

Comparison of Laparoscopic Versus Open Repair for Gastro Intestinal Perforation

Dr.kishan d shah m.s (general surgery)

Dr dharmik velani m.s

Abstract

Background

Gastrointestinal perforation a common abdominal emergency treated by the general surgeon. It is a common dictum that abdomen is a Pandora's Box and gastrointestinal perforation is one such condition to prove it. There is great controversy regarding the choice of procedure for gastro intestinal perforation of patients. The purpose of this study was to compare the early outcome results of laparoscopic and open repair and to propose which risk factors influence the outcome.

Methods

Between January 2018 and august 2019, 20 patients underwent laparoscopic and 30 patients underwent open repair of gastro intestinal perforation in a m.p shah medical college. The results were retrospectively analyzed. The primary outcome measures included operative time, duration of hospital stay, morbidity, and mortality.

Results

The most common site for gastro intestinal perforation is duodenum accounting for 60% of cases then followed by appendicular, ileal, gastric, jejuna, meckels diverticulum and colon in order of occurrence. There is clear male preponderance with males accounting for 72% of cases. Maximum cases are found in age group of 41- 60 years accounting for 44% of cases. In 45% of cases size of perforation was 1-2 cm; it was less than 1 cm in 30% of cases and rest 25% only had perforation of greater than 2 cm size. Pain was the most constant clinical symptom, present in all 50 cases followed by vomiting and abdominal distension. Open laparotomy is the treatment of choice in our institute, done in 60% of cases rest 40% were tried laparoscopically but of these, 2 cases had to be converted to open laparotomy. Intra operative complications are having very low rates. The average postoperative stay of patients in hospital is 4 days for laparoscopic approach and 8 days for open laparotomy. Post operative complications were almost negligible in laproscopic approach and it was only 10% in open laparotomy approach. Hence it is seen that complication rates are low in our institute.

Conclusions

In our study , duodenal perforations were common. Most of them were male patients with smoking and alcohol consumption and in the fourth decade of their life. In a small percentage of patients perforations are the first clinical manifestation of an acid-peptic disease. Repair with omental patch followed by treatment for acid-peptic disease with drugs was done in each case with success. Appendicular perforations were the second most common perforations in our study. Ileal perforations were mostly due to typhoid ulcer perforations. In spite of recent advances in closing perforation by laparoscopy and by other means, still simple closure with omental patch was widely practiced in the study group. The interval between the symptoms and the intervention along with initial resuscitation are important prognostic factors for a good outcome. The most common post-operative complication was wound infection.

Date of Submission: 08-10-2020

Date of Acceptance: 22-10-2020

I. Introduction

Gastrointestinal perforation a common abdominal emergency treated by the general surgeon. It is a common dictum that abdomen is a Pandora's Box and gastrointestinal perforation is one such condition to prove it. Perforation of a hollow viscus from a wide variety of causes comprises the major portion of emergency surgical admissions and emergency laparotomies.

The diagnosis and treatment of gastrointestinal perforation remains a challenge to us. Improved medical and surgical care has reduced this problem in North America and the UK, where vascular lesions and malignancies are predominant cause of perforations, while in our country, peptic ulcer disease, typhoid, tuberculosis and appendicular perforations are common causes of acute abdomen.

Perforation of the stomach, duodenum and small bowel form a considerable proportion of emergency workload than colonic. In developed societies, most common causes are the perforation of diverticular disease and colonic carcinoma, where as in the developing countries infective conditions such as typhoid and

appendicular perforations are predominant. Perforation of the large intestine is a rapidly fatal condition, death being caused by sepsis from peritoneal contamination with various enteric pathogens both aerobic and anaerobic. Majority of patients present with sudden onset of abdominal pain. A high index of suspicion is essential to diagnose visceral perforation early as significant morbidity and mortality results from diagnostic delay.

Thus, a study was undertaken to find the aetiological factors and clinical features, age and sex distribution and also to assess the common type of perforations and their presentations, operative modalities, complications arising postoperatively and to come to conclusions which can influence management of such patients.

II. Materials And Methods

This study involved 50 patients with gastrointestinal perforation that presented during the period of January 2018 to August 2019 in our institute. Data collected was analysed.

INCLUSION CRITERIA

- Cases of acute perforation due to peptic ulcer disease.
- Cases of perforation of small bowel due to diseases.
- Cases of appendicular perforation.
- Perforation of caecum and colon.
- Cases of traumatic perforations - both blunt and penetrating types.

EXCLUSION CRITERIA

- Cases of Oesophageal perforation / rupture
- Cases of perforations of hepatobiliary system.
- Cases of Iatrogenic perforation during laparotomy, and gynecological procedures.

Cases of delayed presentation with shock and septicemia whose general condition did not warrant any operative management even after all resuscitative measures.

III. Results

Fifty cases of Gastro intestinal perforations were studied. Majority of the cases of perforations were the complications of peptic ulcer disease. Anatomically perforations were more common in the duodenum.

Table1
Anatomical distribution of perforations

S.No.	Site	No. of Cases	Percentage
1.	Duodenum	30	60
2.	Appendicular	7	14
3.	Ileal	6	12
4.	Gastric	4	8
5.	Jejunal	1	2
6.	Meckel's Diverticulum	1	2
7.	Colon	1	2
	Total	50	100

We can see from the above observations that by far, duodenum is the most common site for intestinal perforation; accounting for 60 percentage of the cases. Following duodenum, the next most common site is appendicular (14% of cases) then is ileum (12% of the cases). Rest other sites such as the stomach, jejunum and colon account for around 15% of the cases of GIT perforation. The explanation for this may be that uncontrolled acid-peptic disease is the leading cause of GIT perforation and hence seen very commonly in areas of peptic ulceration (it is a known fact that 1st part of duodenum is the most common site for peptic ulcer) which ultimately hence form the pathological spectrum of ulcer leading to perforation.

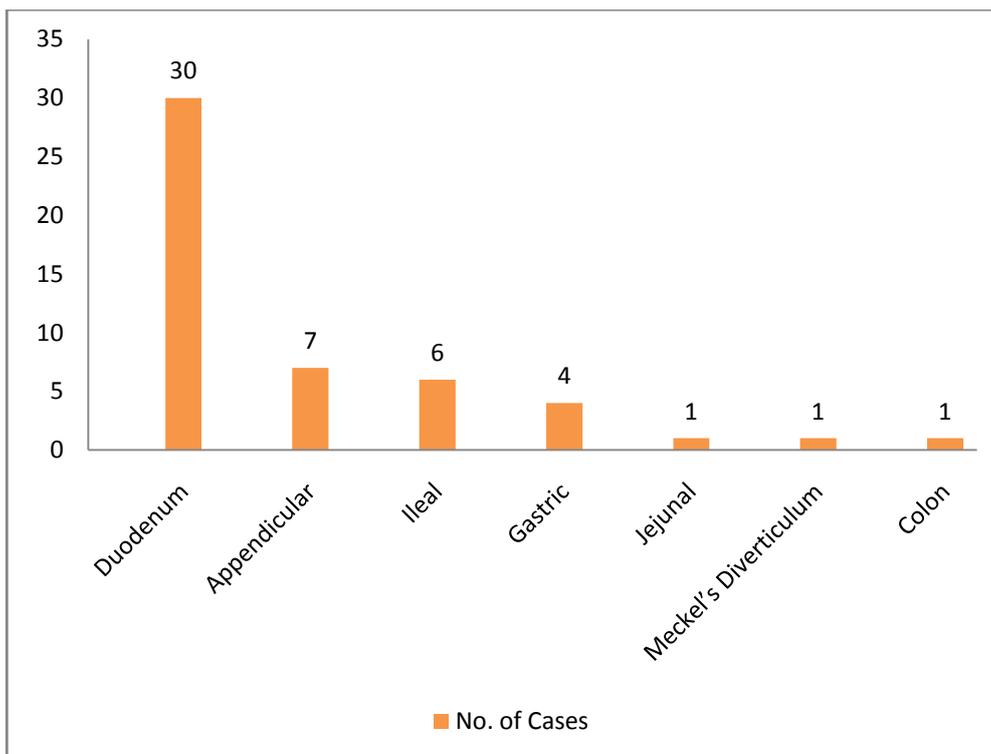
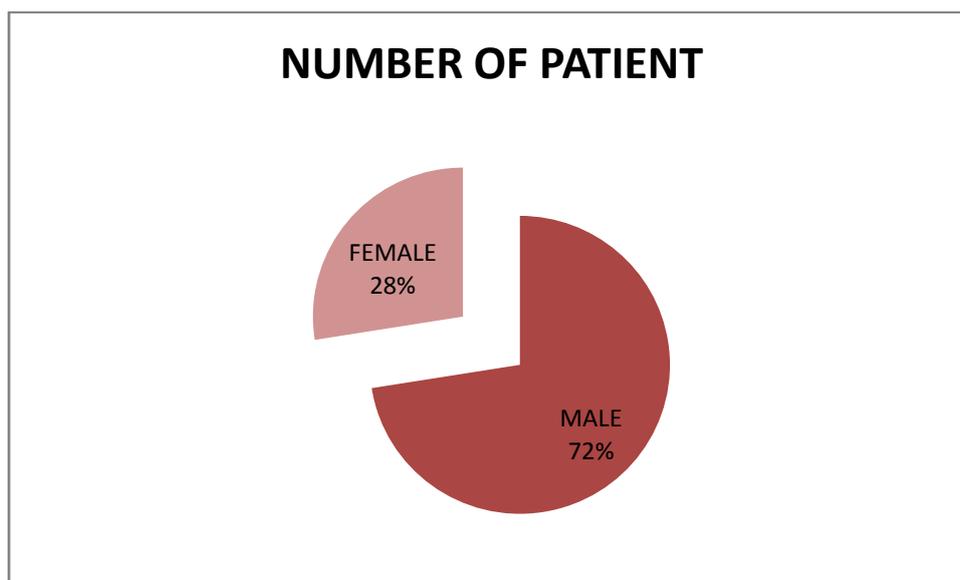


TABLE 2
SEX DISTRIBUTION

SEX	NUMBER OF PATIENT	PERCENTAGE
MALE	36	72%
FEMALE	14	28%
TOTAL	50	100%



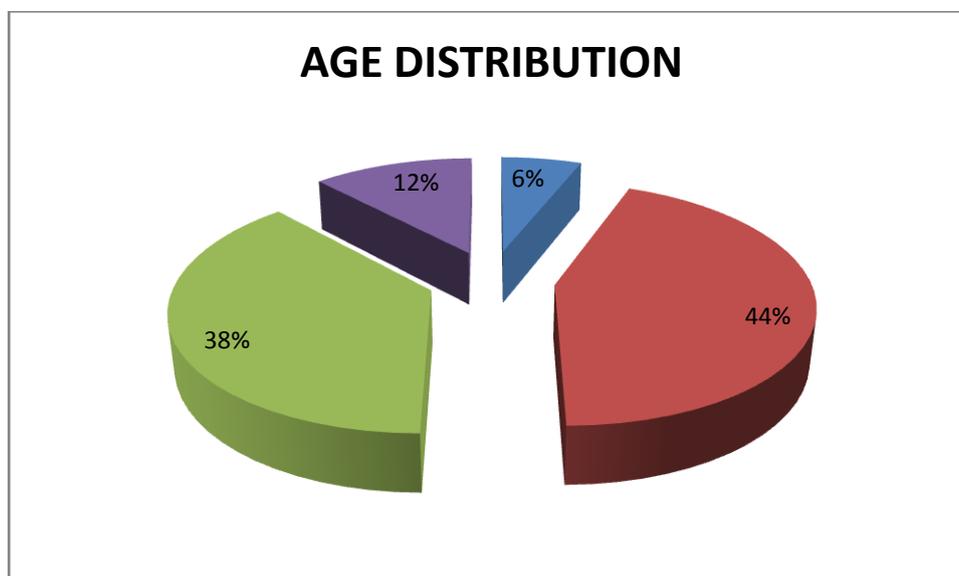
There is male preponderance with 72% patients this can be explained by addiction like alcohol, smoking, tobacco chewing is more common in male than female also incidence of acid peptic diseases is more in males hence the above observation.

COMPARATIVE STUDY

Study	Male : Female
Ersumo D. W, Meskel, Y, Kotisso B, Ethiop Med. J. 2005	7.2 : 1
Plummer, JM, McForlane ME, Nuwnham West Indian Med. J.	9 : 1
Norfolk UK	53 : 47
Kassis .M.S. Al Wattor	14.5 : 1
This Study	3 : 1

**TABLE 3
AGE DISTRIBUTION**

AGE	NUMBER OF PATIENTS	PERCENTAGE
<20 YEAR	3	6%
21 -40 YEAR	19	38%
41-60 YEAR	22	44%
>61 YEAR	6	12%
TOTAL	50	100%



Perforations were more common in the age group of 41– 60 years. The youngest case was 17 years and eldest case was 77 years. Average was 47 years.

COMPARATIVE STUDY

Study	Age Group (Years)
Gupta PS, Taluk dar RN, Neupave HC, Kathmandu University Med. J. 2003	51 – 60
Plummer, JM, McForlane ME, Nuwnham West Indian Med. J.	Male : < 50 Female : > 50
Ersumo D. W, Meskel, Y, Kotisso B, Ethiop Med. J. 2005	25-40
Kassis .M.S. Al Wattor	40 – 50

Norfolk UK	Male : 67.7 Female : 76.6
This study	41-60

TABLE 4
SIZE OF PERFORATION

SIZE OF PERFORATION	NUMBER OF PATIENTS	PERCENTAGE
<1 CM	15	30%
1-2 CM	22	45%
>2 CM	13	25%
TOTAL	50	100%

In 45% of cases Size of perforation was 1-2 cm; it was less than 1 cm in 30% of cases and rest 25% only had perforation of greater than 2 cm size.

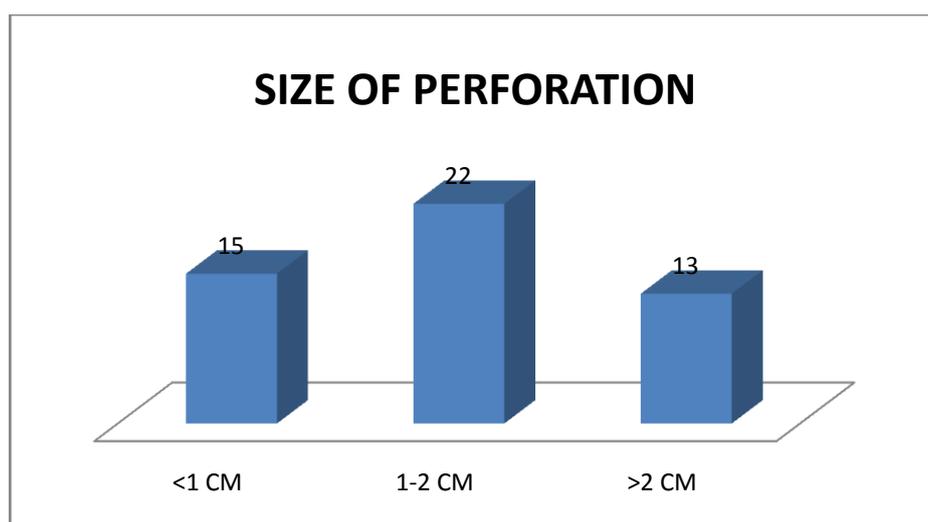
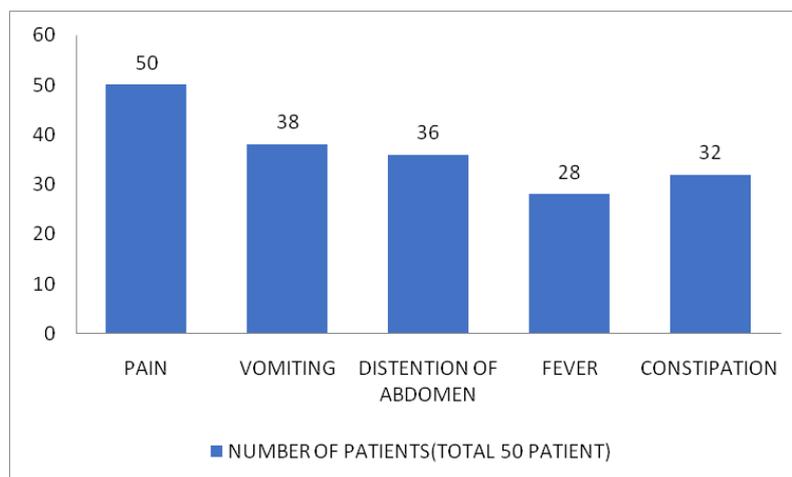


TABLE 5
CHIEF COMPLAINTS

SYMPTOMS	NUMBER OF PATIENTS (TOTAL 50 PATIENT)	PERCENTAGE
PAIN	50	100%
VOMITING	38	76%
DISTENSION OF ABDOMEN	36	72%
FEVER	28	56%
CONSTIPATION	32	64%



Pain was the most common complain present in all 50 patients, followed by vomiting (38 patients), abdominal distention (36 patients). Fever was present in only 28 patients.

**TABLE 6
TREATMENT MODALITIES**

Treatment option	No. of patients
1. Laparoscopic closure	18
2. Open laparotomy f/b perforation closure	30
3. Laparoscopic converted to open approach	02

From the above table it is hence seen that in majority of the patients, open laparotomy approach was the one which is practiced most commonly in our institute and it was done in 60% of patients. Next was the laparoscopic approach which was tried in the rest 20 patients ; but in 02 out of those 20,it had to be converted from laparoscopic to open approach because of adhesions around stomach , large size of perforation (2.5-3 cm) and leakage of food particles from stomach into the peritoneal cavity. So laparoscopic surgery was converted into open laparotomy.

**Table 7
WIDAL TEST**

WIDAL TEST	NUMBER OF PATIENT
PATIENTS WHO TESTED POSITIVE	03
PATIENTS WHO TESTED NEGATIVE	47

Hence from the above table, it is seen that there are only 03 patients who tested positive from amongst total of fifty patients and it is seen as a observation that all the cases who are tested positive are seen to have an ileal perforation; hence working on this observation, on analysing the patients having ileal perforation in my study ; following are the observations-

There were total of five patients of ileal perforation out of which 3 were widal positive.

ILEAL PERFORATION AND WIDAL TEST

WIDAL TEST	ILEAL PERFORATION
POSTIVE	3
NEGATIVE	2
TOTAL CASE	5

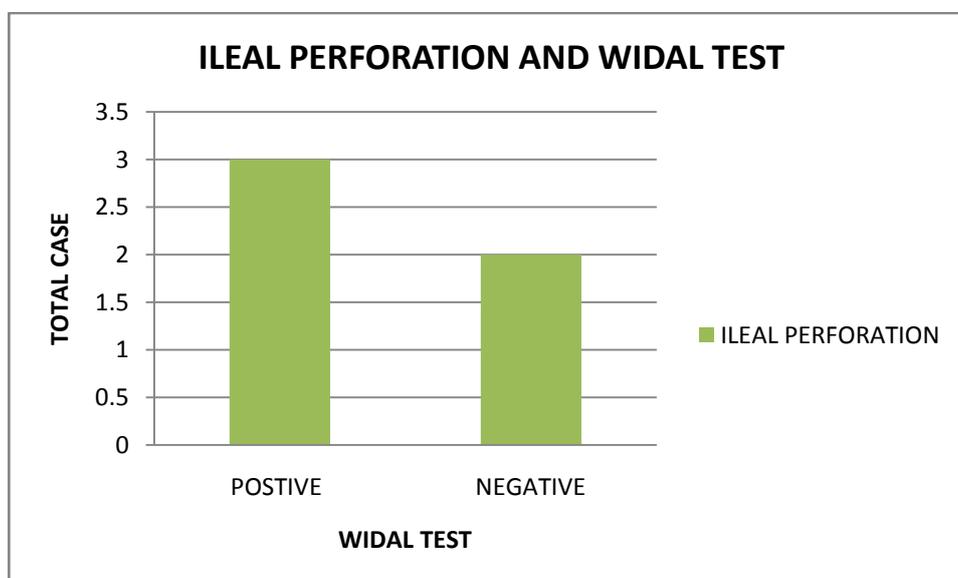


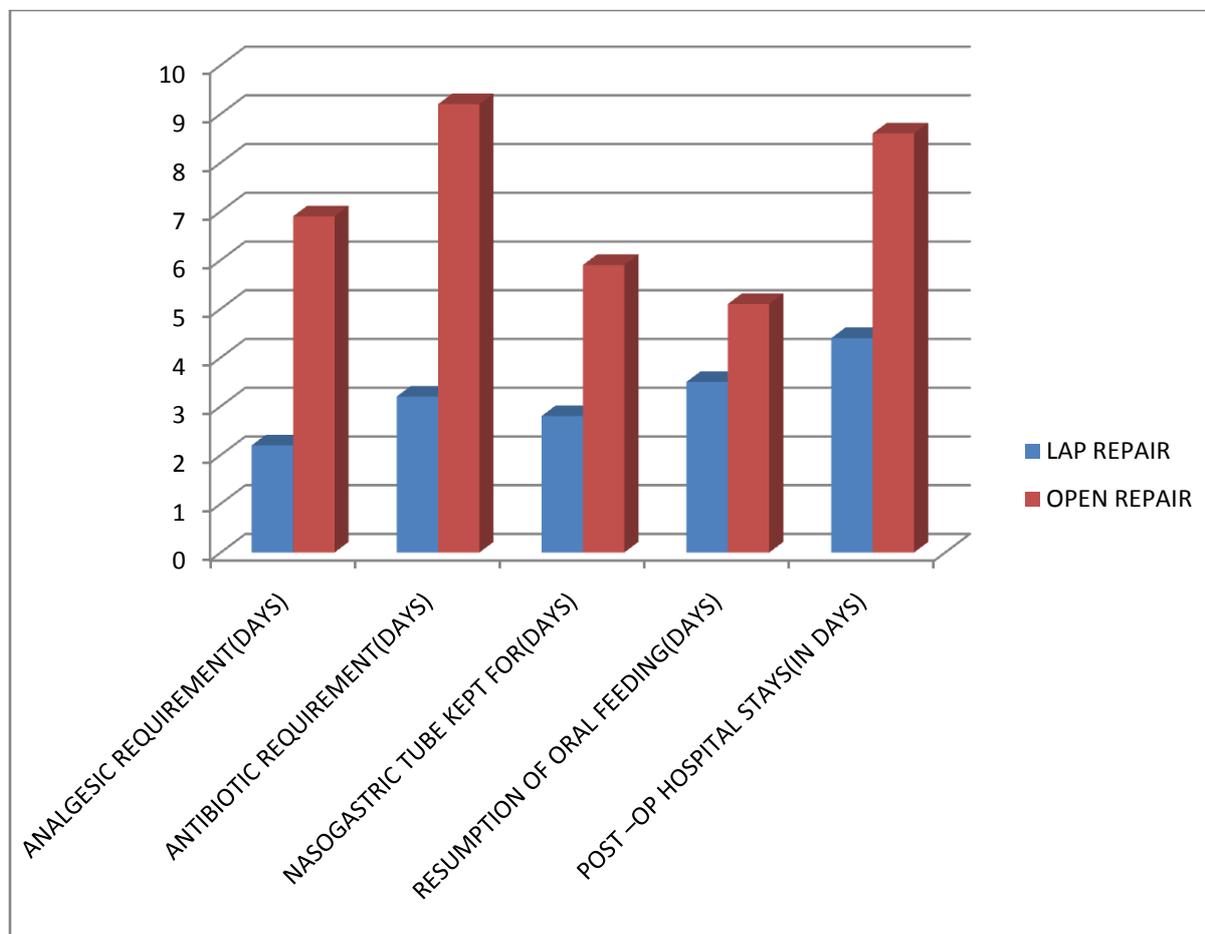
TABLE 8
INTRA –OP COMPLICATION

OBSERVATION	Open	laparoscopic
UNCONTROLLED BLEEDING	0	0
IATROGENIC PERFORATION	0	0
LIVER INJURY	0	0
CONVERSION TO LAPAROTOMY	0	2

During intra operative procedure none of the patients had complications like uncontrolled bleeding from any vessels and none of patient had liver injury. Especially in laparoscopic peptic perforation no patients had liver injury. In 40 patients in this study none of the patients had iatrogenic perforation during operation. But during laparoscopic closure 2 patient had adhesions around stomach, large size of perforation (2.5-3 cm)and leakage of food particles from stomach into the peritoneal cavity. So laparoscopic surgery had to be converted into laparotomy.

TABLE 9
POST OPERATIVE EVENTS

SR NO	EVENTS	LAP REPAIR(MEAN)	OPEN REPAIR(MEAN)
1	ANALGESIC REQUIREMENT(DAYS)	2.3 DAYS	7.3 DAYS
2	ANTIBIOTIC REQUIREMENT(DAYS)	3.5 DAYS	9.6 DAYS
3	NASOGASTRIC TUBE KEPT FOR(DAYS)	2.7 DAYS	6.1 DAYS
4	RESUMPTION OF ORAL FEEDING(DAYS)	3.5 DAYS	5.6 DAYS
5	POST –OP HOSPITAL STAYS(IN DAYS)	4.9 DAYS	8.8 DAYS

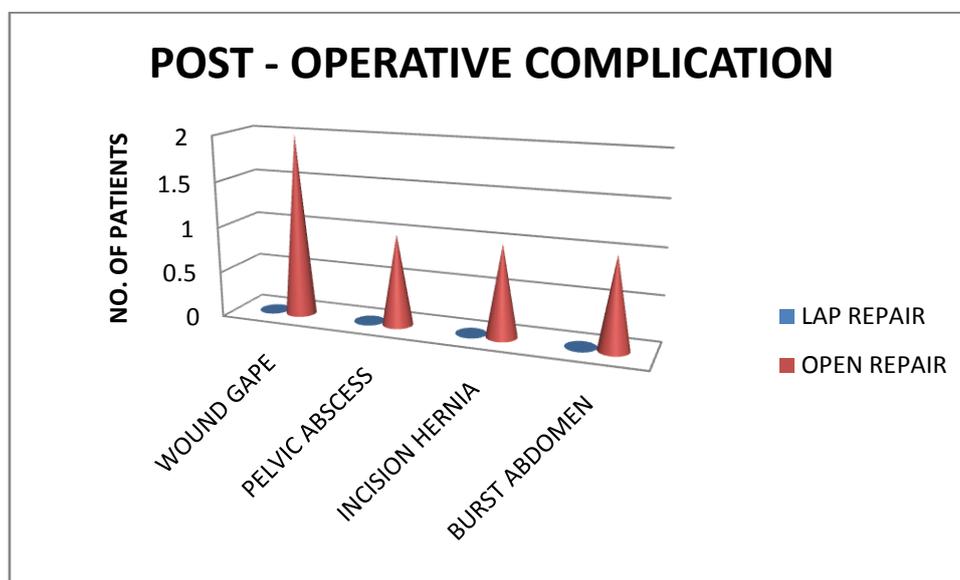


In this comparative study it is found that patients who underwent laparoscopic repair require significantly less parenteral analgesic than open group. Analgesic requirement was mean 2.3 days compared to 7.3 days in open group. The nasogastric tube was removed after 3 days and 6 days in the laparoscopic and open

group respectively. Resumption of oral feeding was achieved on 3rd and 6th day in the laparoscopic and open group respectively. Post-operative hospital stay was 5 days in the laparoscopic group and 8-9 days in open group. Post operative antibiotic requirement was 3-4 days in laparoscopy group and 8-9 days in open group.

Table 10
COMPARISON OF POST OPERATIVE COMPLICATION

COMPLICATION	LAP REPAIR	OPEN REPAIR
WOUND GAP	0	2
PELVIC ABSCESS	0	1
INCISION HERNIA	0	1
BURST ABDOMEN	0	1



In comparative study of peptic perforation closure post operatively wound gap was not present in laparoscopic closure while 2 patients had gap in open laparotomy repair which was treated by daily dressing and healing occurred in 9-10 days. 1 patient had burst abdomen in open laparotomy repair which was treated by spontaneous closure of wound. During follow up 1 patient developed incisional hernia after 2 years.

Table 11
Comparison of various study^[65]

STUDY	NO OF PATIENT	MEAN OPERATIVE TIME (MIN)	CONVERSION TO OPEN SURGERY	MEAN HOSPITAL STAY	MORTALITY	MORBIDITY	MEAN TIME FOR LAPAROTOMY	MEAN HOSPITAL STAY[DAYS]	MORBIDITY IN LAPAROTOMY PATIENTS	MORTALITY IN LAPAROTOMY PATIENTS
PALANI VELU ET AL.[3]	120	46	0	5.5	9	0	NA	NA	NA	NA
DRUART ET AL.[4]	100	80	8	9.3	9	5	NA	NA	NA	NA
LAU ET AL.[5]	24	112	7	5	5	0	NA	NA	NA	NA
SCHIRRU ET AL.[6]	39	77	5	9	5	4	NA	NA	NA	NA
MASTUDA ET AL.[7]	14	135	3	17	1	0	NA	NA	NA	NA
ABID ET AL.[8]	84	95	12	-	15.4	-	NA	NA	NA	NA
VAIDYA ET AL.[9]	31	105	2	5.5	9	0	NA	NA	NA	NA

Comparison of Laparoscopic Versus Open Repair For Gastro Intestinal Perforation

SHIRAJ ET AL.[10]	27/27	55.74	0	4.67	8	0	47.41	6.52	22	0
MEHEN DALE ET AL.[11]	34/33	50	4	6	-	0	55	9	-	0
LAMA TRIAL ET AL.[12]	52/50	75	4	6.5			50	8	2	4
OUR STUDY	50	112	2	12	-	-	92	11	0	0

References:

- [1]. Samy A. Azer M.D. Ph.D., - Article on intestinal perforation, 2005.
- [2]. S. Paterson – Brown – Laparotomy and intraperitoneal sepsis, Hamilton Bailey’s Emergency Surgery, 13th Edition, 315-316.
- [3]. CURRENT MANAGEMENT OF PEPTIC ULCER PERFORATION ,Menakuru SR pak j Med sci 2004;20(2);157-63
- [4]. B D chourasia’s human anatomy 5th addition 259-266
- [5]. Gray’s Anatomy, 40th edition, Chapter 67, Page No. 1116-1117
- [6]. Gray’s Anatomy, 40th edition, Chapter 67, Page No. 1124-1127
- [7]. Gray’s Anatomy, 40th edition, Chapter 67, Page No. 1127-1128
- [8]. Sabiston text book of surgery the biological basis of modern surgical ...practice 17th EDITION
- [9]. Chiba T,yamada T;Gutsmotostatin. In walsh JH,Docray JG(eds); Gut peptides; Biochemistry and physiology.NewYork ,raven press,1994,123-145
- [10]. Schubert ML ,Edward NF, Makhlof GM: regulation of gastric somatostatin secretion in the mouse by luminal acidity; A local feedback mechanism. Gastroenterology 94:317-322,1988.
- [11]. Baily and love short practice of surgery 27th EDITION chapter 63 Page NO1108-1109
- [12]. Tache Y: Central nervous system regulation of gastric acid secretion. In Johnson LR (ed): Physiology of the gastrointestinal Track, 2nd ed. New York,raven press,1987, p 911.
- [13]. Debat HT, Konturek SJ, WALSH JH, et al; Proof of a pyloroxyntic reflex for stimulation of acid secretion in the dog.Gastroenterology 66:526, 1947 .
- [14]. Heyland D, Mandell LA; Gastric colonisation by gram-negative bacilli and nosocomial pneumonia in the intensive care unit patient: Evidence for causation
- [15]. Samloff IM; Peptic ulcer: The many proteinases of ...aggression.Gastroenterology 96:586-595,1989.
- [16]. Wokkinr.m.dennisonar.collim j. 1984
- [17]. HALLE t. debas /sean j mulyuihill : complication of peptic ulcer disease.maingot’S ABDOMINAL operation. 10th edition,983
- [18]. JOHN N. PRIMROSE: PEPTIC ULCER DISEASE. Love AND BAILY.Textbook of surgery,27th EDITION
- [19]. Kurata JH : ulcer epidemiology : an overview and proposed research framework gastroenterology 1989;96 :569 -80
- [20]. Sonnenberg A .cost of medical and surgical of duodenal ulcer.gastroenterology 1989;96 :1445 -52
- [21]. Asian journal of surgery October 2002
- [22]. Hennessey e. perforated peptic ulcer; mortality and morbidity in 603 cases. Austn Zsurg 1969;38;243-8
- [23]. Smedley f, hickish t, taube m, yale c, leach r, wastwll c perforated duodenal ulcer and cigarette smoking. J R soc Med 1988;81:92-4
- [24]. Doll .year observation in male British doctors.BMJ 1984;309:901-11
- [25]. Rodriguez LAG, Jick H. Risk of upper gastrointestinal bleeding and perforation individual non steroidal anti-inflammatory drugs.Lancet 1994;343:769-72
- [26]. Henry D, Dobson A, turner C. Variability in the risk major gastrointestinal complications from non-steroidal anti-inflammatory drugs.Gastroenterology 1993;105:1078-88
- [27]. Svanes C, soreide O. Gastric ulcer bleeding and perforation.NSAIDS or Helicobacter pylori? Scand J gastroenterol 1996;31(suppl220) 128-31
- [28]. Berne TV , Donovan AJ. Non-operative treatment of perforated duodenal ulcer, arch surg 1989;124;830-2
- [29]. Donovan AJ, Berne TV , Donovan JA, Perforated duodenal ulcer ,arch surg 1998;133;1166-71
- [30]. Kato, Ikuto; Abraham M. Y. Nomura, Grant N. Stemmermann and po-huangchyou (1992). “A prospective study of Gastric and Duodenal Ulcer and Its Relation to Smoking, Alcohol, and Diet”. American journal of Epidemiology 135 (5): 521-530.PMID 1570818
- [31]. KURATA Ph.D.,M.P.H., John H.; Nogawa,Aki N. M.S.(jan 1997).”Meta-analysis of Risk Factor for Peptic Ulcer; Non-steroidal Anti-inflammatory ,Drugs, Helicobacter pylori, and Smoking”.Journal of clinical Gastroenterolgy 24(1):2-17.
- [32]. Martin, U.S.A.F.M.C (major),David F ; Captain Elizabeth Montgomery, U.S.A M.C., Arthus S, Dobek, Ph.D., Geoffrey A,Patrissi, M.A., Colonel David A, Peura,U.S.A M.C., F.A.C.G.(28 June 2008). ‘Campylobacter pylori, NSAIDS, and Smoking; Risk factor for peptic ulcer disease’. American journal of Gastroenterology 84 (10); 1286-1272. Doi;10.1111/j.1572-0241.1989.tb06166.x. PMID 2801677.
- [33]. A.B Salih, Barik; M Fatih Abasiyanik, Nizamettin Bayyurt,Ersan Sander(June 2007). “H Pylori infection and other risk factors associated with peptic ulcer in Turkish patient: A retrospective study”. World journal of Gastroenterology 13 (23):3245-3248.PMID 1789905.
- [34]. Cullen DJ, Hawkey GM, Greenwood DC, et al. (1997). “Peptic Ulcer Bleeding in the elderly: relative role of Helicobacter Pylori and nonsteroidal anti-inflammatory drugs’. Gut 41(4):459-62

Dr.kishan d shah m.s, et. al. “Comparison of Laparoscopic Versus Open Repair for Gastro Intestinal Perforation.” *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, 19(10), 2020, pp. 19-27.