

## ASSESSMENT OF LAPAROSCOPIC MANAGEMENT OF INTESTINAL PERFORATION

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### Abstract

**Background:** Intestinal perforation is a surgical emergency often, encountered. Usually, coelotomy is performed to manage intestinal perforation. It has been the gold standard approach to deal with intestinal perforation for the past decades in conjunction with various procedures. Post laparotomy wound related complications have been the biggest challenge for general surgeons till date, so much as to adding up to morbidity, as severe as burst abdomen. Laparoscopic management of perforation is a recent technique.

**Aim:** The present study is aimed to assess the efficacy of laparoscopic management of intestinal perforation.

**Material and Method:** Prospective study of 75 patient admitted and operated in National Institute of Medical Sciences & Research. Intestinal perforation (traumatic and not traumatic) will be managed through laparoscopic procedure. The perforated intestine will be –

1. Identified and exteriorized with or without repair of perforation.
2. Adequate peritoneal toilet would be performed.
3. Sub diaphragmatic and pelvic spaces will be drained.

The outcome of the patients will be assessed in regards to- Total hospital stay, Any associated complications – local or distant. Cause of mortality.

**Results:** In present study the perforation peritonitis was found to be in 70.6% with 58.6% ileal perforation 17.1% jejunal perforation. In our study 52% patients managed laparoscopically 33.3% laparoscopic with exteriorization and 14.6% were converted to open surgery. Various cause for open surgery includes 27.2% multiple perforation, 9.2% cardiac disease and 63.6% site not identified laparoscopically. Patients managed laparoscopically had less complications as compared to open.

**Conclusion:** dealing with intestinal perforation or associated peritonitis using minimal access technique is feasible and in turn helpful in minimizing the most dreaded morbidity i.e. the surgical site infections which can be reduced with improving skills and thorough lavage. Other factors associated with post-operative morbidity i.e. ambulation can be started as early as post operative day one. Prolonged hospital stay can be also be reduced and patients can be sent home early decreasing risk for nosocomial

**Keywords:** Laparoscopic, intestinal, perforation, perforation peritonitis

### Introduction

Intestinal perforation is an emergency often encountered in surgical practice. It can be a result of both traumatic and non-traumatic etiology, wherein, non-traumatic could be a result of enteric fever most commonly occurring in younger age group. Usually, a coeliotomy is performed to manage intestinal perforation. It has been the gold standard approach to deal with the intestinal perforation for the past decades in conjunction with various techniques of perforation repair.

Laparoscopy has been used for gastrointestinal diseases like perforated peptic ulcer and colonic perforations as early as 1990's.<sup>1,2,3-8</sup> Recent studies have shown its use in repair of small bowel perforation,<sup>9</sup> perforated peptic ulcers<sup>10</sup> and peritonitis due to various other abdominal emergencies.<sup>11,12</sup>

Intestinal perforation, if repairable, is closed in two layers with or without proximal ileostomy or the perforated part of the intestine, after repair of perforation can be exteriorized.

Intestinal resection and anastomosis can also be performed. If not, i.e. if the bowel is not healthy enough to retain a primary repair or resection and anastomosis, an ileostomy is made for about six week time to be anastomosed later on.

Post laparotomy wound related complications have been the biggest challenge for general surgeons till date, so much as to adding up to morbidity, as severe as burst abdomen. Other post operative complications involving delayed ambulation leading to respiratory tract infections, deep vein thrombosis have also been attributed to delayed recovery of the patient. Post operative pain management for celiotomy has also been a huge challenge for both the surgeon and the patient.

The post-operative advantages of laparoscopy are commonly accepted. In fact, it may decrease pain, morbidity (pneumonia and wound infections) and mortality; in addition, it may increase prompt recovery of gastrointestinal functions, shorten hospital stay, carry a lower incidence of incisional hernias and lesser

adhesions, thus decreasing health-care costs and allowing higher comfort and better cosmesis. The present study was aimed to assess the efficacy of minimal access surgery in the management of intestinal perforation.

### Material and Method

A time bound assessment study was carried out in the department of general surgery at National Institute of Medical Sciences and Research, Jaipur for a period of eighteen months. 75 patients of intestinal perforation were involved in the study diagnosed with X ray Abdomen erect and ultrasonography of abdomen between the age group of 18-75 years and fit for laparoscopic surgery.

Intestinal perforation (traumatic and not traumatic) were managed through laparoscopic procedure. The perforated intestine was -

1. Identified and exteriorized with or without repair of perforation.
2. Adequate peritoneal toilet was performed.
3. Sub diaphragmatic and pelvic spaces were drained.

The outcome of the patients was assessed in regards to-

1. Total hospital stay.
2. Any associated complications – local or distant.
3. Cause of mortality.

Data was collected and analyzed by software SS 22.0 IBM New York, USA.

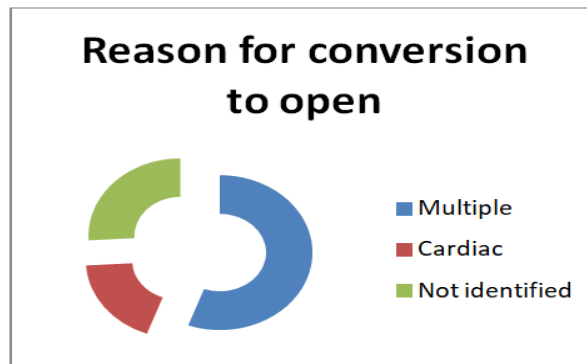


**Figure 1 : Laparoscopic exteriorization of perforated small bowel.**

### Result

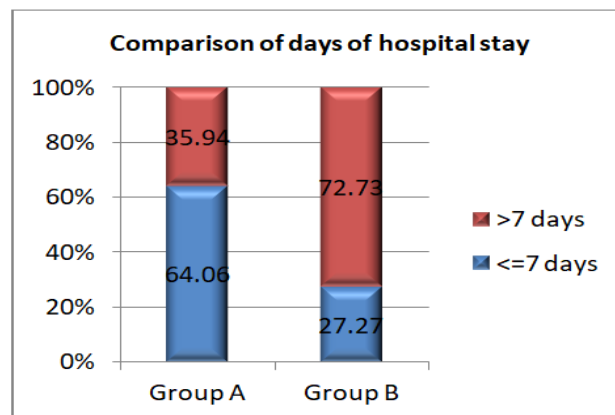
In our study majority patients belong to the age group of 45-54yrs i.e 26.6% . The youngest patient was 18years old and the oldest patient was 67years old. Of the total patients about 50.6% were male and 49.4% females. Time of onset of presentation was within 24hours of onset of symptoms in 90.6% patients. When distributed on the basis of site of pain, 77.3% patients presented with diffuse abdominal pain , 20% with right iliac fossa pain , 1.3% with left iliac fossa pain and 1.3% with hypogastrium region pain. Other

symptoms like fever seen in 58.6% patients, vomiting was seen 74.6% patients and abdominal distention was seen in 53.3% patients. Positive signs of peritonitis were present in 70.6% of the patients. Of the patients taken in the study, 65.3% patient's X-ray showing free air under diaphragm were found. Ileal perforation was seen in about 58.6% patients.



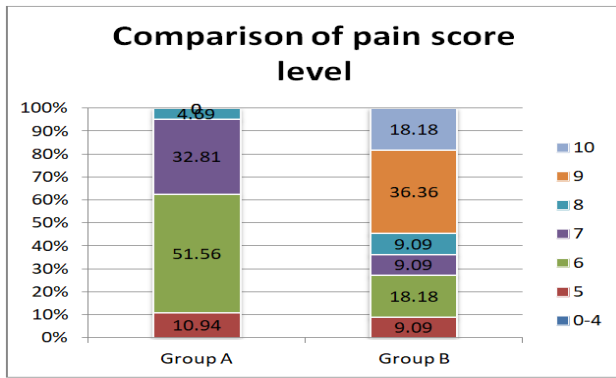
**Figure 2 : Distribution of cases on the basis for reason for conversion to open**

Of the 75 patients in the study 52% cases were managed laparoscopically, 33.3% cases were managed laparoscopically with exteriorization of diseased loop and 14.6% were converted to open exploratory laparotomy. Out of 11 cases which were converted to open exploratory laparotomy, maximum cases i.e. 7 (63.6%) were converted to open as perforation could not be identified.



**Figure 3 : Distribution on the basis of days if hospital stay between Group A (laparoscopic repair of perforation along with laparoscopic exteriorization) and Group B (converted to open )**

Patients operated with laparoscopic technique had a decreased post operative pain score compared to those which were converted to open exploratory laparotomy. 46.6% patients reported a pain score of 6 (using visual analogue scale). In this study maximum cases were found to have an underlying cause for perforation to be typhoid (46.6%) followed by tuberculosis (18.6%).



**Figure 4 :** Distribution on the basis of pain score using visual analogue pain scale between Group A (laparoscopic repair of perforation along with laparoscopic exteriorization) and Group B (converted to open )

### Discussion

The first report of laparoscopic surgery for perforative peritonitis was for a perforated peptic ulcer and appeared in the literature in the early 1990s.<sup>14</sup> Nathanson *et al*<sup>15</sup> and Mouret *et al*<sup>16</sup> were among the first to report successful closure of perforated duodenal ulcers laparoscopically.<sup>15-23</sup>

All these studies confirmed the potential benefits of minimal access surgery in terms of reduced morbidity, less requirement of analgesics, shorter hospital stay, and quicker recovery compared with these things in open surgery.<sup>15,17,24,25</sup> In our study of 75 patients, we made an attempt to assess the laparoscopic management of intestinal perforation.

Management of intestinal perforation and associated peritonitis is till date a challenge for the operating surgeon. With the advancement and acceptance of minimal access surgery in management of perforation peritonitis, the scope for better prognosis and early recovery has come to light.

Sinha *et al*<sup>14</sup> states that the average time of presentation in patients with typhoid ileal perforation was 3 days to 5 days. In our study majority of the patients, 68 i.e. 90.6% presented to within 24 hours of onset of symptoms. Early presentation to the hospital provides an early assessment and intervention which in turn benefits the patient with better prognosis and early recovery. Adeshkumari AR *et al*<sup>26</sup> states late presentation, delay in operation, multiple perforations, and drainage of copious quantities of pus and faecal material from the peritoneal cavity adversely affected the incidence of faecal fistula and the mortality rate.

Ramchandra CS *et al*<sup>27</sup> states that in their study all perforations were localised to the terminal ileum and were single in number. Goh B.K.P. *et al*<sup>30</sup> reports the most common abdominal site being the distal ileum (39%) In our study of total 75 patients most common site of perforation was found to be ileum in 44 i.e. 58.6% followed by jejunum in 12 i.e 17.1%.

Laparoscopic exteriorization is mostly based on the decision making of the surgeon, surgical skills and once identified the site, number, extent of perforation and the overall estimation of the condition of the section of the gut involved. Sinha R *et al*<sup>14</sup> reports no conversion to open celiotomy in their study of 20 cases. Similarly, Patel G *et al*<sup>13</sup> also reports no conversion to open. In our study, however, considering all the parameters 39 i.e. 52% cases were repaired laparoscopically, 25 i.e. 33.6% cases were managed by laparoscopic exteriorization and 11 i.e. 14.6% cases were converted to open celiotomy.

Further, the underlying cause for conversion also enables one to understand the efficacy and helps in decision making of the feasibility of total laparoscopic management of intestinal perforation and associated peritonitis. In our study, out of 75 cases included, 11 cases i.e. 33.6% cases were converted to open for which the most common underlying cause was found to be difficulty in localization of the perforation in 7 i.e. 63.6% cases. Other causes involved multiple perforation and intra-operative cardiac complications due to the pneumo-peritoneum.

Druart ML *et al*<sup>28</sup> reports that in their study post operative comfort was subjectively increased by laparoscopy. In our study comparison was done for post operative pain score using visual analogue pain scale between laparoscopic repair of perforation along with laparoscopic exteriorization (Group A) and cases that were converted to open surgeries (Group B). The result was as significant (p value <0.05) in favour of patients in Group A reporting less post operative pain score compared to Group B. In the study by Patel G *et al*<sup>13</sup> similar outcomes were found in the post operative pain management. Sinha R *et al*<sup>14</sup> also reported similar results.

Good surgical outcome and better patient prognosis involves no post operative complications or if encountered a calculated approach in managing such complications so as to provide patient with best possible care and counselling. In this study

**Figure 5: Comparison between different studies**

Author	No of patients	Days in Hospital	Morbidity (SSI)	Mortality
Sinha R <i>et al</i>	20	10	10%	0
Ramchandra CS <i>et al</i>	6	6	-	-
Patel G <i>et al</i>	20	6	10%	0
Present Study	75	7.3	21%	0

Collectively (Group A and B) reported 21.3% patients had surgical site infection. When comparing both the groups Group A reported 6.8% patients with surgical site infection where as out of 11 patients in Group B 90.91% patients reported surgical site infection. The stastical analysis came out to be highly significant ( p value <0.0001). Sinha R *et al*<sup>14</sup> reported 10% patients with surgical site infection in their study.

Patel G *et al*<sup>13</sup> reported average hospital stay for patients in their study to be 6 days. Sinha R *et al*<sup>14</sup> reported average hospital study in their study varied from 7 to 10 days. Druart

ML *et al*<sup>28</sup> reports their mean hospital stay as 9.3 days and states it was comparable to conventional surgery. Katkhouda N *et al*<sup>29</sup> also states that the laparoscopy group in their study required fewer analgesics, had a shorter hospital stay and a quicker recovery. In our study the mean hospital stay was 7.5±1.1 days. Patients from Group A reported 41 i.e. 64.06% patients to be discharged within 7<sup>th</sup> post operative day. Patients from Group B reported 8 out of 11 patients i.e. 72.73% with average hospital stay more than 7 days (p value 0.022)

### Conclusion

To summarize with the study, dealing with intestinal perforation or associated peritonitis using minimal access technique is feasible and in turn helpful in minimizing the most dreaded morbidity i.e. the surgical site infections which can be reduced with thorough peritoneal lavage and improving surgical skills.

Using laparoscopic management of intestinal perforation, early ambulation of patient can be started as early as post operative day one. Patients operated with laparoscopic procedure had a decreased post operative pain score compared to celiotomy.

Early ambulation facilitated by laparoscopic procedure helps in reducing post operative complications like deep vein thrombosis, respiratory complications and encourages faster recovery.

Another important advantage of laparoscopic surgery is that hospital stay can also be reduced and patients can be sent home early decreasing the risk for nosocomial infection.

To conclude, minimal access approach for management of intestinal perforation is a better modality of treatment than celiotomy under acceptable condition and explained risks.

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