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Acute Abdomen (Atraumatic) : A Comparative Analysis of Clinical, Radiological And Operative Findings in A Rural Setup

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Abstract
Introduction: *Acute abdomen refers to signs and symptoms of abdominal pain and tenderness, a clinical presentation usually treated best by emergency surgical therapy.The proper management of patients with acute abdomen requires a timely decision about need of surgical procedure. Very often an accurate diagnosis cannot be made without surgery. A study was conducted to assess the association between clinical, radiological and operative findings in a case of atraumatic acute abdomen and thus to evaluate clinical diagnostic accuracy and radiological diagnostic accuracy.*
Materials and Methods:*Fifty patients with atraumatic acute abdomen who underwent surgical intervention at KVGMC&H were included in the study. Patient's clinical, biochemical and radiological data was collected prospectively and was compared to final intraoperative diagnosis.*
Results:*The highest incidence is seen in age group of 11-30yrs. Majority of them were males. Total white cell count had a sensitivity of 92.86% and specificity of 31.8% Acute appendicitis (58%) is the commonest cause of acute abdomen followed by perforation of hollow viscus (34%), Intestinal obstruction (4%), Meckel's Diverticulitis (2%), Liver Abscess (2%). Sensitivity and Specificity of clinical diagnosis in diagnosing appendicular pathology were 96.5% and 95.2% respectively. Sensitivity and Specificity of clinical diagnosis in diagnosing hollow viscous perforation was 100% and 96.9% respectively. Sensitivity and Specificity of plain X-ray abdomen in diagnosing hollowviscous perforation was 94.1% and 96.9% respectively. Sensitivity and Specificity ofultrasonogram in diagnosing appendicular pathology was 93.1% and 95.2% respectively. Sensitivity and Specificity of plain x-ray abdomen in diagnosing intestinal obstruction was 100% and 100% respectively.*
Conclusion: *Plain X-ray abdomen was useful in cases of hollow viscus perforation and intestinal obstruction. Ultrasonogram was more accurate in case of acute appendicitis and was contributory in diagnosis of intestinal obstruction.Apart from clinical diagnosis, the laboratory tests and radiological investigations were complimentary to arrive at anaccurate diagnosis of acute abdomen.*

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I. introduction

"The term acute abdomen refers to signs and symptoms of abdominal pain andtenderness, a Clinicalpresentation that often requires emergency surgical therapy".[1]The term acute abdominal pain generally refers to previously undiagnosed painthat arises suddenly and is of less than 7 days (usually less than 48 hours) duration.[2]Itmay be caused by a great variety of intra peritoneal disorders, many of which call forsurgical treatment, as well as by a range of extra peritoneal disorders,[1] which typically donot call for surgical treatment. Abdominal pain that persists for 6 hours or longer isusually caused by disorders of surgical significance.Acute abdomen' encompasses a spectrum of surgical, medical and gynaecological conditions ranging from trivial to life threatening conditions, which require hospitaladmission, investigations and treatment. Acute abdominal conditions occupy one of thefew areas of medical practice where the surgeon often reaches a clinical diagnosiswithout resorting to numerous investigations. The accurate diagnosis and management ofpatients with acute abdominal pain remains one of the most challenging tasks for thesurgeons. The wide range of causes and the varied spectrum of patient presentation posea formidable diagnostic and therapeutic challenge.[4]

Clinical history and physicalexamination are rarely sufficient to establish a definite diagnosis and imaging is usuallynecessary.[5]Historically diagnosis of the causes of acute abdominal pain hasbeen based largely on pattern recognition, in which clinicians attempt to match newcases to pre-existing stereotypes (so-called classic presentations) of various diseases.Certainly knowledge of these classic presentations is basic to successful diagnosis. Thepatients history of pain combined with a careful clinical examination still plays animportant role in detecting appendicitis among patients with acute abdominal pain[9] but itis crucial to remember that at least one third of patients with acute abdominal painexhibit atypical features that render pattern recognition unreliable.[5][7]

Hence, it is always advantageous to do an early surgery than a delayed surgery.The investigative procedures involved should be such that, they should give a definitediagnosis in a short time. And once diagnosis is made the method of management of thepatient holds prime importance.[8]Accurate pre operative diagnosis of acute abdomenremains challenging despite good history and clinical examination and improvement innew imaging techniques including Ultrasonography.In this paper, the objective is to study atraumatic acute abdomen, thevarious clinical patterns that help to make a clinical diagnosis and effectiveness ofradiological investigations in diagnosing acute abdomen and its influence on clinicaldecision making.

II. Aims And Objectives

1. To study the incidence of non-traumatic acute abdominal emergencies.
2. To assess the association between clinical, radiological and operative findings ina case of atraumatic acute abdomen and thus evaluate clinical diagnostic accuracyand radiological diagnostic accuracy.
3. To assess the effectiveness of radiological investigations in diagnosing acuteabdominal conditions.

III. Materials And Methods

This study is carried out in the department of general surgery, KVG MedicalCollege & Hospital, Sullia, Karnataka.Fifty patients with atraumatic acute abdomen who underwent surgicalintervention at KVGMC&H were included in the study. Patient‟s clinical, biochemicaland radiological data was collected prospectively. Written consent of the patient wasobtained prior to enrolment in the study.

Inclusion criteria

Patients with non-traumatic acute abdomen.
Surgical intervention with in 24 hours.

Exclusion criteria

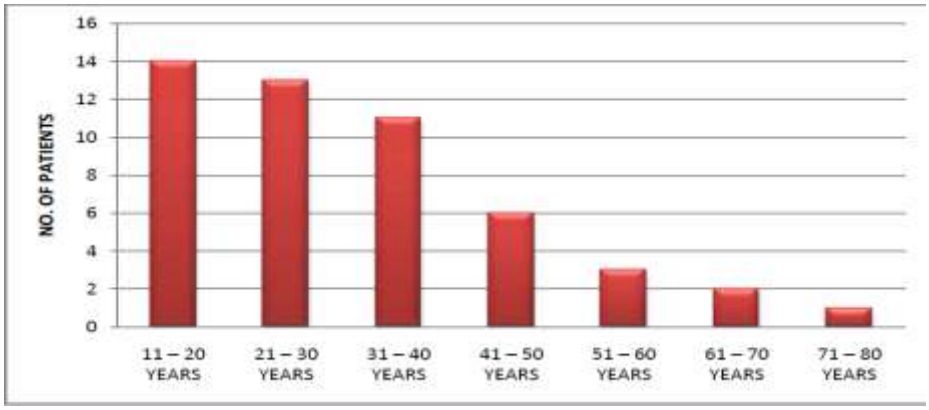
Acute abdomen secondary to trauma (blunt and penetrating injury)
Acute abdomen who did not undergo surgical intervention
Acute abdomen due to urological or gynecological causes
Age < 10 years

Data was systematically collected as per pre-designed proforma. The proforma included relevant history, physical examination, appropriate investigations, treatment,and post-operative follow-up. Routine blood investigations such as Haemoglobinpercentage, Total WBC count, Blood Urea and Serum Creatinine; radiologicalinvestigations such as X-ray of supine and erect abdomen, and Ultrasonogram ofabdomen were recorded. Three common conditions (acute appendicitis, hollow viscusperforation, and intestinal obstruction) were evaluated and sensitivity, specificity(accuracy), and positive predictive value were calculated for clinical diagnosis andradiological diagnosis.

IV. Observations And Results

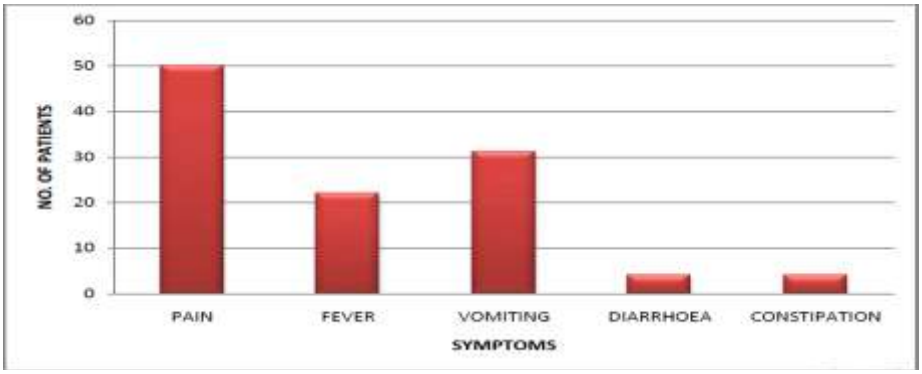
Age distribution

Age	No. of patients	Percentage
11 – 20 years	14	28%
21 – 30 years	13	26%
31 – 40 years	11	22%
41 – 50 years	6	12%
51 – 60 years	3	6%
61 – 70 years	2	4%
71 – 80 years	1	2%
Total	50	100%



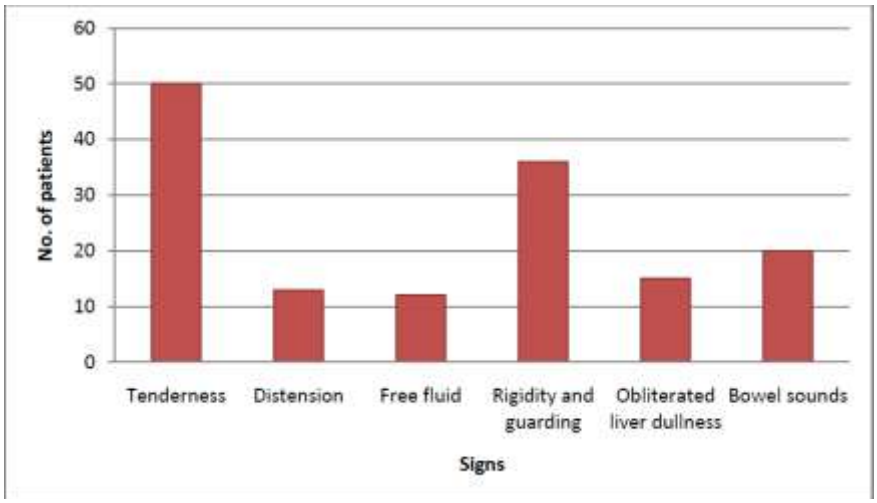
Symptom profile of patients admitted with acute abdomen

Symptoms	No. of patients	Percentage
Pain	50	100%
Fever	22	44%
Vomiting	31	62%
Diarrhoea	4	8%
Constipation	4	8%



Examination findings (signs) of patients with acute abdomen

Clinical findings	No. Of patients	Percentage
Tenderness	50	100%
Distension	13	26%
Free fluid	12	24%
Rigidity and guarding	36	72%
Obliterated liver dullness	15	30%
Bowel sounds	20	40%



Correlation of raised white cell count with intraoperative diagnosis of appendicitis and others

WBC count	Appendicitis +	Appendicitis -	Total
> 11,000	26	15	41
< 11,000	2	7	9
Total	28	22	50

Chi square value = 5.08
df=1
p= 0.024 (significant)
SENSITIVITY = (26 / 28) x 100 = 92.86 %
SPECIFICITY = (7 / 22) x 100 = 31.81 %
POSITIVE PREDICTIVE VALUE = (26 / 41) x 100 = 63.41 %
NEGATIVE PREDICTIVE VALUE = (7 / 9) x 100 = 77.78 %

Clinical correlation of appendicitis compared to intraoperative findings

Clinical	Intraoperative findings		Total
	Appendicitis +	Appendicitis -	
Appendicitis +	28	1	29
Appendicitis -	1	20	21
Total	29	21	50

Sonological correlation of Appendicitis with intraoperative findings

USG	Intraoperative findings		Total
	Appendicitis +	Appendicitis -	
Appendicitis +	27	1	28
Appendicitis -	2	20	22
Total	29	21	50

Sensitivity = (27 / 29) x 100 = 93.10 %
Specificity = (20 / 21) x 100 = 95.23 %
Positive predictive value = (27 / 28) x 100 = 96.42 %
Negative predictive value = (20 / 21) x 100=90.91 %

Radiological correlation of Perforated Peritonitis (PP) compared to intraoperative Findings

Radiological	Intraoperative findings		Total
	PP +	PP -	
PP +	16	1	17
PP -	1	32	33
Total	17	33	50

Sensitivity =(16 / 17) X 100= 94.11 %
Specificity = (32 / 33) X 100 = 96.97 %
Positive Predictive Value = (16 / 17) X 100= 94.11 %
Negative Predictive Value = (32 / 33) x 100= 96.97 %

Clinical correlation of Perforated Peritonitis (PP) with intraoperative Findings

Clinical Findings	Intraoperative findings		Total
	PP +	PP -	
PP +	17	1	18
PP -	0	32	32
Total	17	33	50

Sensitivity = (17 / 17) X 100= 100 %
Specificity = (32 / 33) X 100 = 96.97 %
Positive Predictive Value = (17 / 18) X 100= 94.44 %
Negative Predictive Value = (32 / 32) X 100= 100 %

Clinical correlation of intestinal obstruction (IO) compared withintraoperative findings

Clinical Findings	Intraoperative findings		Total
	IO +	IO -	
IO +	2	1	3
IO -	0	47	47
Total	2	48	50

Sensitivity =(2 / 2) x 100 = 100 %
Specificity = (47 / 48) x 100= 97.91 %
Positive predictive value = (2 /3) x 100= 66.66 %
Negative predictive value = (47 / 47) x 100= 100 %

Radiological correlation of intestinal obstruction (IO) withintraoperativeFindings

Radiological Findings	Intraoperative findings		Total
	IO +	IO -	
IO +	2	0	2
IO -	0	48	48
Total	2	48	50

Sensitivity = (2 / 2) x 100 = 100 %
Specificity = (48 / 48) x 100= 100 %
Positive predictive value =(2 / 2) x 100= 100 %
Negative predictive value = (48 / 48) x 100= 100 %

V. Discussion

The highest incidence of atraumatic acute abdomen was observed in 10-30 years of age (54%). Male preponderence was observed. In all patients pain abdomen was the presenting symptom (100%) and 62% of patients also complained of nausea and vomiting,44% had mild to moderate fever.On physical examination tenderness was present in all patients followed by rigidity and guarding (72%).Total leukocyte count was raised in 41 out of 50 patients. Sensitivity and specificity of raised white cell count in an acute abdomen was 92.8% and 31.8%.Plain X-ray abdomen was done in 20(40%) patients of which gas under diaphragm was present in 17(34%) and air fluid level in 2(4%).It is more helpful in hollow viscus perforation and intestinal obstruction.

Ultrasonogram was done in 33(64%) patients and it has positive findings in 30(60%) patients. It is more accurate in patients with Acute Appendicitis.Final diagnosis was derived from Intraoperative finding, acute appendicitis(58%) was the commonest cause of acute abdomen followed by perforation of hollow viscus(34%), intestinal obstruction(4%), Meckel‟s diverticulitis (2%) and liver abscess(2%).Apart from clinical diagnosis the laboratory tests and radiological investigationsare complimentary to arrive at an accurate diagnosis of acute abdomen.

VI. Conclusion

1. Acute appendicitis was the most common cause of acute abdomen followed by hollow viscus perforation
2. 27(54%) of our patients fall into age group of 11-30years.
3. Total white cell count had a sensitivity of 92.86% and specificity of 31.8%% when correlated with clinical diagnosis of acute appendicitis.
4. Plain X-ray abdomen was useful in patients with hollow viscus perforations and intestinal obstruction. There was no need to do plain X–ray of abdomen in all patients with acute abdomen.
5. Ultrasonogram was more accurate in diagnosing acute appendicitis.
6. CT abdomen may be selectively useful if there is diagnostic dilemma following ultrasound abdomen..
7. Apart from clinical diagnosis the laboratory tests and radiological investigationsare complimentary to arrive at an accurate diagnosis of acute abdomen.

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