Intraperitoneal Drainage Under Local Anaesthesia In Patients Of Perforation Peritonitis
Before Definitive Management: Is It Justified?

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Abstract

Introduction: Perforation peritonitis is one of the most frequently encountered surgical emergency around the world. In spite of advances in diagnosis, antimicrobial therapy, surgery, it remains a fatal affliction with high mortality rate. This high mortality rate makes way for innovation in techniques in addition to the persisting knowledge for a better outcome.

Aims: A pilot study was conducted, to evaluate the efficacy of intraperitoneal drainage in patients of perforation peritonitis during the resuscitation period before definitive surgical treatment.

Methods: This was a prospective control study, conducted on the patients of perforation peritonitis with gastro-intestinal perforation for a period of 2 years w.e.f. January, 2011 to November 2012. 100 patients were included in this study and were divided into two groups (50 each). Group I- patient with preoperative intraperitoneal drainage under local anaesthesia, group II- patient without preoperative intraperitoneal drainage, before definitive surgery.

Results: The overall morbidity and mortality of the patients in group-I were comparable with those in group-II

Conclusion: Intraperitoneal drainage under local anaesthesia, in patients of gastrointestinal perforation peritonitis seems to be effective in decreasing morbidity and mortality.

Keywords: Perforation peritonitis, intraperitoneal drainage, local anaesthesia.

Introduction

Perforation peritonitis is one of the most common surgical conditions encountered in surgical practice and is a common cause of mortality, in tropical countries like India and warrants early surgical intervention. Up to the early part of the 19th century non-operative management was mainstay of treatment. But since late nineteenth century when the first operative treatment of gastric perforation was done successfully the non-operative management fell into disrepute because of its high morbidity and mortality. [1]

Perforation peritonitis have a high mortality rate, ranges between 6–27%. [2,3] Factors contributing to the high mortality include advanced age, late presentation, septicaemia, associated co morbidity, and delay in the treatment. Early diagnosis and effective intervention is crucial for a successful results. [4] Its management includes aggressive surgical intervention for control of contamination and unburdening of bacterial load and more effective antimicrobial agents. [5]

Despite improvements over the last several decades brought about by wide availability of antimicrobial agents, surgical advancement techniques, anaesthesia, critical care, the morbidity and mortality still remained quite high. Therefore, various innovative techniques made their way to bring down this high morbidity and mortality. One of these innovative techniques is to place preoperatively intraperitoneal drain to unburden the contamination load.

Aims and objectives

1. To assess the outcome of the patients with perforation peritonitis who underwent abdominal tube drainage under local anaesthesia (L.A.) before definitive surgical treatment in terms of morbidity and mortality (Group I).
2. To assess the outcome of the patients with perforation peritonitis who did not undergo abdominal tube drainage before definitive surgical treatment in terms of morbidity and mortality (Group II).
3. To compare the outcome between Group I and Group II in terms of morbidity and mortality.

Method

This prospective control study was conducted on the patients of gastro-intestinal perforation peritonitis, presented to and were operated upon in the Casualty Section of Jawaharlal Nehru Medical College Hospital, Aligarh, India.
during the period of about two years w.e.f. January, 2011 to November 2012.

100 patients were included in this study and were divided into two groups. 50 patients in group I (study group) who underwent preoperative peritoneal drainage under local anesthesia and the other 50 patients in group II (control group) without preoperative Intrapertitoneal drain.

Inclusion criteria:
1. All patients with gastro-intestinal perforation peritonitis presented to the Casualty Section in sick condition with hemodynamic instability.
2. Patients with perforation peritonitis who required extended resuscitation for more than 4 hours before undergoing definitive surgical.

Exclusion criteria:
1. Haemodynamically stable Patients at the time of admission
2. Haemodynamically unstable Patients at admission, but become stable within 4 hours of resuscitation
3. Patient who expired before definitive surgery.

The patients are divided into two groups:
1- Group- I: Patient with preoperative peritoneal drainage
2- Group- II: Patient without preoperative peritoneal drainage

Statistical analysis:
Student t-test and chi-square test was used to for statistical analysis. A p value < 0.05 was considered to be statistically significant. All the analyses were performed using 16.0 version of SPSS software.

Results

Demography
A total of 100 cases of perforation peritonitis were studied from January 2010 to November 2012 at JNMCCH, Aligarh, India. The ages of the patients ranged from 14 to 85 years with a mean age of 40.58 ± S.D 16.93 years (Table 1).

Table 1: Age in the two groups

<table>
<thead>
<tr>
<th>Test</th>
<th>Group I (With PPD*) Mean ± S.D (Range)</th>
<th>Group II (Without PPD) Mean ± S.D (Range)</th>
<th>t-value</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>42.02±16.869 (14 - 85)</td>
<td>39.14±17.03 (15 - 75)</td>
<td>0.8495</td>
<td>0.3977</td>
</tr>
</tbody>
</table>

Perforation peritonitis most commonly affects males in their forties of their life with a male to female ratio, M: F ratio of 5:1 (Table 2).

Table 2: Sex distribution in the two groups

<table>
<thead>
<tr>
<th>Test</th>
<th>Group I (With PPD*)</th>
<th>Group II (Without PPD)</th>
<th>Chi-square value</th>
<th>p-value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>42</td>
<td>43</td>
<td>0.784</td>
<td>0.779</td>
</tr>
<tr>
<td>Female</td>
<td>8</td>
<td>7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

77% patients presented after 48 hours, 14% between 24-48 hours, and only 9% presented within 24 hours of the onset of symptoms. All the patients in the study presented in shock with pulse rate > 100/min and systolic blood pressure < 90 mm Hg (Table 3).

Table 3: Presenting vitals in the two groups

<table>
<thead>
<tr>
<th>Tests</th>
<th>Group I (With PPD*) Mean ± S.D (Range)</th>
<th>Group II (Without PPD) Mean ± S.D (Range)</th>
<th>t-value</th>
<th>p-value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulse rate</td>
<td>122.80 ± 6.77 (108 - 136)</td>
<td>122.06 ± 7.84 (110 - 148)</td>
<td>0.5050</td>
<td>0.6147</td>
</tr>
<tr>
<td>Systolic BP</td>
<td>81.64 ± 6.372 (66 - 90)</td>
<td>83.28 ± 5.739 (60 - 88)</td>
<td>1.3523</td>
<td>0.1794</td>
</tr>
<tr>
<td>Diastolic BP</td>
<td>43.64 ± 3.674 (40 - 54)</td>
<td>47.76 ± 5.401 (40 - 60)</td>
<td>4.499</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Respiratory rate</td>
<td>24.88 ± 2.353 (18 - 28)</td>
<td>26.80 ± 2.356 (22 - 32)</td>
<td>4.0773</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Temperature</td>
<td>98.96 ± 1.068 (98 - 102)</td>
<td>99.98 ± 1.332 (98 - 103)</td>
<td>4.2245</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>SPO2</td>
<td>93.20 ± 1.050 (92 - 96)</td>
<td>93.44 ± 1.875 (90 - 98)</td>
<td>0.7897</td>
<td>0.4316</td>
</tr>
</tbody>
</table>

*Percutaneous peritoneal drainage# Student t –test.

73% patients had satisfactory Postoperative anaesthetic recovery. 27% of the patients could not be extubated and required ventilator support. 56% patients developed postoperative surgical site infection (SSI). A lower rate ofSSI has been noted in group I as compared to group II (44% vs. 68%) with a statistically significant difference (P < 0.05) (Table 4).

Table 4: Post-operative complication in the two groups

<table>
<thead>
<tr>
<th>Complication</th>
<th>Group I (With PPD) (%)</th>
<th>Group II (Without PPD) (%)</th>
<th>Chi square value</th>
<th>p-value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wound infect Present</td>
<td>22 (44)</td>
<td>34 (68)</td>
<td>5.84</td>
<td>0.016</td>
</tr>
<tr>
<td>Wound infect Absent</td>
<td>28 (56)</td>
<td>16 (32)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Burst abdomen Present</td>
<td>9 (18)</td>
<td>18 (36)</td>
<td>4.11</td>
<td>0.043</td>
</tr>
<tr>
<td>Burst abdomen Absent</td>
<td>41 (82)</td>
<td>32 (64)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Death expired discharged</td>
<td>10 (20)</td>
<td>19 (38)</td>
<td>3.93</td>
<td>0.047</td>
</tr>
<tr>
<td>Drain site infection Present</td>
<td>5 (10)</td>
<td>8 (16)</td>
<td></td>
<td>0.161</td>
</tr>
<tr>
<td>Drain site infection Absent</td>
<td>45 (90)</td>
<td>42 (84)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Percutaneous peritoneal drainage# Chi square test.
Burst abdomen was found less frequently in group I (18%) as compared to group II (36%) with a statistically significant difference (P< 0.05). Postoperative drain site infection was found less frequently in group I (10%) as compared to group II (16%) (Table 4).

29% patients in our study expired post operatively with 33.33% female mortality rate and 16.47% male mortality rate. The mortality rate in group I was lower than that in group II (20% Vs 38%). The difference between the two groups was significant statistically (p < 0.05) (Table 4).

The overall mean hospital stay was 10.2 ± S.D 6.9 days. The mean duration of hospital stay in group I was 10.04 ± S.D 7.6 and in group II was 10.18 ± S.D 7.68 days and there was statistically significant difference between the two groups (Table 5).

Table 5: duration of stay in the two groups

<table>
<thead>
<tr>
<th>Test</th>
<th>Group I (With PPD)</th>
<th>Group II (Without PPD)</th>
<th>t-value</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Days</td>
<td>Mean ± S.D (Range)</td>
<td>Mean ± S.D (Range)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10.04 ± 7.640 (1 - 36)</td>
<td>10.18 ± 7.68 (1 - 24)</td>
<td>0.0914</td>
<td>0.9274</td>
</tr>
</tbody>
</table>

*Percutaneous peritoneal drainage, # Student t –test.

Discussion
Despite a better understanding of pathophysiology, advances in diagnosis, antimicrobial therapy, surgery, and intensive care support, peritonitis remain a highly fatal affliction, and mortality multiplies with each hour of delay for definitive surgery. [2,7]

As these patients are critically sick and often not stabilized haemodynamically even after resuscitation for 2-4 hours, anaesthetists often refuse for general anesthesia considering the high risks for continued postoperative ventilator support and perioperative mortality. Hence there is often a delay of about 12 to 36 hours for any definitive surgical intervention.

In view of the well-known increased mortality rate with increasing delay for definitive surgery secondary to contained toxic load within the abdominal cavity, a pilot study has been designed to evaluate the effectiveness of intraperitoneal drainage during the waiting period for definitive surgical treatment beyond 4 hours of resuscitation. Intraperitoneal drainage under local anaesthesia without definitive surgery has been reported successfully in children with peritonitis secondary to necrotizing enterocolitis perforation, with an overall success rate of 56% 8. However few such study in adult patient is available in the literature.

Surgical site infection was present in 56 patients (56%), 22 patients (44%) in group I and 34 patients (68%) in group II respectively. The difference was statistically significant (p < 0.05). This was in concordance with earlier studies who documented a lower incidence of surgical site infection with 12.5 % and 8.3% respectively in patients with perforation peritonitis after pre-operative peritoneal drainage. [9,10]

27% patients in our study population developed burst abdomen, with 18% in group I and 36% in group II with a statistical significant difference between the two groups (p < 0.05). This finding corroborates with earlier reports documenting a higher incidence of burst abdomen in patients of perforation peritonitis without preoperative Intraperitoneal drainage.[11,12]

Significant postoperative intra-peritoneal collection was present in 6 patients (6%) with 3 patients 6% in each group I and group II, while in other studies intra-abdominal abscess were encountered in 12.5% and 13.4% of the patients, respectively. None of the patients required drainage as the amount of fluid (quantified by USG score) decreased continuously without clinical manifestation. [9,10]

Failure of surgical anastomosis developed in 8 patients, 2 patients in group I and 6 patients in group II respectively. There was no significant statistical difference between the two groups (p > 0.05). Many previous studies encountered similar incidence of leak requiring redo surgery. [11]

The high mortality rate in patients of perforation peritonitis, compels for search of innovative techniques. Emergency abdominal operations though commonly performed, carry high morbidity and mortality risk, due to delayed admission, septic load and unavoidable coexisting cardiopulmonary disease. [13,14] A study found that the septic state of the patient at the time of admission was an important risk factor and concluded that, in order to improve the outcome of patients with perforation peritonitis, septic load needs to be factored into the existing treatment. [15]

The overall mortality rate in our study was 29%. This high mortality in our study was consistent with previous studies who documented post-operative mortality rate of 18.92% and 10% respectively. The overall mortality rate in patients of perforation peritonitis ranges between 6 – 27%. [4,16]

The male and female mortality rate was 16.47% and 33.33% respectively. We noticed a higher female mortality rate in our study which is in conformity with many previous studies who traced a higher female mortality rate. [9,17,18]

10 out of 50 patients (20%) in group I, and 19 out of 50 patients (38%) in group II, expired post operatively. There was comparatively lower mortality rate in group I than group II. With a significant statistical difference (p < 0.05). This is in concordance with previous studies who documented reduced mortality in patients with pre-operative peritoneal drainage from 20.8% to 8.3% 10. The finding in our study is also comparable to many other studies all of which were also performed in the Third World. [19,22]

No major complication during drain placement was noted. There was no incidence of drain site herniation in any of the patients.

The overall mean duration of hospital stay was 10.2 ± S.D
6.9 days. Similar result was found in the two groups with 10.04 ± S.D 7.6 days in group I and 10.18 ± S.D 7.68 days in group II respectively without any statistically significant difference. This finding was in accordance with previous reports who documented mean duration of hospital stay of 10 days, 8 days and 10.9 days respectively. [9, 23, 24]

**Conclusion**

Preoperative percutaneous peritoneal drainage in patients with perforation peritonitis was found associated with significant (p < 0.05) lower rates of surgical site infection, wound dehiscence (burst abdomen) and mortality as compared to the patients with perforation peritonitis without preoperative percutaneous peritoneal drainage. Preoperative percutaneous peritoneal drainage, in view of the better results, is recommended in haemodynamically unstable patient’s . This study had a limited sample size and therefore a larger study is recommended to validate the present observations.

**What this study adds:**

1. **What is known about this subject?**
   Despite a better understanding of pathophysiology, advances in diagnosis, antimicrobial therapy, surgery, and intensive care support, peritonitis remain a highly fatal affliction, and mortality multiplies with each hour of delay for definitive surgery.

2. **What new information is offered in this study?**
   Intraperitoneal drainage under local anaesthesia, in patients of gastrointestinal perforation peritonitis seems to be effective in decreasing morbidity and mortality.

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**References**


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