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STUDY ON DIFFERENT DIAGNOSTIC VALUES [USG, TWBC AND SERUM AMYLASE] IN ACUTE APPENDICITIS

KEYWORDS: USG ABDOMEN,TLC,SERUM AMYLASE ,ACUTE APPENDICITIS

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ABSTRACT *Aims and Objectives The aim of this study is to review different diagnostic methods (USG, TWBC and Serum Amylase) and to evaluate its feasibility and usefulness in diagnosing acute appendicitis.*

Methodology

- *A study of 50 patients presenting with pain abdomen and diagnosed provisionally as acute appendicitis, was undertaken.*
- *Depending on individual presentation of symptoms and sings the USG abdomen, Total Count and Serum Amylase was done for each case of suspected acute appendicitis.*
- *Depending on the severity of the condition and according to the investigation the patients were treated and operated.*
- *The surgical specimens were sent for HPE, an attempt was made to correlate the investigation modalities with pathological findings.*
- *The results of diagnostic methods, operative measures and HPE were reviewed.*

RESULTS AND OBSERVATION

- *In our study males were predominant in number, in the ratio of 3:2 with females. Out of 50, who were operated, 45 had appendicitis and 5 had normal appendix.*
- *Sensitivity of each diagnostic method was calculated and it was found that sensitivity of USG abdomen was 77.7%, sensitivity of WBC was 73.33% .*
- *Sensitivity of Serum amylase was 8%,this signifies that there is no role of Serum amylase in diagnosing appendicitis though they were slightly increased in 4 appendicular perforation cases and it differentiates complicated appendicitis from uncomplicated appendicitis.*

CONCLUSION :

Different diagnostic values which included USG, WBC have shown to be effective as basic routine investigations necessary for diagnosing Acute Appendicitis .S.Amylase is not significant to diagnose the appendicitis, but it differentiates complicated appendicitis from uncomplicated appendicitis.

The sensitivity of USG abdomen signifies its diagnostic value in diagnosing Appendicitis, TWBC alone is not diagnostic criteria for appendicitis, but still it is a helpful investigation in decision making regarding appendicitis especially in doubtful cases.

INTRODUCTION

Acute appendicitis is the most common surgical cause of emergency laparotomy. Simple appendicitis can progress to perforation, which is associated with a much higher morbidity and mortality, and surgeons have therefore been inclined to operate when the diagnosis is probable rather than wait until it is certain. The surgical principle about acute appendicitis "when in doubt take it out" is not correct in view of the number of major and minor complications following appendicectomy. Despite more than 100 years experience accurate diagnosis still evades the surgeon. Owing to its myriad presentation acute appendicitis is a common but difficult diagnostic problem. The accuracy of the clinical examination has been reported to range from 71% to 97% and varies grately depending on the experience of the examiner. However, because missed ruptured appendixes have direct consequences surgeons have traditionally accepted a 20% rate of negative appendectomy (Removal of a normal appendix in patient with other causes of abdominal pain) is reported to be between 20% and 30%.

The classical signs and symptoms of acute appendicitis were first reported by Fitz in 1886.[1] Since then it has remained the most common diagnosis for hospital admission requiring laparotomy. Approximately 6% of the population will suffer from acute appendicitis during their lifetime therefore much effort has been directed toward early diagnosis and intervention. This effort has successfully lowered the mortality rate to less than 0.1% for non complicated appendicitis, where there is gangrene and perforated cases 8%. The diagnosis of appendicitis can be difficult. Occassionally taking the diagnostic skills of even the most experienced surgeons. Equivocal cases usually require in patient observation. This delay in diagnosis may increase the morbidity and costs. Attempts to increase the diagnostic accuracy in acute appendicitis have included computer aided diagnosis, imaging by ultrasonography, laparoscopy and even radioactive isotope imaging and to evaluate the elevated serum amylase levels in acute appendicitis and gangrenes or perforated cases.

MATERIAL AND METHODOLOGY

A prospective study of 50 patients who were ill enough to warrant surgery for suspected appendicitis admitted in PIMS & Hospital, Karimnagar under various surgical units was conducted during a period from August 2009 to October 2011.

INCLUSION CRITERIA

Patient coming to hospital with pain abdomen and diagnosed provisionally as acute appendicitis and are willing for surgery are included in the study.

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EXCLUSION CRITERIA

Patient coming to hospital with pain abdomen along with distension of abdomen.

Pregnant females.

Any mass per abdomen

Patient with previous history of any abdominal surgeries.

Pancreatitis

Patient not willing for surgery.

Depending on individual presentation of sings and symptoms, USG abdomen, total WBC count, Serum Amylase was done for each case of suspected appendicitis.

The surgical specimens were sent for HPE, an attempt was made to correlate the investigation modalities with pathological findings.

The results of diagnostic methods, operative measures and HPE were reviewed.

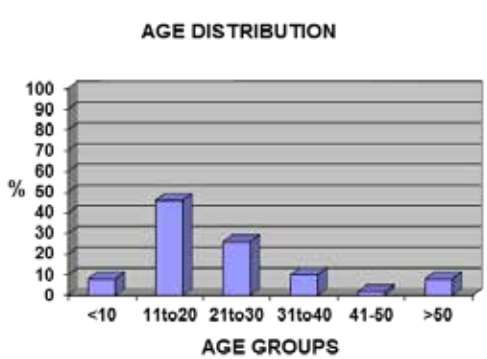
OBSERVATION & RESULT

STUDY DESIGN :

A prospective clinical study consisting 50 acute abdomen cases that were ill enough to warrant surgery for suspected appendicitis to evaluate the sensitivity of USG abdomen, total WBC count and any elevated S.amylase levels in appendicitis cases.

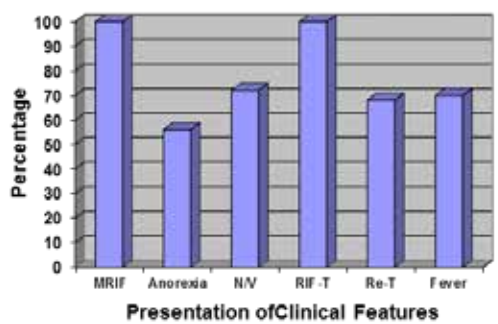
Age distribution with sex

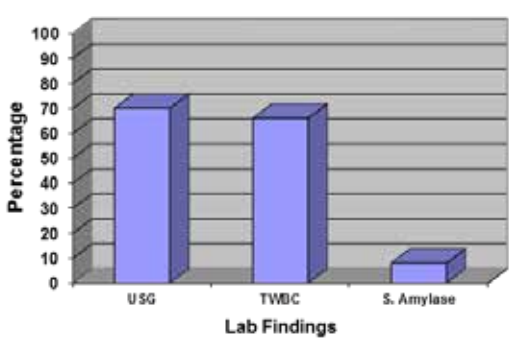
Age in years	Male	Female	Total
</=10	2	2	4
11-20	16	7	23
21-30	5	8	13
31-40	3	2	5
41-50	1	0	1
>50	3	1	4
Total	30	20	50
Inference:	72% of the cases are in the age group of 11-30 years.		



Presentation of clinical features

Clinical features	Number /%
SYMPTOMS	
Migratory RIF pain	100%
Anorexia	56%
Nausea / Vomiting	72%
SIGNS	
RIF Tenderness	100%
Rebound Tenderness	68%
Fever	70%
Lab Findings	
Leucocytosis	66%
USG Findings	70%
Amylase	8%





Results of USG abdomen, TWBC count and S. Amylase levels

Diagnostic tests	Male	Female	**Children**
USG abdomen Positive (35)	19	12	4
USG Negative but Probe Tenderness Positive (15)	6	9	0

Total WBC Count	Male	Female	**Children**
Increased (33)	19	12	2
Normal (17)	10	5	2

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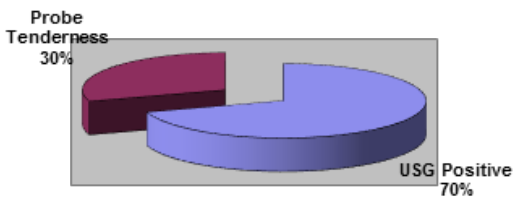
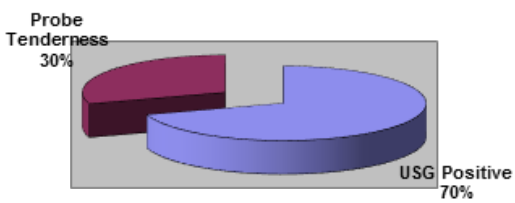
S. Amylase	Male	Female	Children
Increased (4)	2	0	2(F)
Normal (46)	26	18	2

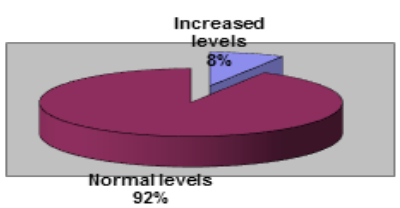
USG ABDOMEN



USG ABDOMEN



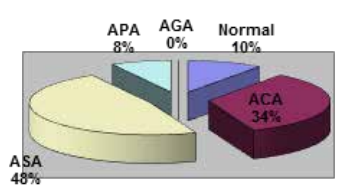
Serum Amylase Levels



Pathological diagnosis of the specimen of Appendix Sent for histopathological Examination

Histopathology	Number	%
Normal	5	10%
Ac. Catarrhal	17	34%
Ac. Suppurative	24	48%
Ac. Perforative	4	8%
Ac. Gangrenous	0	0%

RESULTS OF HPE



Results of Different Diagnostic Values on operated Patients

Diagnostic method	No. of Patients	Appendicitis	Not visualized, probe tenderness present	Other diseases
USG ABDOMEN	50	35	15	0

Diagnostic method	No. of Patients	Increased	Normal
TOTAL COUNT	50	33	17

Diagnostic method	No. of Patients	Increased	Normal
SERUM AMYLASE	50	04	46

Different Diagnostic values in Acute Appendicitis

Diagnostic methods	Appendicitis	Normal Appendix	P Value	OR
USG	35	0	0.0003	1
TOTAL COUNT	32	1	0.02	0
S.AMYLASE	4	0	0.4	0

Inference

USG Abdomen was significant (p value 0.0003) to diagnose the appendicitis, TWC also significant (p value 0.02) but alone it is not diagnostic, but still helpful in decision making regarding appendicitis. S.Amylase is not significant to diagnose the appendicitis, but it differentiates complicated appendicitis from uncomplicated appendicitis.

DISCUSSION

Acute appendicitis remains a common abdominal emergency throughout the world. The diagnosis of acute appendicitis continues to be difficult due to variable presentation of diseases.

Though there are lots of advances in diagnostic field with the invention of sophisticated investigations, a thorough clinical examination with basic investigations like USG, WBC count remains cornerstone in the diagnosis of acute appendicitis.

USG abdomen is most reliable and easy method to diagnose acute appendicitis as most surgeons relay on it as it can make out non compressible inflammed appendix with increased vascularity[2,3,4] based on which most of the cases are posted for appendicectomy if patient is willing.

Total WBC count is other basic investigation where its elevated levels and pain in RIF go in favour of acute appendicitis after excluding other diseases. In appendicitis cases also there are chances of TWBC count being normal, because of antibiotics use before admission.

If in USG abdomen where appendix is not visualized but with probe tenderness positive in RIF can be taken as appendicitis after excluding other diseases(mesenteric lymphadenitis, meckel's diverticulitis, twisted ovarian cyst).

The present study was made to highlight the relation of increased serum amylase with respect to acute appendicitis which was increased in few cases of appendicular perforation, it differentiates complicated appendicitis from uncomplicated appendicitis.

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The age group in which acute appendicitis occurred commonly was between 11 and 30 years. .

In the present series the males outnumbered females in the ratio of 3:2.

Pain was the commonest presenting symptom and has been observed in all the cases (100%) in the present series. The classical shifting pain from umbilical region to RIF was seen in all patients.

Next common symptoms observed were nausea / vomiting in 86% of case of cases and anorexia in 74% if cases.

Burning micturition was seen in 6% and bowel disturbance was seen in the form of constipation (8%) and diarrhea (10%).

Majority of the patients had aching type of pain and some (8%) had colicky pain.

Fever was low grade with corresponding rise in pulse rate and was present in 70% of cases.

Majority of the patients presented within 24 hrs after the onset of pain, with most of them presenting between 12-24 hrs of onset of pain.

On clinical examination, tenderness at Mc Burney's point was commonest sign (100%). Guarding was present in 20% of patients. It was present when the inflammation was severe. Rebound tenderness was present in 68%. In these cases, there was presence of local peritonitis or when inflamed appendix was more anteriorly palced. Abdominal rigidity in 8% was due to performed appendix or gangrenous appendix.

Rovsing's sign was positive in 14%. This sign is seen whenever there is inflammation in the RIF. Psoas test was positive in 6% cases, whereas Obturator test was positive in 24% due to retrocaecal appendix.

Hypersthesia was present in 8%, rectal tenderness in 6%. 4% had appendicular mass.

The present study the TLC was increased in 66%, and it was within normal range in 34%.

Plain X-ray abdomen taken in erect posture showed, ground glass appearance in 4 patients, suggestive of diffuse peritonitis, 4 patients had fluid levels localized to the ceacum. Free gas under diaphragm was not present in the cases with perforated acute appendicitis. In none of the patients, faecoliths casting a radio-opaque shadow could be diminished.

For assessment, the patients were categorized into 3 groups namely, male, female and children. Out of 50- cases studies, 28 were male's 18 were females and 4 were children (<10 years).

In USG Abdomen, out of 28 males 17 showed inflamed appendix and 2 showed appendicular perforation with periappendicular collection and out of 18 females 12 showed inflamed appendix, out of 4 children 2 children showed inflamed appendix and another 2 children showed appedicular perforation and correlated with HPE..

All these cases were operated in order to prevent complications(gangrene and perforation) as it was advocated by some people that the policy of "open and see"is better than "wait and see"[5] as an unnecessary operation is better than unnecessary perforation.

The biopsy shows mucosal ulceration with exudates and submucosal lymphoid hyperplasia along with neutrophilic infiltrate inside muscle along with subserosal congestion.

Out of 50 patients ,in 6 males and 9 females appendix was not visualized but Probe tenderness was Positive in RIF, they were observed for 3 days, as they were not improved symptomatically, they were taken for surgery and correlated with HPE.

In those HPE showed 10 inflamed appendix, 5 normal appendix (2 males & 3 females).

Out of 50 patients 33 showed elevated Total WBC and 17 were normal ,all these cases were operated because they were having Nausea and Pain in RIF, correlated with HPE.

Out of 50 patients 46 showed normal amylase levels (lower limit 46 IU/L)and 4 showed slightly increased Serum Amylase levels (upper limit 164 IU/L), correlated with HPE and 4 were having perforated appendix.

Result of our Series
USG Abdomen with HPE

USG	Appendicitis	Normal Appendix	**Sensitivity**
POSITIVE	35	0	77.7%
NEGATIVE	10	5	Specificity 100%

TWBC with HPE

TWC	Appendicitis	Normal Appendix	**Sensitivity**
INCREASED	32	1	71.1%
NORMAL	13	4	Specificity 80%

SERUM AMYLASE with HPE

AMYLASE	APPENDICITIS	Normal Appendix	**Sensitivity**
INCREASED	4	0	8%
NORMAL	41	5	Specificity 100%

- A study of TOKAI[5] et al in diagnosing acute appendicitis by USG Abdomen showed its sensitivity and specificity as 87.3%, 98.5% respectively.

- In our study in diagnosing appendicitis by USG Abdomen the sensitivity was 77.7% and specificity was 100%.

- A Study of Wu et al reported that TLC may serve as predictive parameter for early diagnosis of acute appendicitis in children.

- Another study of Yang et al[6,7,8] reported that TLC, neutrophils and CRP are helpful in diagnosing of acute appendicitis.

- A study of Ayub Medical College, Abbottabad, the sensitivity and specificity of TLC was 76.5% and 73.7%.

- In our study the sensitivity and specificity of TLC was 73.3% and 80%.

- A study of PGIMS, Rohtak, 25% cases of acute appen-

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dicitis shows mild elevation of serum amylase.

• A Study of Burnet and Ness[9] also reported similar findings. In our study 8% cases of acute appendicitis shows mild elevation of amylase levels.

In our present study the usefulness of basic investigations like USG Abdomen in diagnosing appendicitis ,its role in confirming our clinical diagnosis and ruling out other diseases have been highlighted. TWBC is another diagnostic method which alone is not diagnostic criteria for acute appendicitis because of its low sensitivity and specificity but still it is a helpful investigation in decision making regarding appendicitis in doubtful cases. Serum amylase also not a diagnostic criteria for diagnosing appendicitis but it differentiates complicated appendicitis from uncomplicated appendicitis. All these 3 basic investigations have been highlighted instead of going for sophisticated diagnostic procedures (CT Abdomen)[10] which are cost effective. In women compared to men still negative appendicectomies are high due to differential diagnosis which can be prevented by laparoscopy[11].

CONCLUSIONS

Diagnosis of acute appendicitis mainly depends on clinical features, clinical examination and basic investigation like USG, TWBC.

USG abdomen shows the site and disease of the appendix and is confirmatory in diagnosing appendicitis and also helps surgeon in decision making regarding incision during appendicectomy..

TWBC is increased in acute conditions (inflamed and perforated) and may be found Normal, because of antibiotic use.

In cases where appendix was not visualized in USG, but probe tenderness positive in RIF (excluding meckels diverticulitis, mesenteric lymphadentis & twisted ovarian cyst) such cases were taken for surgery to prevent complications.

Serum amylase levels do not have any diagnostic value in diagnosing acute appendicitis though slight increase in their levels are found in few appendicular perforation, it differentiates complicated appendicitis from uncomplicated appendicitis.

By using these basic investigations along with clinical examination it is easy to diagnose appendicitis which is cost effective.

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