**ORIGINAL ARTICLE**

**Compare Outcomes of Primary Repair and Ileostomy in Patients Presenting with Typhoid Perforation**

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**ABSTRACT**

**Objective:** The aim of this study is to compare the outcomes between primary repair and ileostomy in paediatric patients with typhoid perforation.

**Study Design:** Comparative study

**Place and Duration:** The study was conducted at the pediatric surgery department of Children Hospital and Institute of Child Health, Lahore and Bacha Khan Medical Complex, Swabi, for duration of six months from June 2020 to December 2020.

**Methods:** Total 100 patients of both genders were presented in this study. Patients were aged between 3-18 years. Detailed demographics of patients including age, sex and body mass index were recorded after taking informed written consent. Patients who had typhoid perforation were enrolled. Patients were equally divided into two groups. Group I had 50 patients and received primary repair and group II received ileostomy with 50 patients. Post-operative outcomes in terms of complications and mortality were assessed and compared among both groups. Complete data was analyzed by SPSS 26.0 version.

**Results:** There were 72 males (36 in each group) and 28 females (14 in each group) in this study. Mean age of the patients was 11.14±7.44 years in group I and in group II mean age was 10.17±9.68 years. In group I 35 (70%) cases had low socio-economic status while in group II 33 (66%) cases had low socio-economic status. 60 patients were from rural areas (30 in each group). Wound infection was the most common complication 9 (18%) found in group I and 12 (24%) in group II followed by wound dehiscence in group I 5 (10%) and in group II 7 (14%). Mortality rate in group II 8 (16%) was significantly higher as compared to group I 3 (6%). Satisfaction among patients of group I was significantly higher as compared to group II with p value 0.05.

**Conclusion:** We concluded in this study that the primary repair in patients with typhoid perforation was effective and useful as compared to ileostomy in terms of post-operative complications and mortality.

**Keywords:** Mortality, Complications, Typhoid Perforation, Ileostomy, Primary Repair

**INTRODUCTION**

Typhoid fever is an infectious febrile condition caused by the Gram-negative bacterium Salmonella typhi[1,2]. Typhoid fever is a long-term illness that begins with fever and chills, progresses to widespread reticuloendothelial involvement with rash, stomach discomfort, and prostration in the second week, and culminates in ulceration of Payer’s patches with intestinal hemorrhage and perforation in the third part of ileum. The most prevalent complication of typhoid fever is intestinal bleeding; nonetheless, intestinal perforation continues to be the most common cause of significant morbidity and mortality. On antimesenteric boundary, within 45 cms of the ileocaecal valve, most individuals develop longitudinal ulcers. [3]

There is a 5 to 62 percent mortality rate for typhoid intestinal perforation (TIP). Late perforations increase perioperative mortality to 80 percent[4-6]. Primary double layered closure[7], segmental resection and end-to-end anastomosis is currently available surgical alternatives Diagnosis relies mostly on a blood culture. In addition, feces may include microbes that can be grown in the laboratory. In the widal reaction, a serological test, anti-bacterial antibodies are found.

Perforations in the gastrointestinal tract have been a surgical concern since the dawn of humanity. There is evidence that Egyptian mummies had holes in their stomachs. As soon as a pathology penetrates the complete thickness of the hollow viscus, peritoneal contamination with intraluminal materials occurs, perforation occurs. From the oesophagus to the rectum, the gastrointestinal system might be perforated at any point [8].

A common surgical emergency on the subcontinent and in tropical nations is ileal perforation peritonitis. Due to the high prevalence of enteric fever and tuberculosis in these locations, it is reported to be the fifth most prevalent cause of abdominal crisis. Untreated, this disease has an abrupt start, a rapid decline and a high mortality rate [9,10] despite the availability of contemporary diagnostic facilities and breakthroughs in treatment regimes.

Some of the more common causes of nontraumatic ileal perforation include: bacterial infections (salmonella, tuberculosis), viral infections (cytomegalovirus and human immunodeficiency virus), fungal infections (histoplasma), parasitic infections (A. lumbricoides, E. vermicularis, and E. histolytica), and others (Wagener's granulomatous and drugs (nonsteroidal anti-inflammatory drugs, e Perforations that have no recognized cause are
called non-specific ileal perforations. Peritonitis results from gram-negative aerobic and anaerobic infection [11].

The aim of this study is to compare the outcomes between primary repair and ileostomy in patients presented with typhoid perforation.

MATERIAL AND METHODS
This comparative study was conducted at pediatric surgery department of Children Hospital and Institute of Child Health, Lahore and Bacha Khan Medical Complex, Swabi for duration of six months from June 2020 to December 2020. The study was comprised of 100 patients. Detailed demographics of patients’ age, sex and body mass index were recorded after taking informed written consent. Patients <3 years of age and those did not give written consent were excluded from this study.

Patients were aged between 3-18 years. Patients had typhoid perforation were enrolled. Patients were equally divided into two groups. Group I had 50 patients in which primary repair was done and in 50 patients of group II, ileostomy was made. Informed agreement was obtained from these individuals before they were sent for emergency surgery. Both groups received 3rd generation cephalosporins (cefotaxime, ceftazidime, ceftriaxone, etc.) and metronidazole after hospitalization and before surgery. Post-operative outcomes in terms of complications and mortality were assessed and compared among both groups. Complete data was analyzed by SPSS 26.0 version. In order to compare the results of the two methods, the chi-square test was utilized. Categorical variables were calculated by frequencies and percentages.

RESULTS
There were 72 males (36 in each group) and 28 females (14 in each group) in this study. Mean age of the patients was 11.14±7.44 years in group I and in group II mean age was 10.17±9.68 years. In group I 35 (70%) cases had low socio-economic status while in group II 33 (66%) cases had low socio-economic status. 60 patients were from rural areas (30 in each group). (Table 1)

Table 1: Baseline detailed demographics of enrolled cases

<table>
<thead>
<tr>
<th>Variables</th>
<th>Group I (n=50)</th>
<th>Group II (n=50)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age (years)</td>
<td>11.14±7.44</td>
<td>10.17±9.68</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>36 (72%)</td>
<td>36 (72%)</td>
</tr>
<tr>
<td>Female</td>
<td>14 (28%)</td>
<td>14 (28%)</td>
</tr>
<tr>
<td>Socio-economic status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>35 (70%)</td>
<td>33 (66%)</td>
</tr>
<tr>
<td>High</td>
<td>15 (30%)</td>
<td>17 (34%)</td>
</tr>
<tr>
<td>Residency</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rural</td>
<td>30 (60%)</td>
<td>30 (60%)</td>
</tr>
<tr>
<td>Urban</td>
<td>20 (40%)</td>
<td>20 (40%)</td>
</tr>
</tbody>
</table>

Wound infection was the most common complication 9 (18%) found in group I and 12 (24%) in group II followed by wound dehiscence in group I 5 (10%) and in group II 7 (14%), intra-abdominal collection was in 4(8%) in group I and in group II 7 (14%) and anastomotic leak in group I was 2 (4%) and in group II was 6 (12%). (Table 2)

Mortality rate in group II 8 (16%) was significantly higher as compared to group I 3 (6%). (Table 3)

<table>
<thead>
<tr>
<th>Table 2: Post-operatively comparison of complications among both groups</th>
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<tbody>
<tr>
<td>Variables</td>
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<tr>
<td>---------------------</td>
</tr>
<tr>
<td>Complications</td>
</tr>
<tr>
<td>Wound infection</td>
</tr>
<tr>
<td>Wound dehiscence</td>
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<tr>
<td>Intra-abdominal</td>
</tr>
<tr>
<td>collection</td>
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<tr>
<td>Anastomotic leak</td>
</tr>
</tbody>
</table>

Satisfaction among patients of group I was significantly higher 48 (96%) as compared to group II 43 (86%) with p value 0.05. (Table 4)

<table>
<thead>
<tr>
<th>Table 4: Comparison of satisfaction among both groups</th>
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<tbody>
<tr>
<td>Variables</td>
</tr>
<tr>
<td>-------------------</td>
</tr>
<tr>
<td>Satisfaction</td>
</tr>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
</tr>
</tbody>
</table>

DISCUSSION
Typhoid fever is a severe health problem in developing countries, with a high morbidity and mortality rate due to a lack of resources and inadequate sanitation. [17] In children, typhoid perforation is the most common lethal illness with a significant fatality rate. For the treatment of typhoid ileal perforation, there are a variety of options, but primary repair and ileostomy are the most prevalent. [18] If left untreated, this disease has an abrupt onset and a rapid downhill path, with significant fatality rates.

In this comparative study 100 patients of both genders with ages 3-18 years were presented. Patients were equally divided into 2 groups. Group I had 50 patients and received primary repair and group II received ileostomy with 50 patients. There were 72 males (36 in each group) and 28 females (14 in each group) in this study. Mean age of the patients was 11.14±7.44 years in group I and in group II mean age was 10.17±9.68 years. These findings were comparable to the previous some studies.[19,20] In group I 35 (70%) cases had low socio-economic status while in group II 33 (66%) cases had low socio-economic status. 60 patients were from rural areas (30 in each group).[19] A variety of operational methods have been supported by various authors, including simple primary repair of perforation [12], repair of perforation with ileo-transverse colostomy [13], primary ileostomy [14], single layer repair with an omental patch [15], and resection and anastomosis [16].

In current study wound infection was the most common complication 9 (18%) found in group I and 12 (24%) in group II followed by wound dehiscence in group I 5 (10%) and in group II 7 (14%), intra-abdominal collection was in 4(8%) in group I and in group II 7 (14%) and anastomotic leak in group I was 2 (4%) and in group II was 6 (12%). These results were comparable to the previous researches.[21-23] Patients who underwent primary repair, according to Ahmed et al [24], experienced a 24.4%
postoperative wound infection, 5 percent dehiscence, 6.4 percent intra-abdominal collection and 4.3 percent anastomotic leakage. Four patients with wound infection who underwent surgery for ileostomy and three who underwent primary repair were described in another study by Naga Babu et al[25]. These results were opposite to our findings. We that mortality rate in group II 8 (16%) was significantly higher as compared to group I 3 (6%).[26] However, several studies found no significant difference between patients treated with primary repair and ileostomy in terms of mortality and morbidity.[27] Satisfaction among patients of group I was significantly higher 48 (96%) as compared to group II 43 (86%) with p value 0.05. Children with typhoid perforation have a significant mortality and morbidity rate. It was determined from this study in terms of morbidity and mortality that primary repair in patients with typhoid perforation is better than ileostomy. Early and accurate treatment may also lessen the number of problems. Procedures are chosen based on a patient's clinical presentation.

CONCLUSION
We concluded in this study that the primary repair in patients with typhoid perforation was effective and useful as compared to ileostomy in terms of post-operative complications and mortality.

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