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Original Research Article

Study the profile of pathological disorders resulting in acute abdominal non-traumatic surgical emergencies in a tertiary care hospital, North India

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ABSTRACT

Background: Acute abdomen has a sudden onset, can persist for several hours to days and is associated with wide variety of clinical features requiring evaluation and treatment. The present study has been done to establish the etiopathological details and diagnostic verification of the patients presenting with non-traumatic pain in abdomen. Also, the management and admitted care of non-traumatic abdominal surgical emergencies and their outcome has been discussed.
Methods: A prospective observational study was done in Rohilkhand Medical College and Hospital (RMCH) during November 2015 to October 2016. The study includes acute abdominal non-traumatic surgical emergencies presenting in general surgery department. All the data were analyzed through SPSS 22.
Results: A total of 182 patients were included in the study. The most common complaint among patients was pain in abdomen followed by constipation and vomiting. The most common cases were intestinal perforation (57%) followed by acute appendicitis (14.89%), acute pancreatitis (9.34%), acute intestinal obstruction (9.34%) and others. Most common treatment modalities applied were Exploratory Laparotomy with true Graham's patch repair (30.22%), non-operative/conservative treatment (26.92%) and Exploratory Laparotomy with ileostomy (13.19%). Total 13 cases (7.14%) expired (all post-operatively) and 8 cases (4.39%) developed major complications.
Conclusions: The clinical course and outcome of acute abdominal emergencies in present study showed that a judicious and careful use of clinical evaluation with high index of suspicion along with radiological and biochemical findings help to reach a diagnosis based on which the appropriate management strategy ensures good outcome.

Keywords: Acute abdomen, Non-traumatic, Surgical emergencies

INTRODUCTION

Pain abdomen is one of the most common reasons for an emergency department visit. In the countries where systematic record keeping is done it accounts for nearly 8% of total emergency department visits.[1] Despite its high frequency and common presentation, abdominal pain does not always turn out to be a minor health problem, in fact, in many cases it is a symptom of rather serious disease which is often misdiagnosed owing to commonness of abdominal pain.[2]

Acute abdomen can represent a wide spectrum of conditions, ranging from a benign and self-limiting

disease to a surgical emergency. It poses a diagnostic challenge for the emergency physicians as the causes are numerous, ranging from benign to life-threatening conditions. Causes include gastro-intestinal, urological, and Gynecological among others.[3]

Acute abdomen has a sudden onset, can persist for several hours to days and is associated with wide variety of clinical features specific to underlying condition or disease.

Considering the diagnostic difficulties in clinical examination in emergency settings, a thorough and logical approach to the diagnosis of abdominal pain is necessary. Diagnostic imaging is useful and plain X-ray radiography is the first choice for this purpose, however, plain radiograph of abdomen has limited diagnostic yield owing to a high non-specificity and low sensitivity.[4] In the recent years, ultrasonography and computed tomography have emerged as rapid, safe, cost effective and repeatable methods of evaluation of solid abdominal viscera and free fluid in abdomen.[5,6] American College of Radiology has recommended using different imaging studies to assess abdominal pain based on pain location: ultrasonography (US) is recommended to assess the right upper quadrant pain, and computed tomography (CT) is recommended for the right and left lower quadrant pain.[7] Other direct visualization techniques such as colonoscopy/endoscopy and laparoscopy can also identify abnormal findings and improve the outcome in a majority of patients with abdominal pain, as it allows surgeons to see and treat many abdominal conditions that cannot be diagnosed otherwise.[8,9]

The general rule of thumb is that any abdominal pain that persists for more than 6 hours is usually caused by disorders of surgical significance.[10] However, the appropriate intervention can only be planned after knowing the exact nature and type of pathology involved. Correct pre-operative diagnosis of acute abdomen with limited resources is very crucial to minimize the morbidity and mortality in the developing countries like ours, where the facilities for diagnosis are limited and not economical, the clinical skills play a pivotal role in the diagnosis and management of acute abdomen. Thus, surgeons in developing countries need to improve diagnostic acumen and decision-making in the management of acute abdomen.

Hence, the present study was planned with an aim to provide a profile of various types of pathological disorders resulting in acute abdominal non-traumatic surgical emergencies at a tertiary care centre in North India so as to provide help in decision making in emergency acute abdomen cases.

METHODS

The present prospective study was completed in one year from November 2015 to October 2016. The study was conducted in the Post Graduate Department of General Surgery in collaboration with Department of Radiology and Department of Pathology, Rohilkhand Medical College and Hospital, Bareilly to provide a profile of various types of pathological disorders resulting in acute abdominal non-traumatic surgical emergencies at a tertiary care hospital in North India.

Study population

All patients presenting with non-traumatic acute abdominal pain with or without other associated symptoms requiring emergency admissions and prompt treatment. Traumatic patients, Obstetrical and Gynaecological patients, non-co-operative patients were excluded from the study.

Sample size

A total of 182 patients presenting with non-traumatic acute abdominal surgical emergency during study period, fulfilling the inclusion criteria, were included in this study.

A detailed history on the onset, duration and type of abdominal pain and results of a thorough physical examination were entered on a standard data collection sheet after obtaining a written informed consent.

Basic/routine blood investigations were done in all patients. Relevant Radiological investigations like X-rays, Ultrasonography, Computed Tomography scan and Magnetic Resonance Imaging were done as indicated by clinical evaluation.

The decision whether the patient requires conservative (non-operative) and emergency or elective surgical procedure(s) was based on clinical presentation and provisional diagnosis.

Outcome was noted in terms of uneventful recovery, need for second procedure, wound infection (major and minor) and expiry. Outcome was compared against different diagnoses made, treatments performed, and duration of presenting symptoms.

Statistical analysis

The statistical analysis was done using statistical package for social sciences (SPSS) Version 15.0 statistical analysis software. The values were represented in number (%) and mean±standard deviation (SD).

The following statistical formulas were used like

- Mean
- Standard Deviation (SD): It is denoted by the Greek letter
- Median
- Chi-square test

- Level of significance: "P" is level of significance.

RESULTS

Most common age group was 31-40 years (25.27%) followed by 31-40 years (21.98%) and 21-30 years (17.03%) while least common age group was ≤10 years (0.55%) followed by 71-80 years (Table 1). Age of patients enrolled in the study ranged from 5-80 years, median age of patients was 40 years and mean age of patients was 38.39±14.88 years (Table 1).

Table 1: Distribution of study population according to age (n=182).

Age group	No. of patients	Percentage
Up to 10 years	1	0.55
11-20 years	30	16.48
21-30 years	31	17.03
31-40 years	46	25.27
41-50 years	40	21.98
51-60 years	22	12.09
61-70 years	10	5.49
71-80 years	2	1.10
Total	182	100.00

Majority of the patients enrolled in the study were males (68.68%) and rest of the patients were females (31.32%). Gender ratio was 2.2 (Figure 1).

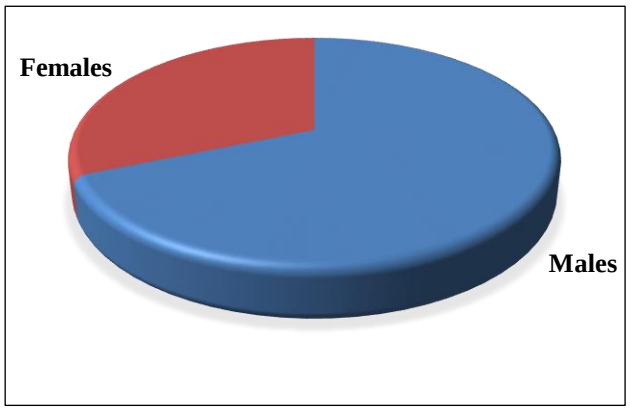

Figure 1: Distribution of study population according to gender.

Most common occupation among the patients enrolled in the study was Farmer (32.97%) followed by housewife (21.98%) and student (19.23%) while least common occupation was shopkeeper/business (3.85%) followed by service (4.95%), skilled worker (6.59%) and unskilled worker (10.44%) (Figure 2). Out of 182 patients 135 (74.18%) were farmers, housewife and students. This was the demographic profile of the patients enrolled in the study.

Presenting complaint/ symptom of all the patients was pain in abdomen (100.0%) and associated complaints were fever (46.70%), constipation (42.86%) and vomiting (40.66%) (Figure 3).

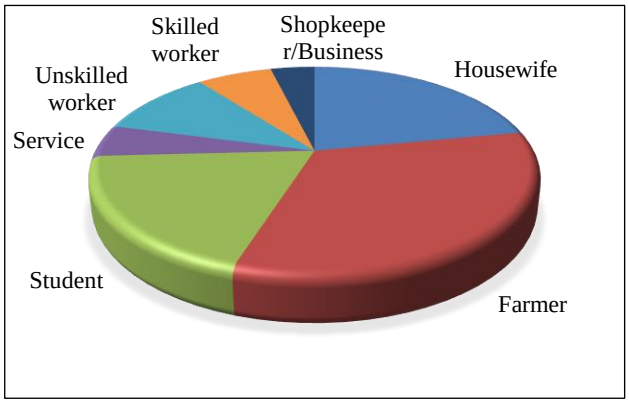

Figure 2: Distribution of study population according to occupation.

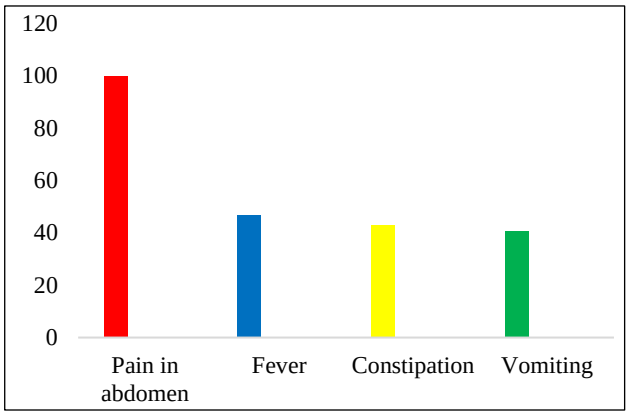

Figure 3: Presenting symptoms of study population.

Table 2: Clinical (per abdomen) examination findings of study population (n=182).

Clinical findings	No. of patients	Percentage
Distended (inspection)	158	86.81
Umbilicus everted	119	65.38
Tenderness	146	80.22
Rigidity	156	85.71
Guarding	156	85.71
Temperature raised	31	17.03
Skin color changes	0	0.00
Visible dilated veins	0	0.00
Visible peristalsis	3	1.64
Rebound tenderness	69	37.91
Rovsing's sign	68	37.36
Palpable lump	16	8.79
Shifting dullness	87	47.80
Bowel sounds on auscultatic	90	49.45

Range of duration of presenting symptoms among the patients enrolled in the study was 1 to 7 days. Median duration of presenting symptoms was 3 days and mean

duration was 3.43±1.30 days. Only 5 (2.75%) patients had past history of similar abdominal pain and only 7 (3.85%) reported family history of similar abdominal pain.

In majority of patients clinical abdominal examination revealed distension (86.81%), rigidity (85.71%), guarding (85.71%), tenderness (80.22%) and eversion of umbilicus (65.38%) (Table 2). Bowel sounds on Auscultation (49.45%), shifting dullness (47.80%), rebound tenderness (37.91%), Rovsing's Sign (37.37%), raised temperature (17.03%) and visible peristalsis were less common clinical findings.

In none of the patient skin color changes, visible dilated veins, were observed. Provisional diagnosis of majority of the patients was intestinal perforation (57.14%), followed by acute appendicitis (14.84%), acute pancreatitis (9.34%), acute intestinal obstruction (9.34%) and acute cholecystitis (5.49%) while least common provisional diagnosis were Acute gastritis (0.55%) and liver abscess (0.55%) followed by renal/ureteric stone (1.10%) and pain under evaluation (1.65%) (Table 3).

Table 3: Provisional diagnosis of study population.

Provisional diagnosis	No. of patients	Percentage
Acute appendicitis	27	14.84
Acute cholecystitis	10	5.49
Acute pancreatitis	17	9.34
Acute intestinal obstruction	17	9.34
Intestinal perforation with/without peritonitis	104	57.14
Liver abscess	1	0.55
Pain under evaluation	3	1.65
Renal/ureteric stone	2	1.10
Acute gastritis	1	0.55
Total	182	100

Table 4: Final diagnosis among study population.

Final diagnosis	No. of patients	Percentage
Acute appendicitis	18	9.89
Acute cholecystitis	12	6.59
Acute pancreatitis	16	8.79
Acute intestinal obstruction	11	6.04
Appendicular tuberculosis	7	3.85
Intestinal perforation	109	59.89
Liver/psoas abscess	4	2.20
Renal/ureteric stone	1	0.55
Acute gastritis	1	0.55
Sigmoid volvulus/non-specifi	3	1.65
Pain/ileocaecal Koch's		
Total	182	100

Most common final diagnosis among patients enrolled in the study was intestinal perforation (59.89%), followed by acute appendicitis (9.89%), acute pancreatitis (8.79%), acute cholecystitis (6.59%) and acute intestinal obstruction (6.04%) (Table 4). Less common final diagnosis was appendicular tuberculosis (3.85%), liver/psoas abscess (2.20%) while least common final diagnosis were renal/ureteric stone (0.55%), acute gastritis (0.55%) and others (1.65%) including sigmoid volvulus, non-specific pain and ileocaecal Koch's.

Most common treatment modality was exploratory laparotomy (exp. lap.) with Cellan-jones/modified graham's repair of duodenal perforation (DP) (30.22%) followed by conservative (non-operative) treatment (26.92%) while less common treatment modalities were exp. lap with primary repair of intestinal perforation (13.74%) followed by open appendectomy (6.59%), exp. lap. with resection anastomosis (RA) with proximal ileostomy (6.59%), exp. lap. with proximal ileostomy only (6.04%), exp. lap. with RA only (2.75%), laparoscopic cholecystectomy (1.1%), Open cholecystectomy (1.10%) and Laparoscopic appendectomy (0.55%). Other modes were used in 8 (4.40%) cases (1 case each: Exp. Lap. with adhesion removed, exp. lap. with left hemicolectomy, USG guided aspiration, pigtail catheterization, incision and drainage, Exp. Lap. with sigmoidopexy, exp. lap. with removal of adhesion band, exp. lap. with adhesiolysis) (Table 5).

Table 5: Treatment modalities of study population.

Treatment	No. of patients	Percentage
Conservative	49	26.92
Laparoscopic cholecystectomy	2	1.10
Laparoscopic appendectomy	1	0.55
Exp. lap. with proximal ileostomy	11	6.04
Exp. lap. with RA with proximal ileostomy	12	6.59
Exp. lap. with Cellan-jones/ modified graham's Repair	55	30.22
Exp. lap with primary repair	25	13.74
Exp. lap. With resection and anastomosis	5	2.75
Open cholecystectomy	2	1.10
Open appendectomy	12	6.59
Others	8	4.40
Total	182	100

Out of 182 patients enrolled in the study, 147 (80.77%) patients recovered uneventfully, minor wound infection was found in 14 (7.69%) patients while major wound infection requiring operative intervention was found in 3 (1.65%) patients (Figure 4). Burst abdomen requiring second procedure was found in 5 (2.75%) patients while 13 (7.14%) patients expired during treatment.

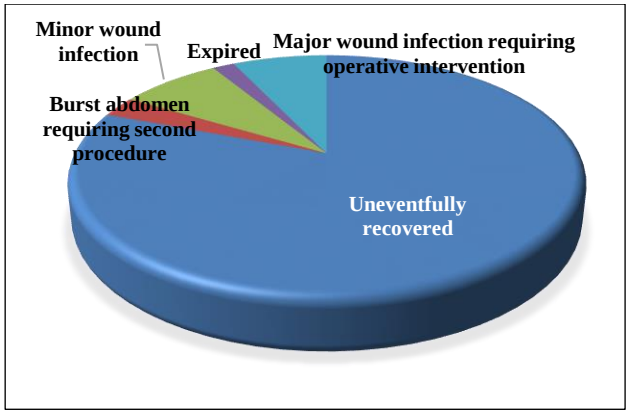

Figure 4: Outcome of study population.

Majority of patients, irrespective of diagnosis, recovered. All the cases diagnosed as Acute Cholecystitis, Acute Pancreatitis, Appendicular Tuberculosis, Abscess, Renal/Ureteric stone, Acute Gastritis and Sigmoid volvulus/non-specific pain/ileocaecal Koch's recovered. Further intervention was required in higher proportion of intestinal perforations (18.35%), acute intestinal Obstruction (9.09%) and acute appendicitis (5.56%) as compared to none of the patients diagnosed with rest of the diagnosis. All the expired patients (7.14%) were diagnosed cases of intestinal perforation. Though proportional difference in final outcome of patients with different diagnosis was found but this difference was not found to be statistically significant (Table 6).

Table 6: Association of outcome and final diagnosis.

	Total	Recovered		Further intervent		Expired	
		No.	%	No.	%	No.	%
Acute appendicitis	18	17	94.44	1	5.56	0	0.00
Acute cholecystitis	12	12	100.00	0	0.00	0	0.00
Acute pancreatitis	16	16	100.00	0	0.00	0	0.00
Acute intestinal obstruction	11	10	90.91	1	9.09	0	0.00
Appendicular tuberculosis	7	7	100.00	0	0.00	0	0.00
Intestinal perforation	109	76	69.72	20	18.35	13	11.93
Liver/psoas abscess	4	4	100.00	0	0.00	0	0.00
Renal/ureteric stone	1	1	100.00	0	0.00	0	0.00
Acute gastritis	1	1	100.00	0	0.00	0	0.00
Other	3	3	100.00	0	0.00	0	0.00
Total	182	147	80.77	22	12.09	13	7.14

C^2=22.494(df=18); p=0.211

Table 7: Association of outcome and treatment.

		Recovered		Further intervention		Expired	
		No.	%	No.	%	No.	%
Conservative	49	47	95.92	2	4.08	0	0.00
Laparoscopic cholecystectomy	2	2	100.00	0	0.00	0	0.00
Laparoscopic appendectomy	1	1	100.00	0	0.00	0	0.00
Exp. Lap. with proximal ileostomy	11	3	27.27	4	36.36	4	36.36
Exp. Lap. With ra							
With proximal	12	9	75.00	2	16.67	1	8.33
Ileostomy							
Exp. Lap. with cellan-jones/ modified	55	41	74.55	9	16.36	5	9.09
Graham's repair exp. Lap with primary	25	22	88.00	2	8.00	1	4.00
Repair exp. Lap. with resection and	5	2	40.00	1	20.00	2	40.00
Anastomosis							
Open cholecystectomy	2	2	100.00	0	0.00	0	0.00
Open appendectomy	12	10	83.33	2	16.67	0	0.00
Others	8	8	100.00	0	0.00	0	0.00
Total	182	147	80.77	22	12.09	13	7.14

C^2=45.438(df=20); p<0.001

Proportion of uneventful recovery was highest in patients with treatment modalities like laparoscopic cholecystectomy, laparoscopic appendectomy, open cholecystectomy and other minor surgical procedures (100.00% each) along with conservative (95.92%), exploratory laparotomy (Exp. Lap.) with primary repair

(88.00%), open appendectomy (83.33%), Exp. Lap with resection anastomosis (RA) with proximal ileostomy (75.00%) and Exp. Lap. with Cellan-Jones/ modified Graham's repair (74.55%) as compared to Exp. Lap with RA (40.00%) and Exp. Lap with proximal ileostomy (27.27%). Also, proportion of further intervention because of infection was higher among patients with exploratory laparotomy (Table 7).

Proportion of expiry among Exploratory Laparotomy (Exp. Lap.) with Resection anastomosis (40.00%) and Exp. Lap. with proximal ileostomy (36.36%) was found to be higher as compared to Exp. Lap. with Cellan-Jones/Modified Graham's repair (9.09%), Exp. Lap. with RA with proximal ileostomy (8.33%), Exp. Lap. with primary repair (4.00%) and none in rest of the treatment modalities.

Difference in outcome of patients with different treatment modalities was found to be statistically significant ($p<0.001$).

DISCUSSION

Acute abdomen is a common yet one of the most generalized causes for emergency department visits. Owing to its generalized nature, it requires a careful and skilful handling by the attending surgeon in order to determine the underlying etiology and to formulate a strategic plan for management. Incidentally, there are wide differences in underlying etiology which may vary substantially from one center to another center depending upon the population concerned and their exposure to various risk factors.

Understanding the centre specific profile of acute abdomen emergencies, use of diagnostic approaches to understand their underlying etiology, intervention, clinical course and outcome is always of interest, hence present study was carried out as a descriptive study to study the various types of pathological disorders resulting in acute abdominal non-traumatic surgical emergencies.

For this purpose, a total of 182 patients presenting with non-traumatic surgical emergencies were enrolled in the study. The age of patients ranged from 5 to 80 years with a mean age of 38.39 year. Age group 31-50 years (n=86; 47.3%) being the most affected. Majority of patients were males (68.68%) and gender ratio of study population was 2.2. Farmers/unskilled workers (n=79; 43.4%) and housewives (n=40; 21.98%) were the most common affected occupational groups.

As stated above that acute abdominal emergencies are manifestation of varying etiologies that affect almost all age groups, hence a wide variability in demographic profile of patients has been reported in various contemporary studies from India and abroad. Although age and gender profile in different studies varies substantially. However, in general, majority of the studies, except those that included only female patients had a skewed gender ratio showing a high prevalence of males as compared to females.[3,11-15]

In the present study, major presenting symptoms except abdominal pain were fever (46.7%), constipation (42.86%) and vomiting (40.66%) respectively. In a study from Nigeria, Agboola et al, reported vomiting (68.5%), anorexia (56.9%) and fever (47.8%) as the major associated complaints apart from acute abdominal pain. Back home, Jain and Gupta in their study reported vomiting (72%), abdominal distension (50%), constipation (48%) and fever (41.8%) as the major findings in their study.[3,15] In general, vomiting, constipation and fever seem to be the major findings, however, their prevalence varies slightly in different studies which might be owing to difference in underlying etiology and profile of patient population.

In the present study, the duration of symptoms varied from 1 to 7 days with a mean of 3.43±1.3 days. Ironically, despite acute etiology, delayed presentation to hospital is an experienced reality in developing countries like this. In a recent study, Khanapure et al analysed the delay between symptom onset and presentation to hospital in a facility from Mumbai and reported this delay to range from 1.5 hrs to 408 hours with a mean of 65.45 hours (2.71 days).[16]

In the present study, a total of 2.75% and 3.85% cases respectively had a past history and family history of acute abdominal pain. In one patient, there was a positive history of ATT, thus suggestive of a possible tubercular diagnosis, finally the patient was traced to have intestinal perforation which might be owing to tubercular origin, and however, the same could not be established in present study. There was one case with history of exploratory laparotomy 3 years back, on exploring further this patient turned out to have acute intestinal obstruction which was managed conservatively. Another patient had history of hysterectomy 8 years back, but this history alone was not sufficient enough to establish the diagnosis in present study. Thus, despite having information regarding past history it was not of much use in present study. With respect to family history, out of 7 cases, in whom a family history was reported 5 were finally diagnosed to have appendicitis, thus in these cases family history helped to provide a clue for diagnosis.

In this study, on per abdomen examination abdominal distension (86.81%), rigidity (85.71%) and guarding (85.71%) were the most common findings. Jain and Gupta[15] in their study also reported abdominal tenderness (99%), guarding/rigidity (61.2%) and absence of bowel sounds (51%) as the major clinical evaluation findings. Clinical evaluation findings are generally indicative of several possible pathologies and require further exploration using biochemical or imaging tools. In present study, based on clinical findings, we derived a provisional diagnosis of intestinal perforation in majority

(57.14%) of cases, followed by Acute appendicitis (14.84%), Acute pancreatitis and Acute intestinal obstruction (9.34% each) while least common provisional diagnosis were Acute gastritis and Liver abscess (0.55% each) followed by Renal/Ureteric stone (1.10%) and Pain under evaluation (1.65%) were classified as others. Although clinical diagnosis is useful in initiating primary management yet before any operative intervention, it is essential that further diagnostic studies be carried out to determine the actual need for surgical intervention.

In the present study conservative (non-operative) management was done in 26.92% cases while surgical management was done in 74.08% cases. In present study, most common indication for surgery was intestinal perforation which incidentally also comprised the most common diagnosis and hence a high rate of surgical intervention was necessitated. In different studies rate of surgical intervention as well as indication varies substantially. Barai et al in their study managed 74.61% conservatively as major findings in their study were acute appendicitis (16.3%) followed by acute pancreatitis (11.92%), acute cholecystitis (9.60%) and renal colic (7.49%) respectively.[14] However, Kumar et al in their series managed all the cases surgically despite having acute appendicitis as the most common condition.[17] In present study, among cases of acute appendicitis, conservative management was done in half the cases. The decision to follow a surgical or conservative management is dependent on the overall evaluation of patient. Moreover, sometimes conservative management is preferred unless the surgical intervention is barely necessity. However, some other studies such as the one by Ray et al, who also found perforation as the major finding and indication for surgical intervention.[18] In their study too, the surgical management rate was high (90%). In their study, Jain et al also found perforation as the major pathology involved.[15] However, Chanana et al in their study had ureteric colic (16.3%), urinary tract infection (12.5%), acute pancreatitis (11%), acute appendicitis (10.6%) and acute gastritis (8%) as the common causes and reported surgical intervention in only 25.8% of cases.[11]

Thus, the higher surgical intervention rate in present study could be justified and is in judicious range in consideration with the pathology involved.

Owing to intestinal perforation being major pathology, most of the procedures (95.49%) were open procedures and only (2.26%) were done through laparoscopic surgery. In present study, for three cases of abscess (2.26%) (1 Psoas abscess and 2 liver abscesses) specific procedures *viz.* I and D, pigtail catheterization and USG guided aspiration were done.

In the present study, most common final diagnosis among patients enrolled in the study was Intestinal perforation (59.89%), followed by Acute appendicitis (9.89%), Acute pancreatitis (8.79%), Acute cholecystitis (6.59%) and Acute intestinal obstruction (6.04%) and Appendicular Tuberculosis (3.85%) while Psoas abscess (n=4; 2.20%), Sigmoid volvulus, Non-specific pain, Ileocaecal Koch, Renal stone, Ureteric stone and Acute gastritis Liver abscess (n=1 each) were classified as other diagnosis. The final diagnosis also correlated well with the clinical diagnosis. In one earlier study too, Kumar et al found clinical diagnosis to have an excellent correlation with surgical diagnosis.[17]

In the present study, the outcome was generally good despite intestinal perforation being the major diagnosis. The overall uneventful recovery was seen in 80.77% cases while another 7.69% recovered after being treated for mild infection. Revision was needed in 8 (4.4%) cases while mortality rate was only 7.14%. All the mortalities were in intestinal perforation cases (13/109; 11.9%). Mortality rate in different series varies substantially. Chavan et al in their study reported a high mortality rate of 17% but it must be considered that they conducted their study in elderly patients and had a high post-surgery infection rate (29%).[19] Compared to this in present study surgery both major and minor infections accounted to 9.3% of total cases. On the other hand Barai et al in their study reported a mortality of as low as 1.72%.[14] The low mortality rate in their study could be owing to fewer number of complicated cases requiring surgical intervention. In their study, surgical intervention was needed in only 25.38% of cases. The mortality rate is definitely dependent on the spectrum of pathologies involved. In series having acute appendicitis as the dominant finding, mortality rates are generally low. However, in another series where perforation was the most common pathology (48/110; 43.64%), the mortality rate was only 2.7%.[18] Although, mortality rate in present study was slightly higher than this yet it was lower as compared to some other studies.

CONCLUSION

The clinical course and outcome of acute abdominal emergencies in present study showed that a judicious and careful use of clinical evaluation with high index of suspicion along with radiological and biochemical findings help to reach a diagnosis based on which the appropriate management strategy ensures good outcome. However, one must take into account the fact that mortality rate and complications are dependent on the variability in patient profile and spectrum of pathologies involved.

Early decision and surgical intervention in operative cases is crucial for satisfactory outcome. Keeping in view dynamic changes in socioeconomic milieu affecting environment, individual and lifestyle factors and more so globalization, the profile of underlying pathologies behind acute abdominal emergencies is changing, hence continued assessments of this type should be conducted from time to time in order to update the information in this area.

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