

Comparative Evaluation of the Role of Sonography in Diagnosis of Acute Appendicitis versus Surgeon's Clinical Impression

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A randomly selected group of patients presented in Accidents & Emergency department of Jinnah hospital Lahore with complaint of acute lower abdominal pain were subjected to abdominal sonography and those positive for acute appendicitis on ultrasound examination were operated. Another group of randomly selected patients with acute lower abdominal pain in Emergency department were clinically evaluated for acute appendicitis and surgery was done based on clinical impression (history and classical signs for acute appendicitis). Ultrasound examination showed the following parameters. Sensitivity 71.8%, specificity 62.5%, PPV 88.4%, NPV 35.7%. Clinical evaluation showed the sensitivity of 95.2%, specificity 77.7%, PPV 90.9%, NPV 87.5%. It was concluded on the basis of the results that clinical evaluation of the patient is more sensitive in correctly categorizing those who need appendectomy than the ultrasound examination. Although the latter can be used in suspected cases and to rule out other pathological conditions resulting in acute abdomen. Limitations: Clinical judgment to a large extent rest on the experience and expertise of the surgeon and so is the quality of sonographic results, which depend on experience of sonographer & quality of ultrasound machine.

Key words: Sonography, acute appendicitis, clinical impression

Appendicitis is present since the time immortal. It is the most common cause of emergency surgery throughout the world. It is routinely diagnosed clinically, however vague symptomatology sometimes pose problems in diagnosis and put the clinician in a diagnostic dilemma to operate or to adopt the policy of wait and see. Failure to operate at times may result in perforation leading to excessive morbidity and mortality on one hand while unnecessary surgery and removal of normal appendix may result in additional cost and inconvenience to the patient in addition to complications of surgery such as wound infection, DVT & chest infection.

Literature Review:

The history of appendicitis dates back to centuries when adhesions in right iliac fossa in an Egyptian mummy in the Byzantine era suggested old appendicitis. In 1735, Claudius Amyand performed the first appendectomy of a boy who presented with a discharging sinus. The appendix was found to be perforated on surgery. Appendectomy was done & the boy made remarkable recovery¹.

Lehman used ultrasound for abdominal & pelvic pathologies in 1960s. Its use for diagnosis of appendicitis started in 1980s and progressively the results obtained were good enough for surgeons to rely upon in doubtful cases².

Study Objective

To compare sonographic findings with the clinical judgment of surgeons in diagnosis of acute appendicitis.

Research Methodology

Patients randomly chosen who presented in Accident's & Emergency department of Jinnah hospital Lahore with

acute abdomen were clinically evaluated for acute appendicitis & those with strong clinical suspicion were subjected to laprotomy. Another group of randomly selected patients also with acute abdomen were send for ultrasonography & those with positive findings were operated for acute appendicitis.

Results

Cross tabulation between surgeon's clinical impression and surgical findings for acute appendicitis

Clinical impression	Surgically proved appendicitis	Normal appendix on surgery	Total
Positive	20 Tp (a)	2 Fp (b)	22
Negative	1 Fn (c)	7 Tn (d)	8
Total	21	9	30

Tp = true positives

Tn = true negatives

Fn = false negatives

Fp = false positives

$$\text{Sensitivity} = \frac{a}{a+c} \times 100 = \frac{20}{21} \times 100 = 95.2\%$$

$$\text{Specificity} = \frac{d}{b+d} \times 100 = \frac{7}{9} \times 100 = 77.7\%$$

$$\text{PPV} = \frac{a}{a+b} \times 100 = \frac{20}{22} \times 100 = 90.9\%$$

$$\text{NPV} = \frac{d}{c+d} \times 100 = \frac{7}{8} \times 100 = 87.5\%$$

Sensitivity of ultrasonography in diagnosis of acute appendicitis was 71.8% as compared to clinical evaluation with sensitivity of 95.2%. Sensitivity is the ability of the test to accurately categorize those who suffer from a disease.

Specificity of ultrasonographic test was 62.5% as compared to clinical evaluation with specificity of 77.7%.

Specificity is the ability of the test to correctly categorize those who do not suffer from a specific disease or condition in question.

Cross tabulation between ultrasonographic findings and surgical findings for acute appendicitis

Ultrasonographic test result	Surgically proved appendicitis	Normal appendix on surgery	Total
Positive	23 Tp (a)	3 Fp (b)	26
Negative	9 Fn (c)	5 Tn (d)	14
	32	8	40

Tp = true positives
 Tn = true negatives
 Fn = false negatives
 Fp = false positives
 Sensitivity = $\frac{a}{a+c} \times 100 = 71.8\%$
 Specificity = $\frac{d}{d+b} \times 100 = 62.5\%$
 PPV = $\frac{a}{a+b} \times 100 = 88.4\%$
 NPV = $\frac{d}{d+b} \times 100 = 35.7\%$

Positive predictive value for ultrasonographic examination was 88.4% and for clinical diagnosis was 90.9%. PPV is the likelihood of having the disease when test results are positive. It is more important from a clinician's point of view.

Negative predictive value for ultrasonography was 35.7% and for clinical assessment was 87.5%. NPV is the

likelihood of not having the disease in question when test results are negative.

Discussion

Parameters for clinical evaluation that is, Sensitivity, Specificity, PPV, NPV are all high as compared to the ultrasonographic examination indicating that the diagnosis of acute appendicitis based on clinical judgment is far superior than diagnosis based on sonography. However the PPV of ultrasonography is also high showing that the technique can be used reliably for those who test positive. Ultrasonographic findings to a large extent depend on the experience of sonographer, the quality of machine and probe and the position of appendix.

It is therefore concluded that it can be used as a supportive technique where it is available free of cost. However the diagnosis should primarily rest on clinical judgment. Sonographic evaluation can be done to rule out other abdominal conditions mimicking the symptoms of acute appendicitis when the surgeon is in doubt.

References

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