appendicitis Score†*
Migration of pain	1
Anorexia	1
Nausea/vomiting	1
Tenderness in right lower quadrant	2
Rebound pain	—
Elevation in temperature (≥ 100.4°F [38.0°C])	1
Leukocytosis > 10,000 per mm³ (10.00 × 10^9 per L)	1
Shift to the left of white blood cell count (> 75% polymorphonucleocytes)	1
Cough/percussion/hopping causes pain in the right lower quadrant	2

Low risk
1-3

Moderate risk
4-6

High risk
7-10

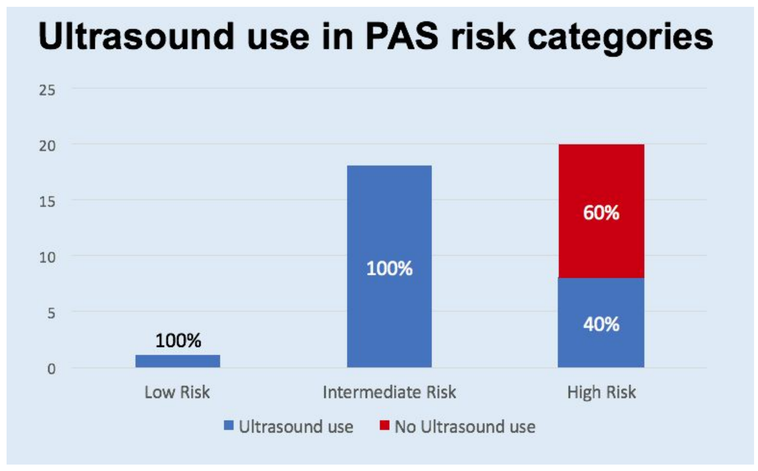
Samuel M, Paediatric Appendicitis Score, Journal of Paediatric Surgery, Vol 37, No. 6, 2002, pp 877-881

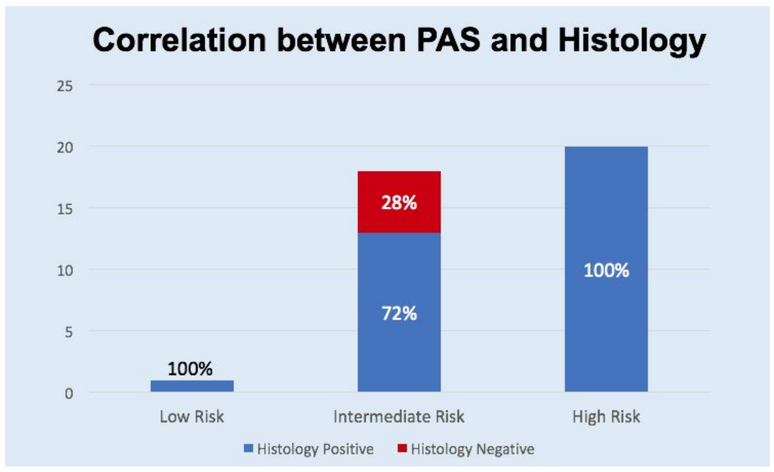
Methods

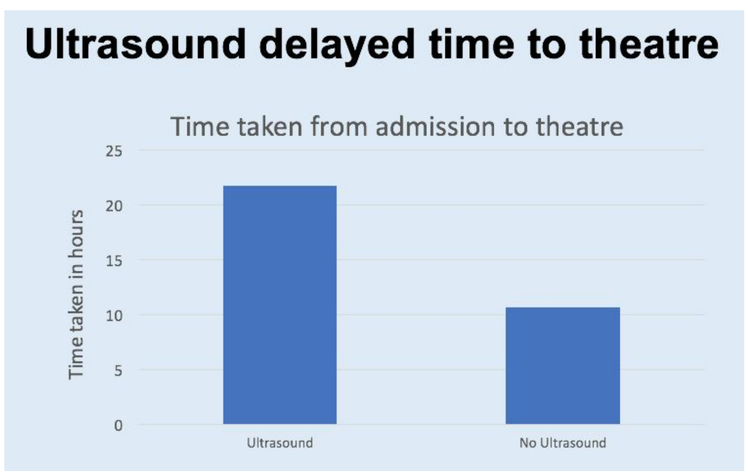
- Retrospective analysis of the clinical records and preoperative imaging of all patients under the age of 18 who underwent an emergency open or laparoscopic appendicectomy over a 6 month period between November 2018 - May 2019.
- History, examination findings and laboratory data was used to calculate PAS.
- Diagnostic performance of PAS and ultrasound were evaluated using histopathology as the gold standard.

Results

- A total of 39 appendicectomies were performed, with a 13% negative appendicectomy rate.
- 20 appendicectomies (51%) occured in the high risk PAS group, and this correlated with 100% positive histology for appendicitis. Out of the 13 appendicectomies performed in the moderate risk PAS group, 72% had positive histology.
- 100% of intermediate risk PAS children had an ultrasound pre-operatively compared to only 40% of children in the high risk PAS category.
- Overall, there has been a 12% reduction in the use of ultrasound pre-operatively in the high risk PAS group (when compared to the data from April to September 2018).
- Having an ultrasound delays the time taken to theatre by 11 hours.







Conclusion

- Overall, PAS was a better tool than ultrasound in diagnosing paediatric appendicitis.
- Despite ultrasound still being used extensively, there has been a 12% reduction in the use of ultrasound in high risk PAS cases between the first audit and re-audit.
- This correlates to a decrease in time taken to theatre.
- Ultrasound plays a more important role in the low/ intermediate risk groups for appendicitis diagnosis.

Take Home Messages

- Clinically risk stratify patients into high, intermediate and low risk using PAS.
- Aim to reduce ultrasound use in the clinically high risk group due to:
  - Delays in definitive treatment.
  - Low negative appendicectomy rate (0%).