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EMERGENCY LAPAROTOMIES- CROSSSECTIONAL STUDY DONE IN A TERTIARY CARE CENTRE IN MUMBAI,INDIA

Surgery

Dr. H Abishek Karthik*	MBBS MS General Surgery, Senior Resident, Department of General Surgery, MGM Medical College and Hospital, Navi Mumbai. *Corresponding Author
Dr. Lisha Suraj	MBBS DNB General Surgery FIAGES, Professor, Department of General Surgery, MGM Medical College and Hospital, Navi Mumbai.
Dr. Sameer Kadam	MBBS MS General Surgery MCh Cardiovascular Thoracic Surgery, MRCS, Professor and Head of Department, Department of General Surgery, MGM Medical College and Hospital, Navi Mumbai.
Dr. Rahul Kadam	MBBS MS General Surgery, Assistant Professor, Department of General Surgery, MGM Medical College and Hospital, Navi Mumbai.

ABSTRACT

Background: Emergency laparotomy is the commonest life saving procedure performed by surgeons in unprepared patients. Despite being one of the most common emergency surgical procedures, it still proves to be a challenge for the surgeons all over the world.
Methods: This is a retrospective cross-sectional study done in a tertiary care hospital. All patients who underwent emergency midline laparotomy for acute abdomen or trauma by department of General Surgery at this hospital were included in the study. All patients who had elective laparotomies were excluded. Study period was from 1 January 2019 to 31 December 2019.
Results: Out of 161 cases of midline laparotomy, 62 was done for abdomen trauma. Bowel Perforation was the most common non traumatic indication for the laparotomy followed by intestinal obstruction. In all cases of trauma, haemoperitoneum was found. The most common site of injury confirmed postoperatively was found to be mesenteric injury followed by splenic trauma.
Conclusion: Emergency laparotomies are most commonly performed in cases of acute abdomen, where perforation peritonitis is the most common indication for a laparotomy. In emergency surgeries, the preoperative diagnosis and the intraoperative findings may not always be the same. Timely surgical intervention will always play a key role in saving the life of the patient.

KEYWORDS

Laparotomy; Hemoperitoneum; Perforation peritonitis

INTRODUCTION

Laparotomies are one of the commonest surgeries done in emergency setting. Mostly it is a done as a life saving procedure, in patients presenting with acute abdomen or trauma.

An acute surgical abdomen is of such a nature that exact diagnosis cannot be made in time to save the patient's life. Early exploration should be the rule. Although laparotomy is done only after doing necessary investigations, the clinical condition of the patient is of at most significance. For eg., penetrating wound of the abdomen should be explored immediately. Any other abdominal injury which fails to improve after six hours should be subjected to exploration.

Nowadays with the increasing availability of sophisticated imaging modalities and other investigative techniques, the and scope of exploratory laparotomy has shrunk over time. Minimally invasive laparoscopic techniques have further reduced the applications of exploratory laparotomy.

This study was done to analyse the various indications of emergency laparotomy in patients presenting to emergency room with acute abdomen, and to determine the most common findings encountered intraoperatively and the various interventions done for each patient. The site of origin of symptoms, duration from time of onset to time of laparotomy, comorbidities of patient, perioperative nursing and anaesthesia care all play a role in the morbidity and mortality of patients following exploratory laparotomy.

This study also compares the various indications of emergency laparotomy done in our hospital to the other hospitals in India and around the world.

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MATERIALS AND METHODS

This is a hospital-based retrospective, descriptive cross sectional study.

Inclusion Criteria:

All patients who underwent emergency midline laparotomy for acute abdomen or trauma at Medical College Hospital for the period of one year starting from 1 January 2019 to 31 December 2019.

Exclusion Criteria-

Elective laparotomies, Emergency/Elective Appendicectomies done for acute appendicitis which did not involve midline laparotomy, acute abdomen due to urological or gynecological emergencies.

METHODOLOGY-

Data collected from hospital records were compiled and analysed. All patients had underwent Ultrasonography Abdomen/Focussed Abdominal sonography for trauma(FAST). Few patients had underwent Contrast CT Abdomen. Preoperative diagnosis and postoperative diagnosis were compared. No randomisation done. Data regarding morbidity, mortality, length of ICU stay and postoperative outcomes were not considered for the study. The results were analysed and presented in tables and graphs.

Statistical Analysis-

As this was an observational data collection study, with no hypothesis testing, formal calculation of sample size and statistical power was not performed.

RESULTS

This study was done on 161 cases of midline laparotomy, out of which 62 (38.5%) was done for abdominal trauma. Majority were male patients(103 out of 162). The most common age group was found to be 31-40 years (38.51%) followed by 19-30 years(26.09%), 41-50 years(21.74%), above 51 years(7.45%), paediatric(upto 18 years) 6.21%. The age distribution is summarised in *Figure 1*.

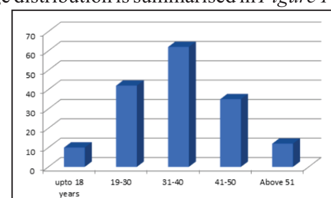

Figure 1- Graph showing the age distribution of various age groups to the number of cases

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Plain Xray Abdomen Standing was done in all patients other than trauma out of which 92(57.14%) showed free gas under diaphragm, multiple air fluid levels seen in 20 patients(12.42%), dilated bowel loops seen in 34 patients(21.11%) and no specific finding in 15 patients(9.31%).

Contrast enhanced computed tomography(CECT) abdomen findings are summarised in *Table 1*. CT prior to laparotomy was not required in 67 (41.61%) cases. The most common finding in CT is presence of free fluid which is a classic feature of perforation peritonitis and hemoperitoneum.

Table 1- Table showing the number of patients with specific CT findings preoperatively

S.No	Findings	Number
1	Not Done	67
2	Free Fluid	52
3	Features of Obstruction	18
4	Splenic Injury	15
5	Liver Injury	3
6	Others(abscess, tumours, adhesive bands)	6

Once the diagnosis was confirmed, patient was shifted to the operating room. Laparotomy was done in 1 % of cases within 1 hour, 30 % within 4–8 h, 38 % of cases within 8–24 h of entry to the casualty. The preoperative diagnosis of acute abdomen were grouped broadly as traumatic and non- traumatic causes. Traumatic abdomen were further divided as blunt trauma and penetrating trauma. Out of the 161 cases 64 were traumatic abdomen, out of which 46(28.57%) were blunt abdomen trauma, The details of the various preop diagnosis and their case count are given in *Table 2.*

Table 2- Table showing the various preoperative diagnosis and their number and percentage out of the total 161 cases

S.No	Diagnosis	Number	Percentage(%)
1	Acute Intestinal Perforation	60	37.27%
2	Blunt Abdominal Trauma	46	28.57%
3	Acute Intestinal Obstruction	18	11.18%
4	Penetrating Abdominal Trauma	16	9.94%
5	Appendicular Perforation	10	6.21%
6	Psoas Abscess	2	1.24%
7	Acute Intussusception	6	3.73%
8	Others	3	1.86%
	Total	**161**	**100.00%**

Acute Intestinal Perforation was the most common non traumatic indication for the laparotomy(37.27%). Intestinal obstruction was found mainly secondary to Obstructed Inguinal Hernia. There was 1 case of obstructed epigastric hernia and 2 cases of obstructed incision hernia. Acute Intussusception was found in 6 cases, all were of paediatric age group. Psoas abscess was found in 2 patients.

In all cases of trauma, haemoperitoneum was found. The most common site of injury confirmed postoperatively was found to be mesenteric(6.52%). The various sites of injury are summarised in *Table 3*. Splenic injury was found in 32.61% and all underwent emergency splenectomy.

Table 3- Table showing the various sites of injury in the cases of blunt abdomen trauma

S.No	Site of Injury	Number	Percentage
1	Mesenteric Injury	20	43.48%
2	Spleen injury	15	32.61%
3	Liver Injury	3	6.52%
4	Bladder Injury	4	8.70%
5	Kidney injury	4	8.70%

Majority of cases were found to be bowel perforation, mostly gastric and duodenal. Graham's Patch omentoplasty was done in 42 cases(26.09%). Resection and anastomosis of small bowel was done in acute intestinal obstruction secondary to obstructed hernia or adhesive obstruction due to previous surgeries.The various intraoperative interventions done for the cases are summarised in *Table 4.*

Table 4- Table showing the various intraoperative interventions

S.No	Intraoperative Interventions	Number	Percentage
1	Graham's Patch omentoplasty	42	26.09%
2	Resection and Anastomosis	28	17.39%
3	Stoma	14	8.70%
4	Splenectomy	15	9.32%
5	Appendicectomy	10	6.21%
6	Pancreatic Necrosectomy	1	0.62%
7	Intraperitoneal Abscess Drainage	5	3.11%
8	Hepatorraphy	3	1.86%
9	Manual Reduction of Intussusception	6	3.73%
10	Hernia repair(inguinal/ventral)	8	4.97%

The common sites of perforation are tabulated in Table 6. The most common was found to be Gastric(28 out of 76) followed by Duodenal(27 out of 76). Jejunal and ileal perforation were found mostly in penetrating abdominal trauma. Solitary rectal perforation was found as a rare case. The various sites of perforation are summarised in Figure 2.

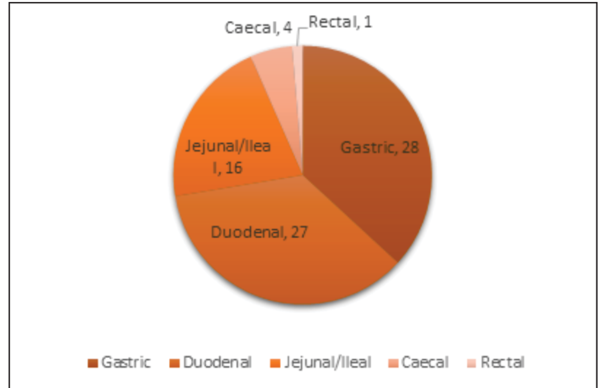

Figure2- Chart showing the various sites of perforation

DISCUSSION

Acute abdomen is one of the most common causes of admission as a general surgical emergency. The term acute abdomen includes a long list of differential diagnosis which poses a great challenge to surgeons. The indications for this procedure can broadly be divided into those done for acute abdomen and those done for trauma. Sometimes emergency laparotomies are termed exploratory laparotomies as the exact diagnosis will not be certain before surgery, and only on opening the abdomen, pathology is identified. 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.

Male female ratio of our study is 1.7:1. This is different from the ratio of 1.95:1 in USA but similar to a range of 2.5:1-4.5:1[1].It is also comparable with the studies of Dickson et al[2], Noguiera et al[3] who also found a higher male: female ratio. But Gupta et al[4] and Wani et al[5], found male:female ratio were 3.25:1 and 3:1 respectively. The present study is in conformity to the world literature where males outnumbered females probably because of higher rate of smoking, alcohol, drug abuse and a higher proportion of outdoor activities exposing to trauma than in females[5].

In our study the maximum cases reported were in the age group between 21-40 years. The commonest presentation out of them is bowel perforation(37.27%). This is comparable to Bansal *et al* [6] where 76% of the patients were of 21 to 50 years of age and most of them suffered from intestinal perforation (36%), intestinal obstruction (11%), road side accidents (10%), penetrating injuries (7%), burst appendix (4%) or ruptured liver abscess, tubercular perforation etc. These findings were also in concordance with the studies conducted by Kapoor et al[7], in which 69% were between 21 to 50 year age groups where mostly the above aetiologies were found in this age group. Also the present study was similar to the study conducted by Gandhi et al[8], where in 44.5% patients were between 31-45 years and peptic perforation (28%), enteric perforation (8.73%), road side accidents (7.23%) were the commonly encountered pathologies.

The perforations of proximal gastrointestinal tract were more common than perforations of distal gastrointestinal tract as has been noted in earlier studies from India[9] which is in sharp contrast to studies from developed countries like the United States, Greece and Japan which revealed that distal gastrointestinal tract perforations were more common[10,11].

The patients with gastric or duodenal perforation present rapidly and have sudden clinical deterioration due to the chemical peritonitis while those with colonic perforation present late[12]. This is due to the fact that the microorganism load is inversely proportional to the relative toxicity of the respective organ fluid composition[13]. The stomach and duodenal secretions contain acidic contents or erosive biliary and pancreatic fluid, whereas distal small bowel and colon contain a relatively neutral environment.

Radiographic evaluation of acute abdomen characteristically involves Xray Abdomen Standing and Xray chest. The presence of free air under the right hemidiaphragm denotes hollow viscus perforation. Studies have shown that even 1 ml of air under the right hemodiaphragm can be detected with a good Xray. However, sensitivity of a plain film radiograph is only 50–70 % and the probable site of perforation is never elucidated[14]. Computed tomography (CT) is useful in detecting extraluminal gas. A study of multidetector CT with Contrast (CECT) showed 86 % accuracy in predicting the site of perforation[15]. The most common finding in CT of perforation peritonitis as well as hemoperitoneum is presence of free fluid. However the decision to take a preoperative CT depends upon the clinical status of the patient. In cases of blunt abdomen trauma CT is preferred over Xray Abdomen as the latter involves patient to be in a standing position for a long time. However if the patient is not vitally stable, CT should be avoided and surgical intervention should be done at the earliest. As per the Advanced Trauma Life Support(ATLS) guidelines[20], if there is a definite indication of laparotomy as in penetrating abdomen trauma like gunshot wounds or stab injury with bowel evisceration, exploratory laparotomy is mandated at the earliest. In our study preoperative CT was not done in 41.61% of cases.

Nowadays with the advent of Focussed Abdomen Sonography for Trauma (FAST), presence of hemoperitoneum is detected faster compared to olden methods like diagnostic peritoneal lavage(DPL). In this study among blunt abdominal injuries, the most common mode of injury was road traffic accidents and most common intraop findings were mesenteric vessel injury with hematoma (43.48%) followed by splenic injury(32.61%). This is similar to the study conducted by Mukhopadhya et al[16]which showed mesenteric injury was common in blunt abdominal injuries. This is however in contrast to the studies of Bansal *et al*[6] , Yogish *et al*[17] and Mehta *et al*[18] in which 53%, 50% and 46.6% cases were having splenic injury respectively.

The incidence of intestinal perforation in younger age group is usually higher because of high rate of smoking and analgesic drug abuse as the same are easily available in medicine stores and sold as over the counter drug. This age group is also economically productive group and are involved in outdoor activities and are therefore more prone to road side accidents leading to head injury or abdominal injuries. In developing countries the incidence of laparotomies due to traumatic abdomen injuries is increasing due to road traffic accidents as compared to developed countries, where laparotomies for atraumatic acute abdomen is more[19].

CONCLUSION

Emergency laparotomies are most commonly performed in cases of acute abdomen, where perforation peritonitis is the most common indication for a laparotomy. In developing countries like India, traumatic abdomen injuries are more common than atraumatic acute abdomen due to high incidence of road traffic accidents.

Radiological investigations like CT help in diagnosing the cause of acute abdomen, but the decision for taking up a patient for emergency laparotomy lies in the hands of the skillful surgeon and the clinical condition of the patient.

Abdomen is considered as 'The Pandora's box' and the concept of exploratory laparotomy is to get inside the abdomen not to target a particular organ, but to be ready to find out any problem inside and rectify it then and there intraop. Hence in emergency surgeries, the preoperative diagnosis and the intraoperative findings may not always be the same. Timely surgical intervention will always play a pivotal role to save any patient of acute abdomen.

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