Original Research Article

A study to assess the role of ultrasound and histopathology in the diagnosis and anatomical presentation of acute appendicitis

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Abstract

Background: One of the most prevalent illnesses treated in emergency rooms is acute appendicitis. Despite advancements in diagnostic medicine and therapies, appendicitis diagnosis is still mostly clinical, requiring clinical judgement and surgical expertise. Maximum prevalence seen in the second to fourth decades of life, with males predominating. U/S has recently been proved to be beneficial in diagnosing. **Materials and Methods**: From January 2019 to December 2020 hospital-based observational longitudinal research was undertaken at Subbaih Medical College. A total of 120 patients classified as acute appendicitis by the surgeon's clinical examination were then submitted to clinical evaluation utilising signs, symptoms, and laboratory criteria, histology, and the appendix's location, all of which were documented in the report. An ultrasound examination was performed on all patients by a skilled radiologist to rule out any other pathology and to confirm the diagnosis. **Results:** The majority of the individuals in the research were in their late 20s and 30s, out of a total of 100 instances. The average age of the participants in our research was 29+9.5 years. In our research, men accounted for about 70% of the cases, while females accounted for 30%. Ultrasound examinations were performed on all 120 subjects suspected of having appendectomies. Only 100 of the 120 patients were scheduled for surgery due to an appendicitis diagnosis. Only 100 appendectomies were done out of the 83 patients that were taken for surgery. All of the patients experienced right iliac fossa discomfort and tenderness, and 61.5 percent of them also had fever and vomiting. The total accuracy of appendectomy diagnosis was 89.3 percent. The total Sensitivity and Specificity were 91.6 percent and 56 percent, respectively. The Positive Predictive Value (PPV) was 99.2%, whereas the Negative Predictive Value (NPV) was 33%. **Conclusion:** The use of ultrasound in the diagnosis of acute appendicitis is beneficial. Ultrasound as an auxiliary to clinical evaluation may help to minimise the number of unnecessary laparotomies while not jeopardising the risk of delay.

Keywords: Appendicitis, Appendectomy, Ultra Sound, Histopathological Examination. Sensitivity and Specificity.

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INTRODUCTION

Acute Appendicitis is one of the most prevalent causes of acute abdomen in young middle-aged individuals. The signs and symptoms of acute appendicitis have a substantial paradigm change in their clinical presentation. Even with all of the advancements in medical diagnostic technologies, appendicitis diagnosis will always remain a nightmare for most surgeons. Many diagnostic approaches may be used to make a diagnosis, ranging from obtaining the patient's medical history to doing a clinical examination to using appropriate diagnostic technology such as ultrasound and computed tonography.[1] The overall incidence of appendices is 1 in 7, and correct and effective

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use of the diagnostic approach has lowered the frequency of appendectomies in individuals who do not have appendicitis signs and symptoms.[2] 'Acute appendicitis is one of the most prevalent conditions for which the surgeon is called upon to handle the patient as an emergency,' said one of the surgeons, Sir Heneage Ogilive.[3] Ultrasound Sonography is a simple and rapid approach to confirm the diagnosis of appendicitis, and it is also one of the least costly investigations. However, the USG findings should not take precedence over the clinical characteristics and the surgeon's evaluation judgement. Ultrasonography is the least costly and intrusive of these, with a claimed accuracy of 71% to 95%.[4] Thus, the varied anatomical presentations of the appendix and the significance of USG in the diagnosis of appendicitis and minimising the rate of negative appendectomy were investigated in our research..

Objective: To study the various anatomical presentation of Acute Appendicitis and the role of Ultrasound in the diagnosis of the Appendicitis.

METHODOLOGY

Janaury 2019 toDecember 2020 a hospital-based observational longitudinal research was undertaken at Subbaih Medical College and Hospital. A total of 120 patients classified as acute appendicitis by the surgeon's clinical examination were then submitted to clinical evaluation utilising signs, symptoms, and laboratory criteria, histology, and the appendix's location, all of which were documented in the report. An ultrasound examination was performed on all patients by a skilled radiologist to rule out any other pathology and to confirm the diagnosis. The surgery was performed under either general or spinal anaesthesia. Lenz or Mc Burney's incisions were used to access the abdomen, as well as a right lower paramedian incision. Before disturbing the structures, the location of the appendix was determined and documented, along with the length of the appendix, whether it was fixed or freely movable in the peritoneal cavity, peri-appendiceal collection, existence of perforation, and other appendicitis complications. The state of organs was also taken into consideration. The material was submitted to histological evaluation by a skilled pathologist after the appendectomy was completed. Only those patients that were shown to have appendicitis by histology were included in the research.

RESULTS

Out of the total 100 cases which were included in the study, Majority of the subjects were in the late 20 and 30s. The mean age of our study population was 29±9.5 Years. Nearly 70% of the cases were male and 30 % of them were females in our study. Out of the 120 cases which were included in the study, The anatomical position of the Appendix during the surgery was variable, with majority 70% of them belonging to retrocaecal position, 9 % in paracaecal, 3 % in Post and pre ileal region, 10 % in Pelvic and 5 % in the sub caecal region.

Table 1: Comparison between position of appendix with clinical presentation and intra operative findings

Position of appendix	Intra operative	Percentage
Retrocaecal	70	70
Paracaecal	9	9
Post- ileal	3	3
Pre-ileal	3	3
Pelvic	10	10
Sub-caecal	5	5
Total	**100**	**100**

Table 2: Clinical and Ultrasound Assessment of the cases

Clinical assessment	120
Ultrasound was done for	115
Total number of cases operated	100
Total number of appendectomies	100
Cases managed on conservative	20

All the 120 cases suspected of appendectomies was subjected for ultrasound examination. out of the 120 cases only 100 cases were taken for surgery with the diagnosis of appendicitis. Out of the 83 cases taken for surgery only 100 cases were performed appendectomies. All the cases presented with pain in right iliac fossa and tenderness, 61.5% of them had fever and vomiting. The overall accuracy of the diagnosis of appendectomy was 89.3%. The overall Sensitivity was 91.6% and Specificity was 56%. The Positive Predictive Value was 99.2 and Negative Predictive Value was 33%.

Table 3: Comparison of Clinical Results with Histopathological Report

Findings	Total
Accuracy	89.3%
Sensitivity	91.6%
Specificity	56%
Positive Predictive Value	99.2%
Negative Predictive Value	33%

Table 3: Comparison of Ultrasound with Histopathological Report

Findings	Total
Accuracy	89.1%
Sensitivity	88.6%
Specificity	76%
Positive Predictive Value	98.9%
Negative Predictive Value	35.5%

The comparison of Ultrasound and Histopathology was found to be good with 89.1% of accuracy in the diagnosis. The Sensitivity was 88.6% and specificity was 76%. The Positive and Negative Predictive Value was 98.9% and 35.5% respectively.

Table 5: COMPARISON OF ULTRASOUND WITH CILINICAL DIAGNOSIS

Modality	Positive Case	Negative Case	Total
Clinical	85	10	95
Ultrasound	83	12	95

The association between the diagnosis of Appendicitis by clinical method or Ultrasound Method was found to statistically not Significant.

DISCUSSION

Appendicitis diagnosis is usually difficult, and there are no particular tests that can be used to identify the condition. Waiting until they perforate, according to Ravitch, is one approach to detect 100 percent of the condition.[3] Clinical scoring, ultrasound, Doppler, laparoscopy, and peritoneal aspiration are a few of the procedures that may be employed for the confirmation of the diagnosis in suspected cases, according to different research, with each approach showing variable outcomes in the accuracy of the diagnosis.[5,6] Appendicitis was more common in those in their forties and fifties. According to Lewis *et al.*[7] and Ooms *et al.*,[8] the most prevalent age group afflicted by appendicitis was between the ages of 20 and 40. In our analysis, males were more likely than women to have appendicitis, which is consistent with the results of Lewis *et al.*[7] and Adams *et al.*[9] Our findings on the anatomical location of the appendix were virtually identical to Wakeley[10] findings in 1993, when he evaluated 10,000 patients and classified the positions of the appendix and the relative proportion of it. Overall, ultrasound examination sensitivity and specificity were determined to be 86.1 percent, 89.6 percent, and 75 percent accurate in diagnosing appendicitis. In our research, this is the case. Adams *et al.* 9 reported 89 percent sensitivity and 86 percent specificity, whereas Jeffrey *et al.*[11] claimed 89.9% sensitivity and 96.2 percent specificity. These findings outperform those of our research. There were a lot of false negatives, including 12 instances where the appendix couldn't be seen on ultrasonography. Although ultrasonography proved specific in identifying acute appendicitis, the high rate of false negatives prohibited its utility as a screening method for acute appendicitis, according to John *et al.*[12.]

CONCLUSION

Appendicitis is commonest during 3rd and 4th decade with a male preponderance. U/S is useful diagnostic procedure in diagnosis of this condition and its complications. Although ultrasound was not significantly more accurate, its specificity of 75% was significantly higher than clinical assessment. Ultrasound is useful in the diagnosis of acute appendicitis. Clinical assessment may be assisted by ultrasound as an adjuvant, to reduce the number of unnecessary laparotomies, while not compromising on the danger of delay. All investigations should, however, be interpreted in the light of clinical findings.

REFERENCES

1. Williams R A, Myers P. Pathology of the appendix. Chapman and Hall Medical: New York, NY;1994:28-29.
2. Kardong, K.V. Vertebrates: Comparative anatomy, function, evolution. Third edition. McGraw-Hill: New York, NY, 2002:513-115
3. Richard. A Williams and Pauk Myers – Monograph – Pathology of the Appendix, First Edition, Chapman and Hall inc.1994.
4. Larson WJ. Human Embryology. 3rd ed. Philadelphia, PA: Churchill Livingstone 2001; 16: 254-56.
5. J. Hoffman and O. Rasmussen. Aids in the diagnosis of acute appendicitis. Br J Surg 1989; 76:774-79
6. Ramirez JM and Deus J. Practical score to aid decision

making in acute appendicitis. Br J Surg 1994; 81:680-683
7. Lewis FR, Holcroft JW, Boey et al. Appendicitis: a critical review of the diagnosis and treatment in 1000 cases. Arch Surg 1975; 110: 677-684.
8. Ooms et al. Ultrasonography in the diagnosis of acute appendicitis. Br J Surg 1991; 78: 315-318.
9. Adams D, Calthrope Fine, Brooks David et al. High resolution Real Time ultrasonography, a new tool in the diagnosis of acute appendicitis. Am J Surg 1988; 155: 93-97.
10. Wakeley C.P The position of the vermiform appendix as ascertained by an analysis of 10,000 cases. J. Anat, 1933, 67, 277-283.
11. Jeffrey RB, Laing FC, Lewis FR. Acute appendicitis High resolution real time US findings. Radiology 1987; 163:11-14.
12. Hubert John, Urs Neff, Milos K et al. Appendicitis diagnosis today-clinical and ultrasonic deduction. World J Surg 1993; 17: 243-249.

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