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Original Research Article

Spectrum of exploratory laparotomy for acute abdomen in a central Gujarat tertiary care centre

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ABSTRACT

Background: Exploratory laparotomy is one of commonest emergency surgeries performed in the world. Despite technological advance imaging, the fundamental technique of exploratory laparotomy has remained unchanged over years. Studies quantifying the spectrum of laparotomy in central Gujarat are lacking.
Methods: A retrospective study of 249 patients of emergency exploratory laparotomy for acute abdomen in SSG Hospital Baroda from May 2022 to May 2024 was done and data involving clinical presentation, imaging, operative findings and post- operative course were studied and analysed. The cases were divided into gastro-intestinal perforation, gastro-intestinal obstruction and miscellaneous cause.
Results: The most common cause of exploratory laparotomy in study was perforation peritonitis including 59 ileal, 16 jejunal, 49 pre-pyloric, 29 duodenal, 1 body of stomach, 17 appendicular and 8 colon. With post op major complications like burst-11%, leak-5%, pneumonia-5%, multi-organ failure-6.5% and ileus 5%, wound infection 18%. The overall mortality was 15%. Out of 58 cases of laparotomy for obstruction including adhesions (29.3%), obstructed inguinal hernia (12%), tuberculosis (32%), malignancy (13.8%), internal hernia (12.6%). The miscellaneous causes were ruptured liver abscess (9), rupture ectopic pregnancy (2), twisted ovarian tumour (1).
Conclusions: Acute abdomen remains a significant surgical problem. Peptic perforation remains a common cause of acute abdomen with high morbidity and mortality, despite improves medical management, though there is a declining trend in incidence, tuberculosis remains an important cause.

Keywords: Exploratory laparotomy, Acute abdomen, Intestinal obstruction, Gastrointestinal perforation

INTRODUCTION

The acute abdomen is a term used to encompass a spectrum of surgical, medical and gynaecological conditions, ranging from trivial to life threatening, which require hospital admission, investigation, and treatment.[1] Acute abdomen is amongst the commonest surgical emergencies in the world. Exploratory laparotomy is therefore one of the commonest emergency surgeries performed in the world.[2] Most common symptoms are abdominal pain, vomiting and abdominal distension whereas tenderness and guarding are most common signs. Despite technological advances and advance imaging, the fundamental technique of an exploratory laparotomy has remained unchanged over the years. Morbidity and mortality continue to remain on the higher side, in spite of advances in antibiotic therapy and intensive care. Despite the large number of laparotomies being performed in the Central Gujarat, there is scarcity of data.

The present study explores the intra-operative findings, clinical findings, imaging findings and outcomes in cases of exploratory laparotomy performed in the last 2 years.

METHODS

Study type

It was a retrospective descriptive study.

Study place

The study was conducted at Sir Sayajirao General Hospital, Vadodara.

Study period

The duration of the study was from May 2022 to May 2024.

Sample size

The sample size was 249 cases, time bound retrospective study from May 2022 to May 2024.

A retrospective study of patients who underwent emergency exploratory laparotomy for acute abdomen from May 2022 to May 2024 in Department of Surgery, Sir Sayajirao General hospital, Baroda. Patients underwent emergency exploratory laparotomy after adequate preoperative resuscitation and routine blood investigations like complete blood count renal and liver function tests, serum electrolytes and imaging like X-ray chest and abdomen standing, ultrasound of abdomen and pelvis. After opening abdomen peritoneal lavage was done with copious amounts of warm saline. The pathology causing peritonitis was identified and treated accordingly. Closure of the abdominal wound was done with number 1 monofilament suture (polypropylene, PDS, and polyamide). Single or multiple drains were inserted in all cases. All patients received broad spectrum antibiotics in the peri-operative period.

Inclusion criteria

Patients who underwent exploratory laparotomy from May 2022 to May 2024 with age more than 15 years were included.

Exclusion criteria

Patients undergoing laparotomy for trauma, and patients who underwent relaparotomy (e.g. an enterocutaneous fistula or an anastomoticdehiscence) were not included in the study.

Patients were divided into 3 categories: perforation peritonitis, intestinal obstruction, and miscellaneous.

Ethical approval given by the Institutional ethics committee, medical college and SSG Hospital, Baroda.

Statistical analysis

All the data was collected and recorded on Microsoft excel. Data was analysed as incidence (%).

RESULTS

In 249 cases of exploratory laparotomy between May 2022 to May 2024, the mean age of patients was 40.4 years, male female ratio was 2.5:1, 182 male and 67 female. The age distribution of the common causes of acute abdomen is shown in Table 1.

The common sites of perforation were gastro-duodenal (79), small bowel (75) and appendix in 17 and, the large bowel in 08 cases. The overall mortality was 32/188 (17.02%). The major complications encountered were burst abdomen, anastomotic leak, intra-abdominal abscess and, multi-organ failure patients. Results pertaining to the individual causes are described.

Table 1: Age distribution of causes of acute abdomen.

Pathology	Age				Total
	<20	21-40	41-60	>60	
Gastro-duodenal perforation	3	24	44	8	79
Small bowel perforation	23	21	21	10	75
Appendicular perforation	10	4	2	1	17
Large bowel perforation	0	1	4	3	8
Rupture liver abscess	0	2	4	3	9
Intestinal obstruction	0	18	26	14	58

Gastric/duodenal perforation

Out of 79 cases of gastro-duodenal perforations, stomach (antral) were 74, duodenal 4 and body of stomach 1. All presented with epigastric pain with average duration of 36 hours. Pneumoperitoneum on chest or abdominal radiographs was present in 68(90%) patients. All duodenal perforations were present on the anterior wall of 1st part of the duodenum, gastric perforations were in antrum in 74/75 and only 1 patient had perforation at the lesser curve. Graham's omental patch repair was done in 78 cases and truncal vagotomy and pyloroplasty in one patient over and

above it. 1 patient with a perforated malignant gastric ulcer underwent a partial gastrectomy. Biopsy of the ulcer edge was taken for all cases.

The mortality rate was 12/79 cases (15%), where 10 had gastric perforation and 2 had duodenal perforation. Major complications are tabulated in Table 2.

Table 2: Major post op complications of laparotomy for gastro-duodenal perforations.

Complications	N
Pneumonia	14
Burst abdomen	11
Leak	7
Ileus	4
Superficial wound infections (excluding caseswith burst	19
Septicemia/MODS	7

Small bowel perforation

This was seen in 75 patients (59 ileal and 16 jejunal). Fever was the most common presenting complaint, and prolonged fever (>1-week duration) was in 46 cases. Abdominal pain was the next most common symptom, with an average duration of 4 days (range 6 hours to 10 days). 13 patients had a history of previous episodes of intestinal obstruction and 8 had taken antitubercular therapy (ATT). Pneumoperitoneum was seen in 60 cases (80%).

In 95% cases ileal perforation was on the antimesenteric border. Gangrene of a bowel was present in 4 cases and multiple perforations were present in 8 cases.

Primary repair of the perforation was done in 39 cases. Resection and anastomosis was performed in 26 patients. Enterostomy with or without resection was done in 20 patients. The abdominal wall was left open in 2 patients and kept on ventilator support for 6 days.

Mortality in small bowel perforations was 18/75 (24%). Major complications are tabulated in Table 3.

Table 3: Major post op complications of laparotomy for small bowel perforations.

Complications	N
Wound infections	14
Leak	9
Ileus	7
Intra-abdominal collections	4
Pneumonia	17
MODS	14

Appendicular perforation

17 patients of appendicular perforation with 1 patient with associated cecal perforation at base of appendix. Pain (average duration of 3 days) was the most common symptom. Pneumoperitoneum was seen on radiographs in 1 case. Appendicectomy was done in 16 cases. In 1 patient of associated cecal perforation resection with ileo-ascending anastomosis was done. No mortality in this group. The main complications were wound infection (3 patients), ileus (2 patients), chest infection (1 patient), intra-abdominal collection (2 patients), and, burst abdomen and anastomotic leak (1 patient each).

Large bowel perforation

There were 8 patients with large bowel perforation. Age of presentation was 40-60 in 4 cases and above 60 in 3 cases. Most common presentation was abdominal distension and generalised abdominal pain for 4-5 days. Fecoperitoneum was in all 8 Patients. 5 out of 8 (63%) patients had cecal perforation in which 3 had malignant mass distally in colon and 3 out of 8 (37%) patients had sigmoid perforation in which 2 had diverticular perforations and 1 had sigmoid volvulus.

Diversion ileostomy with ileo-transverse anastomosis was performed in cecal perforation patients with ascending colon mass. Patient with sigmoid volvulus was unstable, double barrel colostomy was performed. In diverticular perforation patients diversion ileostomy and resection anastomosis was performed.

Table 4: Major post op complications of laparotomy for large bowel perforations.

Complications	N
Wound infections	4
Leak	1
Ileus	1
Pneumonia	2
MODS	1

The mortality in large bowel perforation patients was 2 out of 8 (25%).

Intestinal obstruction

There were 58 patients of intestinal obstruction. The most common features on presentation included distension of the abdomen (87%), vomiting (73%), absolute constipation (88%), dehydration (67%) and pain in abdomen (75%). Operative management of small intestinal obstruction was chosen for people with signs and symptoms suggestive of strangulation. These parameters were presence of fever, leucocytosis, continuous abdominal pain and peritonitis. Operative management was also chosen for patients in which abdominal radiographs showed signs of closed loop obstruction and free gas. In majority of the patients, there was a substantial delay in admission to the hospital from the time of development of the symptoms as shown in Table 5.

A past history of abdominal surgery was present in 21 cases. The commonest aetiology was tuberculosis which was found in 19 out of 58 cases. (32.7%) followed by adhesions in 18 cases (29.3%). Left sided colorectal malignancy was cause in 4 cases. Incarcerated internal hernia and obstructed groin hernia occurred in 7 and 6 cases respectively. Adhesive intraperitoneal band was the cause in 4 cases.

The surgical procedures performed were adhesiolysis, intestinal stomas, resection anastomosis and herniorraphy. The frequency of each procedure is tabulated in Table 6.

Table 5: Time since onset of symptoms and arrival at emergency room.

Time	N
<12 hours	0
>12 hours to 1 day	2
>1 day	2
>2 day	6
>3 day	7
>4 day	11
>5 day	24
>10 days	6

Table 6: Performed surgical procedure in laparotomy for intestinal obstruction.

Operative management	N
Adhesiolysis	13
Reduction of internal hernia	6
Resection anastomosis	14
Enterostomy	13
Negative laparotomy	3
Herniorraphy	7

Postoperative adynamic ileus was the most common complication followed by wound infection. The mortality was 10 patients. The complications are tabulated in Table 7.

Table 7: Major post op complications of laparotomy for intestinal obstruction.

Complications	N
Pneumonia	8
Burst abdomen	2
Leak	7
Ileus	21
Superficial wound infections (excluding caseswith burst	14
Septicemia/MODS	7

DISCUSSION

The acute abdomen is a term used to encompass a spectrum of surgical, medical and gynaecological conditions, ranging from trivial to life threatening, which require hospital admission, investigation, and treatment.[1] With the increasing availability of sophisticated imaging modalities and other investigative techniques, the indications for and scope of exploratory laparotomy have shrunk over time. The increasing availability of laparoscopy as a minimally invasive means of inspecting the abdomen has further reduced the applications of exploratory laparotomy.[3] Most exploratory laparotomies are performed in an emergency situation where the value of exhaustive investigations has to be balanced against any deterioration which may occur in the patient's general condition due to the inevitable delay.[2]

Perforation peritonitis is one of the most common surgical conditions encountered in surgical practice and is a common cause of morbidity and mortality and warrants early surgical intervention.[4] Adequate resuscitation along with baseline investigations and broad spectrum antibiotics, source control, organ support are imperative in each case.[5,6] Further management depends upon the cause of peritonitis. In most of the cases the peritoneal contamination is caused by mixed flora both aerobic and anaerobic. Anatomical, pathological, and surgical factors may favour localisation of peritonitis. However, in majority of the cases peritonitis becomes diffuse when it occurs in patients with sudden anatomical disruption, extremes of age, immunodeficiency, perforation proximal to obstruction, stimulation of peristalsis and following trauma.[7] The clinical presentation of the patients depends upon the site, size, duration of perforation.[8,9] Patients of duodenal perforation present with a short history of pain in epigastrium or upper abdomen along with generalised tenderness and guarding. In diverticular perforation patients are generally of old age and past history of constipation is present along with signs of peritonitis. Appendicular perforations have a characteristic pain starting in peri umbilical area or right iliac fossa along with vomiting and fever. There are also conspicuous signs present like guarding and rebound tenderness in right iliac fossa. Ileal perforations are usually preceded by a history of some medical disease followed by sudden onset of lower abdomen pain, vomiting, abdominal guarding and distention later on. Radiographic evaluation of acute abdomen begins with upright chest and abdominal X-ray and supine abdominal X-ray. The presence of intraperitoneal air on routine radiograph indicates bowel perforation. However, sensitivity of plain film is only 50-70% and probable site of perforation is never elucidated.[10] Another modality is ultrasound but it should not be considered definitive in excluding pneumoperitoneum. Computed tomography (CT) is useful in detecting extra luminal gas with 86% accuracy in predicting site of perforation.

In India, the small bowel is the most common site of spontaneous perforation as shown in our study. Most perforations occur in the distal ileum. This is because the

two main causes, namely enteric fever and tuberculosis are prevalent in this region.[11] Abdominal tuberculosis was common cause in our series. Most cases had either prior episodes of obstruction, or a history of anti-tubercular drug intake, or the operative finding of a stricture adjacent to the perforation.

It is well known that perforations of the large bowel constitute a higher proportion of peritonitis cases in developed countries than in developing countries like India. This was confirmed by our study. Various factors, like lower incidence of infectious diseases, especially typhoid and tuberculosis and higher incidence of inflammatory colitis, like Crohn's diseases and diverticulitis, in these countries contribute to this fact.[12]

Acute intestinal obstruction is one of the common life threatening emergencies all over the world. There is a global change in the spectrum of aetiology of acute intestinal obstruction over the past few years. A number of recent studies have found adhesive obstruction to be replacing obstructive hernias as the most common cause. This is probably due to the fact, that elective hernia surgeries are more commonly performed these days. Intestinal tuberculosis is still an important cause of small bowel obstruction. Large bowel malignancy is less common cause of obstruction in India in contrast to the western countries due to lower incidence of colorectal cancer. Principal management of intestinal obstruction are provision of analgesia, intestinal decompression, intravenous fluid and electrolyte administration and if appropriate surgery.[13]

Surgery is indicated if failure of adhesive obstruction to settle within 48 hours of conservative management, signs of peritoneal irritation, primary underlying obstructed hernia or carcinoma.[13]

The overall mortality in our series was 16.86% which is comparable to other similar studies.[7,14] Common factors in all the deaths were late presentation, extremes of age, low preoperative haemoglobin, poor nutrition, associated malignancy, pulmonary tuberculosis, poor cardiac risk patients, irreversible shock, and septicaemia and associated co-morbid conditions.

Limitations

The findings of study cannot be generalised as the study was done in tertiary care hospital in central Gujarat, as every location has different demography and people of every location has different life style, food habits, addictions, education, occupation and socioeconomic status so causes and outcomes of laparotomy can be different in every location with different people.

CONCLUSION

Exploratory laparotomy remains one of the commonest emergency surgeries performed today. Acute abdomen remains a significant surgical problem associated with high morbidity and mortality. Peptic perforation remains a common cause of acute abdomen with high morbidity and mortality, despite improves medical management, though there is a declining trend in the incidence, tuberculosis remains an important cause of bowel disease.

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