A PROSPECTIVE STUDY OF VARIOUS AVAILABLE DIAGNOSTIC AND TREATMENT MODALITIES AND INTRAOPERATIVE FINDINGS OF NON-TRAUMATIC ACUTE ABDOMINAL CASES IN A TERTIARY CARE HOSPITAL OF CENTRAL INDIA

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ABSTRACT

BACKGROUND

Acute abdominal pain is a common complaint of patients presenting at the Emergency Department. Patients presenting with acute abdominal condition which often requires an immediate surgical intervention and is one of the commonly encountered emergencies in the practice of General Surgery. Very often an accurate diagnosis cannot be made without surgery and many wonders are revealed on opening the abdomen. So it is often the last court of appeal in investigating abdominal cases.

MATERIALS AND METHODS

This is a prospective study of 98 patients of non-traumatic acute abdominal cases conducted in a Tertiary Care Hospital of Central India. In our study, all routine blood investigations were carried out and relevant radiological investigations like abdomen x-ray, ultrasound whole abdomen was done in majority of patients and CT scan was done wherever needed. In our study 97 patients were managed surgically, while conservative management is done in only 1 patient.

RESULTS

Amongst the study of 98 patients x-ray, USG and CT were used as diagnostic modalities. Maximum cases were operated, while conservative management was done in one patient.

CONCLUSION

Our study is a sincere attempt to know the sensitivity of diagnostic modalities and to evaluate the treatment protocol in non-traumatic acute abdomen cases.

KEYWORDS

Acute Abdomen, Laparotomy, Abdomen X-Ray, Ultrasound Abdomen.

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BACKGROUND

Acute abdominal pain is a common complaint of patients presenting at the Emergency Department.^[1] Approximately, 10% of presentations at the Emergency Department are because of acute abdominal pain.^[2] It can be caused by a variety of diseases ranging from mild and self-limiting to life-threatening diseases.^[2] An early and accurate diagnosis results in more appropriate management and subsequently leads to better outcomes. The first step in the diagnostic pathway is clinical evaluation. In daily practice, a preliminary diagnosis should be made based on medical history, physical examination and in some cases laboratory parameters. After clinical assessment, the decision can be made to perform additional diagnostic investigations to increase certainty of the diagnosis. The use of additional imaging modalities such as plain radiography, ultrasound and Computed Tomography (CT) has increased over the years. Only a few decades ago,

when imaging was not widely available and its diagnostic accuracy was low, patients would immediately proceed to the operating theatre. However, many causes can be treated conservatively and do not need diagnostic laparoscopy and laparotomy.^[3]

The terms "acute abdomen" and "abdominal emergency," which are constantly applied to such cases signify the need for prompt diagnosis and early treatment. Patients presenting with acute abdominal condition, which often requires an immediate surgical intervention and is one of the commonly encountered emergencies in the practice of General Surgery.^[4,5] Very often an accurate diagnosis cannot be made without surgery and many wonders are revealed on opening the abdomen. So it is often the last court of appeal in investigating abdominal cases.^[6] The "aim of this study" was to study various diagnostic modalities, their effectiveness and treatment modalities in patients presenting with "Non-Traumatic Acute Abdomen in Central India."

MATERIALS AND METHODS

This is a prospective study of 98 patients of non-traumatic acute abdominal cases conducted in a Tertiary Care Hospital of Central India. In our study, all routine blood investigations were carried out and relevant radiological investigations like abdomen x-ray, ultrasound whole abdomen was done in majority of patients and CT scan was done wherever needed.

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In our study, 97 patients were managed surgically while conservative management was done in only 1 patient.

Study Design

- Sample Size – 98 patients were included in the study.
- Study Duration – January 2015 to July 2016.

Inclusion Criteria

1. Patients with history of acute onset of pain in abdomen.
2. Positive findings in USG and x-ray abdomen erect.
3. Patients and/or his/her legally acceptable representative willing to provide voluntary written informed consent for participation in the study.

Exclusion Criteria

1. All the OPD cases [cases who would not get admitted].
2. Patients presented with acute abdomen of traumatic origin.
3. Pregnant women and children (less than 15 years) presented with acute abdomen.
4. Patients and/or his/her legally acceptable representative not willing to provide voluntary written informed consent for participation in the study.

RESULTS

(N = 98)

Investigations Done	No.	%
Ultrasound whole abdomen	98	100.0
Abdomen x-ray	51	52.0
CT scan whole abdomen	19	19.4
Diagnostic laparoscopy	02	2.04

Table 1. Distribution of Patients according to Investigations Done

In our study Ultrasound whole abdomen was done in all the patients 98 (100.0%), while abdomen x-ray was done in 51 (52.0%) patients and Computerised Tomography scan whole abdomen was done wherever indicated; hence, it was done in only 19 (19.4%) patients and diagnostic laparoscopy was done in 02 (2.04%) of the total patients studied.

Figure 1. Bar Diagram showing Distribution of Patients according to Investigations Done [Ref. Table No. 1]

(N = 51)

X-Ray Findings	Intraoperative Findings		Grand Total
	Negative	Positive	
Negative	1	2	3
Positive	8	40	48
Total	9	42	51

Table 2. Association of Abdomen X-Ray Findings with Intraoperative Findings

The above table shows the association of abdomen x-ray findings with intraoperative findings.

The Sensitivity, Specificity, Positive Predictive Value and Negative Predictive Value of Abdomen x-ray is given below

Sensitivity: 95.2%
Specificity: 11.11%

Positive Predictive

Value: 83.3%

Negative Predictive

Value: 33.33%

(N = 98)

Ultrasound Whole Abdomen Findings	Intraoperative Findings		Grand Total
	Negative	Positive	
Negative	1	4	5
Positive	34	59	93
Total	35	63	98

Table 3. Association of Ultrasound Whole Abdomen Findings with Intraoperative Findings

The above table shows the association of Ultrasound whole abdomen findings with intraoperative findings.

The Sensitivity, Specificity, Positive Predictive Value and Negative Predictive Value of Ultrasound whole Abdomen is given below

Sensitivity: 93.65%
Specificity: 2.85%

Positive Predictive

Value: 63.4%

Negative Predictive

Value: 20.0%

(N = 19)

CT Scan Whole Abdomen Findings	Intraoperative Findings		Grand Total
	Negative	Positive	
Negative	2	2	4
Positive	6	9	15
Total	8	11	19

Table 4. Association of Computerised Tomography Scan Whole Abdomen Findings with Intraoperative Findings

The above table shows the association of Computerised Tomography scan findings with intraoperative findings.

The Sensitivity, Specificity, Positive Predictive Value and Negative Predictive Value of Computerised Tomography Scan is given below

Sensitivity: 81.81%
Specificity: 25%

Positive Predictive

Value: 60.0%

Negative Predictive

Value: 50.0%

(N = 98)

Type of Management	No.	%
Open surgery	88	92.6
Laparoscopic surgery	09	9.2
Conservative	01	1.0
Total	98	100.0

Table 5. Distribution of Patients according to Type of Management

As per above table out of 98 patients open surgical management was done in 88 (92.6%), while laparoscopic surgery was done in 9 (9.2%) and conservative management was done in only 1 (1.0%) of the total patients studied.

Figure 2. Pie Diagram showing Type of Management [Ref. Table No. 5]

(N = 39)

Site of Perforation	No.	%
Ileal	18	46.2
Gastric	14	35.9
Appendicular	2	5.1
Jejunal	2	5.1
Caecal	2	5.1
Sigmoid	1	2.6
Total	39	100.0

Table 6. Distribution of Cases of Perforation Peritonitis on the Basis of Site of Perforation

In our study, perforation peritonitis was seen in 39 patients. Of these 39 patients, perforation which formed the major cause of acute abdomen in the study was found to be ileal in 18 (46.2%) followed by gastric in 14 (35.9%).

Figure 3. Pie Diagram showing Sites of Perforation [Ref. Table No. 6]

(N = 3)

Ruptured Liver Abscess	No.	%
Surgical	2	66.7
Laparoscopic drainage	1	33.3
Total	3	100.0

Table 7. Treatment of Ruptured Liver Abscess

There were 3 cases of ruptured liver abscess. Of these 2 (66.7%) were managed surgically, while laparoscopic drainage was done in 1 (33.3%) of the total patients studied.

Figure 4. Pie Diagram showing Management of Ruptured Liver Abscess [Ref. Table No. 7]

(N = 13)

Aetiology	No.	%
Adhesions/bands	9	69.2
Volvulus	2	15.4
Foreign body	1	7.7
Internal hernias	1	7.7
Total	13	100.0

Table 8. Aetiology of Cases of Intestinal Obstruction

Intestinal obstruction was seen in 13 cases in our series. Of these, most common aetiology was found to be adhesions/bands in 9 (69.2%) followed by volvulus in 2 (one caecal and one sigmoid) (15.4%), foreign body and internal hernias in only 1 (7.7%) of the total patients studied.

Figure 5. Pie Diagram showing Aetiology of Cases of Intestinal Obstruction [Ref. Table No. 8]

(N = 14)

Management	No.	%
Open surgical management	12	85.7
Laparoscopic surgical management	1	7.1
Conservative management	1	7.1
Total	14	100.0

Table 9. Management of Cases of Intestinal Obstruction

Of the 14 cases of intestinal obstruction observed in our study, 12 (85.7%) were managed by open surgery and 1 (7.1%) by laparoscopic surgery, while 1 (7.1%) was managed conservatively.

Figure 6. Pie Diagram showing Management of Cases of Intestinal Obstruction [Ref. Table No. 9]

(N = 9)

Diagnosis	No.	%
Appendicitis	3	33.3
Unclear diagnosis	2	22.2
Gall bladder pathology	2	22.2
Intestinal obstruction	1	11.1
Liver abscess	1	11.1

Table 10. Distribution of Patients in which Laparoscopic Surgery was Done for Management

Among 9 patients managed by laparoscopic surgery, laparoscopic appendicectomy was done in 3 (33.3%) patients of appendicitis, while in patients with unclear diagnosis (diagnostic laparoscopy with appendicectomy) in 2 (22.2%) of the total patients studied.

Figure 7. Pie Diagram showing Distribution of Patients in which Laparoscopic Surgery was Done [Ref. Table No. 10]

(N = 37)

Position of Appendix (Intra-Op)	No.	%
Retro-caecal	30	81.1
Pelvic	4	10.8
Pre-ileal	2	5.4
Post-ileal	1	2.7

Table 11. Distribution of the Different Positions of Appendix Found during Appendicectomy

Among 37 cases of this study in which appendicectomy was done, on the basis of intra-operative findings, as per above table, the commonest position of appendix was retrocaecal in 30 (81.1%), pelvic in 4 (10.8%), pre-ileal in 2 (5.4%) and post-ileal in 1 (2.7%) of the total patients studied.

Figure 8. Pie Diagram showing Distribution of Different Positions of Appendix found during Appendicectomy [Ref. Table No. 11]

DISCUSSION

Acute abdominal pain constitutes a significant percentage of emergency admissions worldwide and comprises a largest group (non-traumatic) of people presenting as general surgery emergency. The pattern of disease may vary according to age, sex, geography, class and genetic factors. The purpose of this study was to evaluate the various diagnostic modalities, their role in making decision regarding surgery^[7] and to know various treatment modalities in patients presenting with non-

traumatic acute abdomen in a tertiary care hospital of Central India.

Investigations

In our study, abdomen x-ray is the investigation with highest sensitivity (95.2%) followed by ultrasound abdomen (93.65%). In a similar study done by K. Gupta et al^[8] in 2005, where ultrasound is the investigation of choice with highest sensitivity (98.3%) followed by abdomen x-ray (70.9%). Hence, results in our study are different with the findings of the study done by K. Gupta et al.

Type of Management

In the present study, majority of patients were treated by open surgical method (92.6%) and some patients by laparoscopic surgery (9.2%). In a similar study done by Ferdinando Agresta et al^[9] in 2004 where majority of patients were treated by laparoscopic surgery (94.1%), while less by open surgical method (5.8%). Hence, results in our study regarding type of management are different from the study done by the author.

Site of Perforation

In our study, the most commonest site of perforation peritonitis is ileal (46.2%) followed by gastric (35.9%). In a similar study done by Rajender Singh Jhobta et al^[10] in 2006, where the most commonest site was duodenal (57%) followed by ileal (15%) and study done by Memon et al^[11] in 2008, the commonest site was gastric (14.6%) followed by ileal (5.9%). Hence, findings in our study regarding site of perforation is different as compared with the findings of other authors.

Treatment of Ruptured Liver Abscess

In our study, majority of patients of ruptured liver abscess were treated by open surgical method (66.7%). In a similar study done by Jin Fu Tu et al^[12] in 2011, majority of patients of ruptured liver abscess were treated by open surgical method (58.06%). Hence, findings in our study is similar to findings of Jin Fu Tu et al.

Aetiology and Management of Intestinal Obstruction

In our study, the common cause of intestinal obstruction is adhesions/bands (69.2%) followed by volvulus (15.4%). In a similar study done by Patrick G. Jackson et al^[13] in 2011, the common cause is adhesions/bands (60%) followed by neoplasm (20%). Hence, our study on aetiology of intestinal obstruction matches with the study done by the author.

In our study, majority of cases of intestinal obstruction were managed by open surgical method (85.7%) and few cases by laparoscopic surgical management (7.1%) and remaining by conservative management (7.1%). In a similar study done by Adhikari Souvik et al^[14] in 2010, majority of cases were managed by open surgical method (78.4%), while conservative management was done (14.17%) and in a similar study done by Mohamed AY et al^[15] in 1997 majority of patients were managed by open surgical method (73%) and conservative management (27%). So our findings match with the findings of other studies and the standard treatment of acute intestinal obstruction is by surgery only.

Patients Treated by Laparoscopy

In present study out of nine patients in which laparoscopic surgery was done for management in majority of patients laparoscopic appendicectomy was done (33.3%) for acute appendicitis, diagnostic laparoscopy with appendicectomy (22.2%), laparoscopic cholecystectomy (22.2%) for gall bladder pathology, while laparoscopic adhesiolysis (11.1%) of intestinal obstruction. In a similar study done by Edvaldo Fabel et al^[16] in 1999, where laparoscopic appendicectomy (44.15%) was done for acute appendicitis followed by laparoscopic cholecystectomy (21.4%) for gall bladder pathology. Thus, we conclude that in an era of laparoscopic surgery, it has been the "gold standard" for many elective procedures and has been used in abdominal emergencies for diagnosis as well as for treatment purposes. Different positions of appendix found during appendicectomy in the present study, the commonest position of appendix found during appendicectomy is retrocaecal (81.1%) followed by pelvic (10.1%). In a similar study done by Patel KG et al^[17] in 2013 the commonest position of appendix found during appendicectomy is retrocaecal (62%) followed by pelvic (13%). Hence, our study on different positions of appendix found during appendicectomy matches with the study done by author.

CONCLUSION

The increasing incidence of cases of non-traumatic acute abdomen is a diagnostic dilemma for the surgeons and warrants early recognition and prompt treatment to avoid major morbidity and mortality. Acute abdomen is often a surgical emergency and a challenge to any surgeon. Abdominal pain is a common presenting complaint in the emergency department and surgeons must consider multiple diagnoses, especially in those cases that require immediate intervention in order to limit morbidity and mortality. Rigorous approach to diagnosis is mandatory. It is extremely important for surgeons to develop the skill of identifying patients with an "acute abdomen" requiring immediate surgical intervention. Our study is a sincere attempt to know the sensitivity of diagnostic modalities, treatment protocol in non-traumatic acute abdomen cases presenting in tertiary care centre in Central India.

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