CLINICAL AND RADIOLOGICAL DIAGNOSIS IN ACUTE ABDOMINAL EMERGENCIES
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ABSTRACT: BACKGROUND: Acute abdominal pain is a common presentation that requires immediate management. It includes traumatic and non-traumatic conditions of abdomen and if not diagnosed and treated promptly in the golden hours, it can lead to high mortality rate. Hence, this study was undertaken to correlate different modes of diagnosis which helps in deciding the immediate line of management proved to be lifesaving. OBJECTIVES: To analyse and compare the efficacy of clinical and radiological methods in early diagnosis of acute abdominal conditions. MATERIALS AND METHODS: This study includes patients admitted in emergency wards of Shadan General and Teaching Hospital, Hyderabad. Total 100 cases were included in this study who presented with acute abdomen. After thorough clinical examination they were subjected to Plain X-ray Abdomen and Ultrasonography of abdomen and pelvis. RESULTS: All 100 patients were thoroughly evaluated clinically and subjected to Plain X-ray abdomen with Ultrasonography of abdomen. Acute Abdomen was most common in age group between 20-40 years with male predominance. Acute appendicitis was the most common cause of surgical condition, followed by Peritonitis and then Intestinal Obstruction. The diagnostic accuracy rates in male and female patients were 93% and 80% respectively. Ultrasonography had highest sensitivity rate (97.8%) and plain X-ray abdomen had highest specificity rate (88.4%). CONCLUSION: Each of these diagnosing methods in acute abdomen are complementary to each other. With efficient clinical acumen and using ultrasonography and X-ray abdomen as basic diagnostic investigations, one can do early diagnosis with 97% to 99% accuracy and thus can avoid unnecessary operations. KEYWORDS: Acute Abdomen, Ultrasonography, Plain X-ray Film.

INTRODUCTION: “Without precision there is no perfection” this statement holds much truth in the field of medical science in the diagnosis and management of acute diseases of abdomen. Abdominal pain is a common presentation to emergency department. It is vital that physician has an understanding with the presentations of common diseases of acute abdomen.[¹] Diagnosis of acute abdominal conditions in many instances is challenging and complex.

Acute abdomen forms bulk of emergencies in surgical practice often taxing diagnostic acumen regardless of the experience of the surgeon. Preoperative diagnosis of acute abdomen is crucial to minimize the morbidity and mortality where the diagnostic facilities are limited.[²] Prognosis of acute Abdomen for both traumatic and non-traumatic origin depends largely on early diagnosis.

It has been said that one can be accurate only upto 30% even if the surgeon is highly skilled and most experienced in clinical diagnosis. The complexity of the entity known as acute abdomen is such that a careful, methodical diagnostic approach is necessary in order to arrive at a correct diagnosis. Preoperative accurate diagnosis prevents from unnecessary laparotomies and results in reducing negative operations.[³]
In the past 20 years, the ability to accurately determine intra-abdominal pathologic process by radiological imaging has allowed earlier and more accurate diagnosis. Previous studies have shown that a considerable volume of diagnostic errors would be reduced by paying more attention to diagnosis before laparotomy.[4] In earlier part of 20th Century, plain X-ray of abdomen was the only investigation which was introduced as a diagnostic tool in clinical practice even though x-rays are shadows and not true images. Plain X-rays were found to be useful in 40% of acute abdominal cases.

Plain Abdominal films generally are not recommended unless other conditions like perforations of gastrointestinal tract, intestinal obstructions and ureteral calculus are suspected on clinical assessment.[5] Due to tremendous advancements in technology, more diagnostic tools like ultrasonography, MRI, CT Scan have proved to be more sensitive in its accuracy to arrive at early diagnosis.

So, with this view a study was planned to analyse and evaluate the findings of clinical examination, findings of plain X-ray abdomen and ultrasonography in diagnosing acute abdominal emergencies. Improvement in the surgeon’s power of decision making is the basic pivot of disease diagnosis and therapy, particularly in developing countries with limited diagnostic facilities.[2]

In India and other developing countries where availability of MRI and CT scan in remote areas and affordability of these investigations by poor patients become hindrance to achieve early diagnosis in acute abdomen conditions that is the reason only plain x-ray and ultrasonography was included apart from clinical assessment which is affordable and relatively available across the country. This study can be helpful for those surgeons who are working in developing countries and striving to deliver their best performance with minimal diagnostic tools to manage acute abdomen which is the commonest surgical disease.

MATERIALS AND METHODS:
Source of Data: This study was conducted in Shadan General and Teaching Hospital of Hyderabad, India. It included patients admitted in emergency wards of all age groups and both the genders who have presented with acute abdomen.

Inclusion Criteria: 100 cases were selected from the study period which includes various acute surgical abdominal conditions including abdominal trauma.

Exclusion Criteria: This study has excluded the patients presenting as acute abdomen having medical and gynecological causes.

Method of Collection: All patients included in the study were examined thoroughly with proper history and detailed per abdomen examination. Relevant points in the history included site of pain, character of pain with any radiation, fever, Vomiting, distention abdomen, change of bowel habits, urinary or genital symptoms. Physical examination included vital signs with thorough per abdominal examination with regards to site of pain, localised tenderness, guarding rigidity and rebound tenderness. Patients with clinical suspicion were subjected to plain X-ray abdomen and ultrasonography. Surgical intervention were carried out as an emergency operations on clear indications. Finally clinical methods and radiological investigations in terms of their accuracy in early diagnosis of acute abdominal emergencies were done.
RESULTS: Acute abdomen was most common in the age group 20–40 years with male predominance (69%). Acute Appendicitis (35%) was the most common cause of acute surgical condition, followed by peritonitis due to Gastro intestinal perforation (15%) and then intestinal obstruction (12%). The most common symptoms with abdominal pain were nausea (69.1%) and vomiting (43.9%). The most common clinical signs were abdominal tenderness (97.1%), voluntary guarding (66.9%) and rebound tenderness (66.2%). The diagnostic accuracy rates in male and female patients were 93% and 80% respectively.

| Sl. No. | Diseases Presented as Acute Abdomen | Number of Cases |
|--------|-------------------------------------|-----------------|
| 1      | Acute Appendicitis                  | 35              |
| 2      | Peritonitis due to gastric intestinal perforations | 15              |
| 3      | Intestinal obstruction              | 12              |
| 4      | Renal / Ureteric calculi            | 9               |
| 5      | Acute Cholecystitis                 | 7               |
| 6      | Liver abscess                       | 5               |
| 7      | Strangulated Hernia                 | 4               |
| 8      | Blunt Injury Abdomen                | 4               |
| 9      | Acute pancreatitis                  | 2               |
| 10     | Psoas abscess                       | 2               |
| 11     | Splenic abscess                     | 1               |
| 12     | Appendicular abscess                | 1               |
| 13     | Acute gastritis                     | 3               |

Table 1: Causes of Acute Abdominal Pain

| Causes of G I Perforations | Number of Cases |
|----------------------------|-----------------|
| Duodenal perforations      | 6               |
| Jejunal perforations       | 2               |
| Ileal perforations         | 3               |
| Appendicular perforations  | 4               |
| **Total**                  | **15**          |

Table 2: Causes of Gastro Intestinal Perforations

| Causes of intestinal obstruction | Number of Cases |
|----------------------------------|-----------------|
| Small Bowel Obstruction          | 6               |
| Large Bowel Obstruction          | 4               |
| Duodenal atresia                 | 1               |
| Ileocolic Intussusception        | 1               |
| **Total**                        | **12**          |

Table 3: Causes of Intestinal Obstructions
Table 4: Acute Cholecystitis

| Cause                | Number of Cases |
|----------------------|-----------------|
| Acalculous Cholecystitis | 5               |
| Calculous Cholecystitis        | 2               |
| **Total**             | **7**           |

Clinically all 7 cases were diagnosed cholecystitis on basis of history and clinical examination. Plain X-ray was not suggestive. Ultrasonography of abdomen showed Gall bladder wall thickening more than 4mm with sludge in 5 cases of acalculous cholecystitis and gall stones in other 2 cases.

Acute Pancreatitis were 2 in our series. Only one had presented clinically with features of acute pancreatitis. Plain X-ray abdomen erect view showed “sentinel loop” sign. Ultrasonography showed oedematous pancreas in both cases and calcification noted in one case.

Blunt Injury Abdomen in our series were 4 in number. Of which 2 were splenic injury and other 2 were Liver trauma. In all 4 cases, clinical assessment were suggestive of visceral injury. Plain X-ray Abdomen showed obliteration of psoas shadow and elevation of left diaphragm in splenic injury.

Ultrasonography showed subcapsular haematoma of spleen in one case and intrasplenic haematoma with intraperitoneal collection in other case. In both cases of Liver injuries, echogenic lesion in the liver with intraperitoneal collection was evident. These findings were confirmed on respective laparotomies.

Table 5: Renal and Ureteric calculi

| Disease        | No. of cases | Diagnosed Clinically | Diagnosed on KUB X ray | Diagnosed on USG Abdomen |
|----------------|--------------|----------------------|------------------------|--------------------------|
| Renal Calculi | 4            | 4                    | 3                      | 4                        |
| Ureteric Calculi | 3            | 3                    | 2                      | 3                        |
| Both Calculus | 2            | 1                    | 1                      | 2                        |

All urolithiasis cases were diagnosed clinically with its typical presentation. Ultrasonography and Plain X ray KUB were complementary to each other in establishing final diagnosis.

Table 6: Predictive values of Plain X-ray and Ultrasonography

| Predictive Values | USG | X ray |
|-------------------|-----|-------|
| Sensitivity (%)   | 97.8| 46.4  |
| Specificity (%)   | 73  | 88.4  |

Ultrasonography had highest sensitivity rate (97.8%) and plain X-ray abdomen had highest specificity rate (88.4%).
DISCUSSION: Patients with acute abdominal pain are a heterogeneous group that consumes a great deal of resources.\[^3\]\ In cases when the diagnosis is suspected, laparotomy has been advised to be performed,\[^6\]\ but this policy has increased the rate of negative laparotomies.\[^7\]\ This study of 100 cases of acute abdomen was conducted in this teaching hospital with the aim of studying the efficacy of various methods of diagnosis which include clinical evaluation, radiological studies and ultrasonographic findings and their correlation with final diagnosis which were done by operative intervention.

In this study, acute abdomen was most commonly seen in age group of 20–40 years, whereas the statistics from other study reported the prevalence of acute abdomen mostly in 20-29 years of age.\[^2\]\ The causes of acute abdomen are several and their relative incidence varies in different populations. Several factors are seen to be responsible for these differences.

Socioeconomic factors and diet have mostly been incriminated to be responsible for the observed differences.\[^8\]\ Acute Appendicitis (35%) was the most commonest cause of acute surgical condition, followed by peritonitis due to Gastro intestinal perforation (15%) and then intestinal obstruction (12%). Other studies reported acute appendicitis to be leading cause of acute abdomen in 55% cases,\[^2\]\ visceral perforation and bowel obstruction in 8-12% and 15-24% of cases respectively.

Clinical skills and examinations were found to be more reliable in almost all acute abdomen cases. Plain X-rays were found to be accurate in 87.80% of cases. Chhetri reported sensitivity of 64.8% and specificity 88.8% for plain abdominal X ray.\[^2\]\ Ultrasonography were found to be accurate in 94% of cases.
Chhetri reported sensitivity and specificity of 69.4% and 81.5% for ultrasonography in the diagnosis of acute abdomen.[2] In diagnosing renal and ureteral stones, ultrasonography is highly effective in showing large stones more than 5 mm but poor at visualizing stones smaller than 3 mm.[9,10] Sonography is reported to have overall sensitivity between 73% to 100% for obstruction of the collecting system.[10,11] Kidney ureter bladder radiography has been reported to have sensitivity between 45% and 69% and specificity between 71% and 82%.[12,13] KUB X-ray along with ultrasonography has been reported to achieve clinical accuracy close to that of non-contrast enhanced CT in follow up of renal calculi.[14]

We have found that early diagnosis in acute abdominal conditions can be achieved using one or more of these clinical and radiological investigative tools. Each of these methods has been proved to be complementary to the other in early diagnosis. In other studies, diagnosis has been reported 80% by skilled physicians and 50% by young physicians.[15]

Decision to surgically intervene in acute abdominal emergencies is based on the results of a good history, thorough physical examination along with judicial usage of basic radiological imaging tools. Therefore, an accurate and early diagnosis of acute abdomen can avoid unnecessary operations thereby reducing the rate of negative laparotomies. In the study of Chhetri, negative laparotomy rate was 17.6%.[2]

**CONCLUSION:** The accurate clinical assessment of acute abdominal pain remains one of the more challenging areas of medicine. The variety of conditions that require emergency surgical management vary widely in its clinical presentation and physical examination.[16]

Diagnosis of many acute abdominal conditions relies on a good history and physical examination and the appropriate use of radiological investigations.[17] There is no single radiological test that is uniformly effective in identifying the cause of acute abdominal pain.[18] In the advent of new advance diagnostic modalities like MRI, CT scans and PET scans, we have found that the basic radiological investigations along with detailed clinical evaluation still have stood the test of time and have helped in making early and accurate diagnosis in acute abdominal conditions.

Thus the study has strongly suggested that surgeon with efficient clinical skills, good analysis of clinical findings with basic provision of Plain X-ray and Ultrasonography can diagnose acute abdomen diseases with 97% to 99% accuracy.

However, our series is small and the paucity of literature in this field of comparing and evaluating various modalities of arriving at early diagnosis in acute abdomen refrain us from making any dogmatic conclusions.

Hence a further detail study in this regard is suggested to arrive at more concrete conclusions.

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