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FINDING THE ROLE OF ULTRASOUND AND CT SCAN IN REDUCING NEGATIVE APPENDECTOMY RATE

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Abstract

Introduction: Acute appendicitis is a common surgical emergency, with a prevalence of 112 per 100,000 people per year in Europe. In England alone, it accounts for more than 40,000 hospital admissions annually.

Objectives: The main objective of the study is to finding the role of ultrasound and CT scan in reducing negative aappendectomy rate.

Material and methods: This descriptive study was conducted in The royal Oldham Hospital, Greater Manchester during July 2021 to November 2021. The data was collected from 64 patients with age range 18 to 60 years.

Results: The data was collected from 38 patients of which 7 (18.4%) were male and 31 (81.6) were female. The mean and standard deviation of age in years age was 12.5789 ± 3.10 years.

Conclusion: It is concluded that ultrasonography is justified as an appropriate diagnostic tool in suspected cases of Acute appendicitis in paediatric patients to avoid undue surgical interventions.

Introduction

Acute appendicitis is a common surgical emergency, with a prevalence of 112 per 100,000 people per year in Europe. In England alone, it accounts for more than 40,000 hospital admissions annually. Appendicitis is defined by the presence and spreading of inflammation within the inner lining of the vermiform appendix. Its presentation varies with severity but typically includes anorexia, nausea, vomiting and migration of central abdominal pain to the right iliac fossa. Early diagnosis and prompt appendicectomy are crucial to prevent significant increases in morbidity and mortality.

The diagnosis of acute appendicitis can often be made on clinical bases, and clinical scoring systems such as the Alvarado score can aid diagnosis. While CT scan is not always required to confirm the diagnosis, current evidence recommends routine CT scan for patients 50 and older with right iliac fossa (RIF) pain in the diagnostic workup, to rule out a possible neoplasm. Often, however, clinical diagnosis is challenging, particularly in early presentation, and further investigation such as CT should be considered even in younger patients. This leaves the surgeon trapped in a dilemma whether to proceed

with laparoscopy and ignore the risks of a potentially unnecessary procedure, or proceed with a CT scan, exposing the young patient to the risks of radiation, only to find that laparoscopy is needed anywise, either due to positive or inconclusive CT findings.

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Approximately six percent of the population will suffer from acute appendicitis during their lifetime. Delay in operation may lead to perforation and the attendant morbidity and mortality, a problem especially common in children. Consequently, the practice has been early surgery in cases of suspected appendicitis. With this concept however, there is an increased chance of having high rates of negative appendectomy. Various authors have reported different rates of negative appendectomy, with an acceptable range being between 5 and 20 percent.

Appendectomy has its associated complications and negative appendectomy (removal of a normal appendix) is not exempt from such complications. Negative appendectomy also has financial implications. Several factors have been considered to influence the incidence of negative appendectomy. The experience of the surgeon is of great importance. Some investigators have also considered the availability of various diagnostic tests (abdominal ultrasonography and CT) as being very useful in minimizing the incidence of negative appendectomy.

Objectives

The main objective of the study is to finding the role of ultrasound and CT scan in reducing negative aappendectomy rate.

Material and methods

This descriptive study was conducted in The royal Oldham Hospital, Greater Manchester during July 2021 to November 2021. The data was collected from 64 patients with age range 18 to 60 years.

Inclusion criteria

- Both male and female.
- Those who are willing to participate in the study.

Exclusion criteria

- Patients with non-specific pain, with trauma and with diagnosed abnormalities.

Data collection

All the patients were scanned by ultrasound. The graded compression technique described by Puylaert was used. Sonographic signs of AA defined as a blind-ending loop measuring greater than or equal to 6 mm in diameter, demonstrating any of the following features: non-compressibility, aperistalsis, increased wall thickness and vascularity, free fluid, lymph node greater than or equal to 8 mm in diameter, echogenic fat in the RLQ and presence of appendicoliths. Patients with the diagnosis of acute appendicitis underwent an appendicectomy. Histopathology reports were collected from the patients

afterwards. Diagnostic accuracy was calculated for ultrasonography taking histopathology as gold standard. Mc Nemar test was applied. A P-value less than 0.05 was considered as significant.

Results

The data was collected from 38 patients of which 7 (18.4%) were male and 31 (81.6) were female. The mean and standard deviation of age in years age was 12.5789 ± 3.10 years. Table 01 shows the frequency of findings of 38 patients. 55.3% patients were showed the increased wall thickness but 44.7% were showed the normal. All the patients had increased diameter of visualized appendix, with no compressibility and increased echogenecity of fat. Fecolith seen in 5.3% of patients and target sign was seen in 47.4% of patients.

Table 01: Frequency of findings in the selected patients

	Frequency	**%**	**Valid %**	**Cumulative Percent**
Wall thickness				
Increased	21	55.3	55.3	55.3
Normal	17	44.7	44.7	100.0
Tubular structure diameter				
Increased	38	100.0	100.0	100.0
Compressibility				
No	38	100.0	100.0	100.0
Probe tenderness				
Yes	38	100.0	100.0	100.0
Fecolith				
No	36	94.7	94.7	94.7
Yes	2	5.3	5.3	100.0
Target sign				
Not seen	20	52.6	52.6	52.6
Seen	18	47.4	47.4	100.0

All patients of acute appendicitis underwent detailed ultrasound examination . After the diagnosis of acute appendicitis histopathology of all the patients was done. According to the findings of histopathology in 3 (7.9%) patients appendix was not inflamed while in remaining 35 patients 28.9% patients showed acutely inflamed appendix, only 2.6% showed gangrenous appendix and 52.6% showed only inflammation. The data is shown in table 02.

Table 02: Histopathological findings of patients with acute appendicitis

Histopathology final diagnosis					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	acutely inflamed appendix	11	28.9	28.9	28.9
	appendix not inflamed	3	7.9	7.9	36.8
	gangrenous appendix	1	2.6	2.6	39.5
	inflamed appendix	20	52.6	52.6	92.1
	mildly inflamed appendix	2	5.3	5.3	97.4
	severely inflamed appendix	1	2.6	2.6	100.0
	Total	38	100.0	100.0	

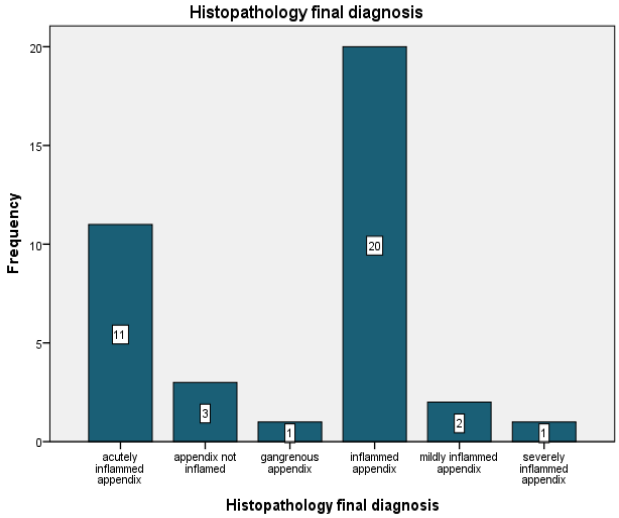

Figure A: Histopathology of patients with acute appendicitis

Discussion

This cross sectional study "Role of ultrasound for the diagnosis of acute appendicitis in paediatric patients presenting with right iliac fossa pain" was conducted in university of Lahore hospital for academic requirement of Masters of philosophy in Ultrasound after the approval of ethical review committee.

38 paediatric patients who fulfilled the inclusion/exclusion criteria were enrolled. Detailed history was taken from all patients including age , sex, duration of pain and associated symptoms.

The patients were scanned by ultrasound. The graded compression technique described by Puylaert was used.[20] Sonographic signs of Acute appendicitis defined as a blind-ending loop measuring greater than or equal to 6 mm in diameter, demonstrating any of the following features: non-compressibility, aperistalsis, increased wall thickness and vascularity, free fluid, lymph node greater than or equal to 8 mm in diameter, echogenic fat in the RLQ and appendicolith. Histopathology reports were collected from the patients

Acute appendicitis remains the most common abdominal condition requiring surgical intervention worldwide.[10] Epidemiological studies have shown that appendicitis is more common in the age 10–20 year age group.[11] Our study also reveals high incidence in the 3 to 12 years age group, in concordance with Limpawattanisiri et al. Males were more frequently affected than females in our study, a finding in contrast with some studies.[12]

Varied visualization rates of the appendix on ultrasound are reported in the literature.In one study out of 100 cases recruited for the study, 95 cases underwent surgical intervention in the form of immediate appendicectomy (89 patients), interval appendicectomy (four patients), or drainage of abscess (two patients).[13] On histopathological/surgical correlation, true positive was 85, false positive – 1, true negative – 6, and false negative – 3. The observed sensitivity, specificity, positive predictive value, and negative predictive value of ultrasonography (US) in the diagnosis of acute appendicitis was 96.5%, 85.7%, 98.8%, and 66.7%, respectively, with an overall accuracy of 95.7%.[14] In our study, 89.5% patients of appendicitis showed hyperemic color Doppler flow. Furthermore, the use of color and power Doppler sonography was more helpful in those patients where it was difficult technically to visualize the entire appendix.[15]

Another study evaluated the additional value of secondary signs in the diagnosing of appendicitis in children with ultrasound. From May 2005 to June 2006, 212 consecutive paediatric patients with

suspected appendicitis were examined. Ultrasonographic depiction of the appendix was classified into four groups: 1, normal appendix; 2, appendix not depicted, no secondary signs of appendicitis; 3, appendix not depicted with one of the following secondary signs: hyperechoic mesenteric fat, fluid collection, local dilated small bowel loop; 4, depiction of inflamed appendix[16]. Prevalence of appendicitis, proven by surgery and/or pathology, in this study was 34%. The US diagnosis of acute appendicitis was true positive in 70 patients, false positive in five patients (2/13 patients in group 3 and 3/62 patients in group 4), false negative in one patient and true negative in 136 patients. The sensitivity of US classification method was 99%; the specificity of the imaging strategy was 97%[17]. Negative predictive values (NPVs) of groups 1 and 2 were 99% and 100%, respectively. Positive predictive values (PPVs) of groups 3 and 4 were 85% and 95%, respectively.[18-19] while in our study histopathology reports showed that in 7.9% of patients appendix was not inflamed while in remaining 35 patients 28.9% patients showed acutely inflamed appendix, only 2.6% showed gangrenous appendix and 52.6% showed only inflammation.

Conclusion

It is concluded that ultrasonography is justified as an appropriate diagnostic tool in suspected cases of Acute appendicitis in paediatric patients to avoid undue surgical interventions.

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