



Comparative Study of Sensitivity and Specificity of Ultra Sonography and Computed Tomography in Clinically Suspected Acute Appendicitis as a Diagnostic Tool and Further Confirmed and Correlated with HPE

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Abstract

Introduction: *The vermiform appendix, which for a long time was thought as a vestigial organ turned out to be an immunological organ. Immunoglobulin A is the predominant immunoglobulin secreted by the appendix. The acute inflammation of this organ is called as Acute appendicitis. Surgical emergency is supposed to be acute appendicitis. The diagnosis is based mainly on clinical exam. But now the drastic improvement in imaging techniques has been h. This prospective study compares the sensitivity and specificity of Ultrasonography and Computed tomography, as a diagnostic tool in the patients clinically diagnosed as acute appendicitis and confirmed and correlated with histopathological examination post operatively.*

Study Design: *First nearly One hundred and forty-nine patients with symptoms of abdominal pain, vomiting, fever was selected and the Alvarado scoring system was followed. Patients who had scoring above seven were considered. All patients underwent Ultrasonogram. Those who did not show appendicitis were taken for computerised tomogram. All patients who were diagnosed by the imaging techniques and the clinically suspected acute appendicitis were taken up for the procedure. After the surgery the specimen taken for histopathological examination and the results compared.*

Results: *For ultrasonography, the sensitivity was 65%, the specificity was 77%, the positive predictive value was 92%, and the negative predictive value was 38%. Comparatively for Computerised tomogram the sensitivity was 93%, the specificity was 94%, the positive predictive value was 97%, and the negative predictive value was 87%. The combined values for ultrasonography and computed tomography (in inconclusive ultrasonographic cases only) was sensitivity 98% , specificity 70% , positive predictive value 93% , negative predictive value was 86% and the most important, diagnostic accuracy was 92% .*

Conclusion: *In diagnosing acute appendicitis the computed tomogram is found to be better than ultrasonogram. So, we can combine computed tomography with ultra-sonogram for only patients who are inconclusive with ultra-sonogram, thereby saving cost, radiation, time, and manpower.*

Keywords: *Histo pathological examination, Alvarado scoring, ultra-sonogram (USG), sensitivity, specificity, Computerised tomogram (CT).*

Introduction

In surgical ward, the commonest cause of acute abdomen is Acute appendicitis, particularly in young adults. And so the frequent surgery done is appendicectomy. The first major surgery done by any surgeon will be invariably appendicectomy. Though the advances in radiographic studies has improved the diagnostic accuracy, we still rely on clinical examination mainly. A great observation, knowledge in surgical science, and clinical acumen is needed. Even though the combined technique had high predictive value, computed tomogram is reserved for cases who are inconclusive in ultrasonogram so that radiation exposure is prevented and also cost effective.

A prospective study was designed to compare the sensitivity and specificity of USG and CT as a diagnostic tool in clinically suspected cases of acute appendicitis which is further confirmed and correlated with the histopathological examination.

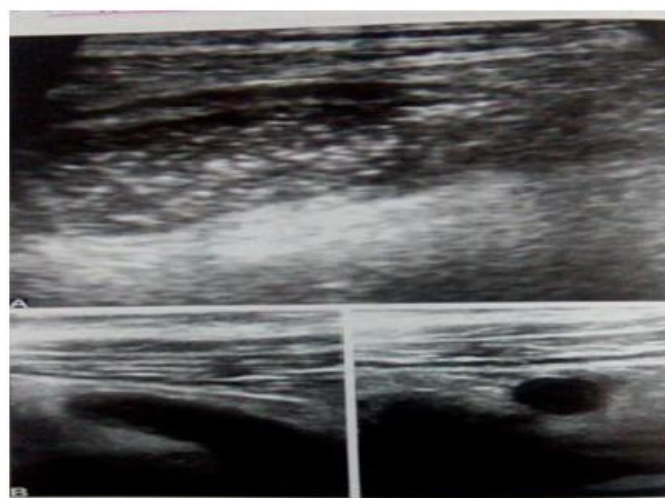
Objective

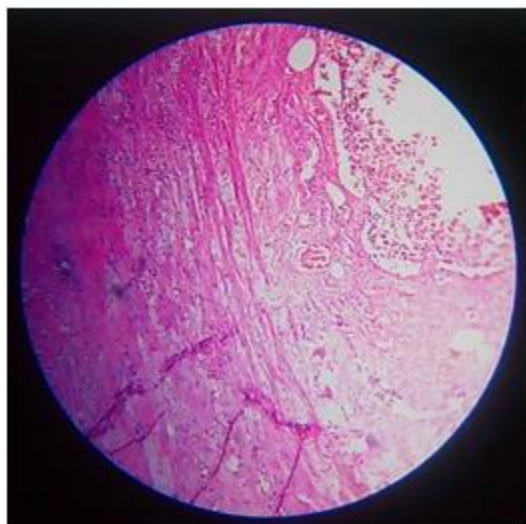
1. The sensitivity and specificity of USG in diagnosing clinically suspected case of acute appendicitis as a diagnostic tool is determined and correlated and confirmed with HPE.
2. The sensitivity and specificity of CT in diagnosing clinically suspected patient with acute appendicitis determined as a diagnostic tool and correlated and confirmed further with HPE.
3. Comparing the combined accuracy of USG and CT in clinically suspected case of appendicitis and further confirming with HPE.

Materials and Methods

The study was done in government erode medical college for a period of one year and the approval of the hospital's ethical committee for human studies. Got before the procedure. Patients who presented with abdominal pain and those who are above 13 years were considered.

After evaluating all the patients , those who had typical signs and symptoms of acute appendicitis and whose Alvarado scoring was above seven were taken up for the study. The patients were explained about the radiological procedures they are going to undertake, the logistics of the study was explained, and consent was obtained. Patients who had other diagnosis were treated accordingly. The age, sex, complaints, ALVARADO score, USG report, CT report, findings in surgery and HPE report post operatively were noted. In the 149 patients taken up for the study and scanned with USG, 82 were positive for appendicitis and 4 had mass formation and so interval appendicectomy was decided for them. 52 patients were inconclusive with USG and 15 had alternate diagnosis. So the remaining 67 patients (USG inconclusive and other diagnosis) were made to undergo CT imaging. CT had 41 positives, 11 negative and the other 15 had alternate diagnosis. So the USG positive (82), CT positive (41) and 11 patients who were clinically suspected was taken up for surgical procedure. The total comes to 134. In 134 cases taken for surgery, 124 cases were positive for acute appendicitis and ten looked with no signs of appendicitis. In the 124 cases, there was two gangrenous appendicitis, seven perforation and faecolith was ten, and two had mass formation.





In the post-operative period few patients had complications like respiratory tract infection, infection at surgical sight and one patient had faecal fistula.

Histology showing acute appendicitis

Infiltration of the muscularispropria by the neutrophil granulocytes is the important finding in diagnosing acute appendicitis. The specimen which had this finding were marked positive and others were marked negative. The patients follow up was done for six weeks.

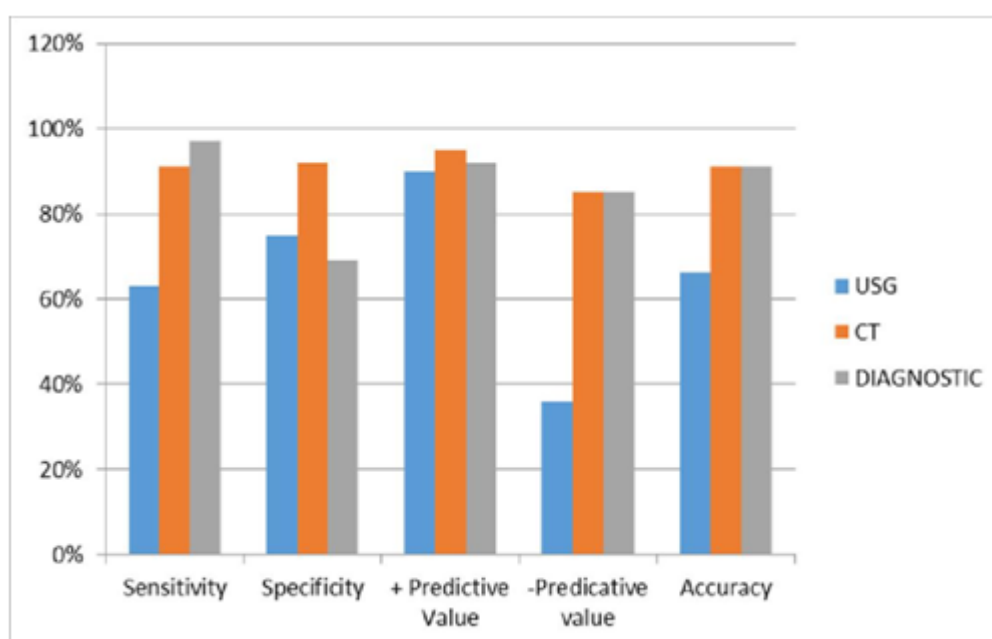
Statistical Analysis

With the gathered information’s and details the statistical analysis was done. For USG and CT the calculation of Sensitivity, specificity, positive predictive and negative predictive values and the calculation of accuracy for USG, CT and combined Diagnostic pathway (using USG and CT in USG negative or inconclusive cases) was calculated and results tabulated.

Statistics	USG	CT	USG+CT
Sensitivity	65%	93%	98%
Specificity	77%	94%	70%
+ Predictive Value	92%	97%	93%
-Predicative Value	38%	87%	86%
Accuracy	68%	93%	92%

Results

Chart



Discussion

The total number of patients with abdominal pain was 469. In the patients the Alvarado scoring system followed and patients with scoring above seven was considered. In the above group, 187 patients had the score above seven.

These patients (187) were explained about their condition and the investigation and the treatment plan. And the details of the study were clearly explained. Out of these 149 patients gave their consent for the study.

In the 149 patients, USG positive was 82 and inconclusive was 67. In this 74 became HPE positive. In the 67 inconclusive patients, CT was done. 41 was positive and inconclusive was 11. Other diagnosis was 15. In the 41 CT positive patients, histo pathological examination became positive for 39 and negative for 2.

Conclusion

In this study clinically suspected cases of acute appendicitis were taken and the sensitivity and the specificity of USG and CT in diagnosing acute appendicitis was studied and also the combined efficacy was studied and further confirmed and correlated with the post-operative HPE. The results of USG was sensitivity 65% and the specificity 77%. The results of CT was sensitivity 91% and the specificity was 92%. On combining USG with CT (When USG was inconclusive) the sensitivity was 98% and the specificity was 70%. Hence, we conclude:

1. CT is the best in diagnosing acute appendicitis
2. Clinical examination is more important in diagnosis.
3. USG is resorted when findings are equivocal.
4. If USG is not in favour of our clinical diagnosis, then doing CT is the next best option.
5. So acute appendicitis is diagnosed by clinical, sonographical, and Radiological methods combined.

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