



East Surgical Ward Enteric Perforation Score: A Novel Scoring System for Swift Decision in Enteric Perforation

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ABSTRACT

Background: For enteric perforation the ESWEP Score is a metric designed to determine whether to perform ileostomy or primary closure. The Objective of this study was to compare the outcomes of primary repair and ileostomy in regard to ESWEP score and effectiveness of ESWEP score in both surgical methods.

Methods: This comparative cross-sectional study was carried out at surgical department of LUMHS, Jamshoro for 06 months from January 2024 to June 2024. 52 individuals fulfilling the criteria were selected and grouped as PR (Primary Repair) and PR+I (ileostomy). Preoperative ESWEP score was calculated and based on a cut off of 13 the patients with a score of ≤ 13 underwent PR and those with a score > 13 underwent PR with

ileostomy. Per-operative findings observed and outcomes were analysed.

Results: Mean ages of the patients in the PR group were 36 ± 8.14 years and in the PR+I group were 37 ± 9.23 years. The mean pre-operative ESWEP score in the PR group was 5 ± 0.78 and in the PR+I group was 16 ± 1.72 . The mean per-operative ESWEP score in the PR group was 6 ± 0.77 and in the PR+I group it was 14 ± 4.17 . The mean total ESWEP score in PR group was 11 ± 1.23 and in the PR+I group it was 30 ± 4.06 . Surgery related and systemic complications were significantly less in the PR group.

Conclusion: This study concluded that ESWEP score in patients with typhoid perforation was a useful guide for the surgeons for making decisions regarding PR alone or primary repair with ileostomy and PR alone.

Keywords: Intestinal perforation, ESWEP score, Typhoid perforation.

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How to cite: Ali MA, Danish AA, Memon MA, Akbar M, Bux K, Khan G, et al. Accuracy of ESWEP Score: Concerning Decision Between Primary Repair And Ileostomy In Enteric Perforation. Pak J Med Dent. 2025 September ;14(4): A-B. Doi: <https://doi.org/10.36283/ziun-pjmd14-4/019>.

Received: Sun, June 08, 2025 **Accepted:** Sun, September 28, 2025. **Published:** Mon, September 29, 2025

INTRODUCTION

To treat enteric perforation, various surgical techniques have been used, such as primary perforation repair, simple perforation repair with proximal diversion, ileo-transverse anastomosis to avoid the perforation, exteriorizing the perforation as loop ileostomy, resection of the diseased segment and

end-to-end anastomosis of the healthy gut, or resection of the diseased gut and exteriorizing as double barrel ileostomy^{1, 2}.

The most serious sequelae of typhoid fever are the intestinal perforations, which is still a major surgical issue in several parts of the world especially in the developing countries³. Typhoid/enteric perforation increases the risk of mortality in such patients. The death rate is specifically high in areas where adequate medical care cannot be accessed easily⁴. Perforation of the terminal ileum's antimesenteric boundary is a common occurrence. Caecal perforation is possible, but it is uncommon. Multiple perforations can be seen in roughly 20% of cases⁵. The prevalence of intestinal perforation during typhoid fever varies greatly in different geographical areas and seems to be changing over time, with Ghana having the highest reported rate i.e. 17.9%. Men and individuals under the age of 40 are more likely to get typhoid perforation⁶.

Typhoid Perforation is diagnosed by rising abdominal pain that usually starts in the right iliac fossa as well as lower abdomen and spreads from there. Guarding, rigidity, tenderness or loss of dullness of liver seems to be the most helpful clinical symptoms. Among 75% of patients, there is a presence of free sub diaphragmatic gas⁷. Preoperative confirmation of typhoid infection via cultures or Widal's test is not possible due to the urgency of carrying out surgical intervention⁸.

Surgical treatment is now widely acknowledged as the most definitive treatment, but few surgeons still favor conservative management. However, the best surgical strategy is up for debate, and several have been suggested. This lack of consensus has often resulted in a neglect of the other therapeutic procedures, such as vigorous hydration and electrolyte therapy, transfusion of the blood, and antibiotics, all of which can assist in minimizing mortality⁹.

In order to have a successful operation of typhoid perforation, there is a need of controlling the abdominal infection with the help of detailed peritoneal lavage as well as site repair of perforation. The strategy for controlling the perforation must focus on the risk associated with the re-perforation as well as anastomotic disruption, whose development carries critical consequences for patients. The emergence of many surgical techniques for TP resulted from the search for a remedy to the unacceptably high rate of death¹⁰. As a result, valid objections related to superiority of the segmental bowel resection as compared to the simple single-perforation closure, the advantages of ileostomy in comparison to the primary repair in the case of severe peritoneal contaminations, or tube ileostomy's benefits over the traditional technique continue to exist¹¹. Segmental resection is based on the elimination of inflammatory, unwholesome bowel surrounding one or more perforations or the

formation of the single anastomosis with sustainable bowel that has a greater probability of healing as well as a lower risk of re-perforation or the anastomotic disruption¹².

Points that favor that single perforation should be managed by simple closure compared to segmental resection is the speed and the feasibility of operation in patients who are critically ill. The effects of dreaded failures are more commonly related to simple closure such as re-perforation and disruption of anastomosis and this has been reduced by improving the level of supportive care given to the patient's particularly parenteral nutrition¹³.

East surgical ward enteric perforation score (ESWEP): Globally, there are about 21.6 million cases of EF. Approximately 200,000 people die annually and 80 percent of those are from South Asian nations including Bangladesh, India and Pakistan. It is common for complications to arise during the second or third week of an EF. A consequence of EF is an intestinal perforation, often known as an enteric perforation. Surgeons always have to decide between constructing a stoma or repairing an intestinal hole. The benefits of PR are that the patients recover quickly, complications related to stoma are not present and usually there is no need for re-intervention, however, it has a drawback of anastomotic leakage. On the other hand, benefit of ileostomy is that it's a safe intervention whenever a surgeon has doubt regarding the perforation and the drawbacks are the complications related to stoma (such as retraction, prolapse and bad smell), bad cosmetically and the need of another surgical intervention for its closure. While taking a decision, a surgeon looks into the general parameters using ESWEP score¹⁴.

Surgeons are never sure whether to repair an EP or create a stoma. To remove any ambiguity regarding ileostomy and repair in patients experiencing peritonitis from an intestinal perforation, Amar *et al.* developed and evaluated the statistical validity of a new measure called the ESWEP score and proposed that this would establish a uniform standard for use worldwide. The ESWEP score consisted of two sections. The preoperative score, which was evaluated prior to surgery, made up the first section. ESWEP was a newly developed validated score which could help the surgeons in making decisions about whether to go for PR or an ileostomy in individuals with perforation due to enteric fever¹⁴.

METHODS

This observational cross-sectional study was carried out in the Department of General Surgery, Liaquat University Hospital Hyderabad/Jamshoro for the period of 06 months from January to June 2024 after approval from Advance Board and Research Studies, LUMHS, Jamshoro, (Letter No. LUMHS/REG/ACD/-28867-79 dated 21-07-2023).

Patients aged 13 years to 65 years both genders, admitted with peritonitis caused by enteric fever perforation were included in this study. Patients with traumatic perforation, corrosive perforation, tuberculous perforation and peptic ulcer perforation, with suspicion of malignancy or with comorbidity and deemed unfit for anesthesia or Patients not willing to participate were excluded from the study. Sample size was calculated using sample size calculator by WHO keeping 95% confidence level, 5% margin of error, 80% power and prevalence of disease 3.5%¹⁵. Fifty two (52) individuals with intestinal perforation due to enteric perforation, fulfilling the inclusion & exclusion criteria were selected and divided in two groups PR and PR +1.

The patient or attendant provided the primary source of data in person during the initial pre-operative period of admission, following informed consent and a brief history, clinical examination and investigations followed by per-operative findings in regard to ESWEF score. The diagnostic criterion involves brief history, clinical examination, laboratory blood investigations and evaluation with radiological investigation including Chest X-Ray, abdomen X-Ray (Erect/Supine), Ultrasound Abdomen and pelvis, per-operative confirmation and histopathology of specimen.

All patients fulfilling the selection criteria undergone surgery were enrolled and were divided into two equal groups i.e. 26 patients in each group. Pre-operative ESWEF score of all patients was assessed and patients underwent laparotomy. Per-operative ESWEF score of all patients was also assessed and noted down and based on the ESWEF score. Patients in one group underwent primary repair alone of the enteric perforation and patients in the other group underwent primary repair with ileostomy. Patients were followed up till discharge and the outcomes were assessed as per operational definition and findings were subjected to statistical analysis.

All data was analyzed in SSPS (version 25.0). The statistical methods included were descriptive statistic i.e. frequency, standard deviation and mean. Quantitative variables such as age, duration of hospital stay, ESWEF pre-operative and ESWEF per-operative scores were presented as mean and standard deviation. Wound infection, wound dehiscence, anastomotic leakage, systemic complications and mortality were presented as frequencies and percentages. Chi-square test was used to determine the difference between the outcomes of both groups and a p-value of ≤ 0.05 was considered statistically significant.

RESULTS

Table 1: Mean age, preoperative ESWEF scores, and length of hospital stay of the patients in both groups (n1=26, n2=26).

Characteristics	Group	N	Mean & Standard Deviation
Age of the Participants	Primary repair group (PR)	26	36±8.14
	Primary repair with ileostomy (PR-1)	26	37±9.23
Preoperative ESWEF score	Primary repair group (PR)	26	5±0.78
	Primary repair with ileostomy (PR-1)	26	16±1.72
Length of Hospital Stay (in days)	Primary repair group (PR)	26	6 ± 0.74
	Primary repair with ileostomy (PR-1)	26	9 ± 0.83

There were 18 (69.2%) males and 8 (30.8%) females in the PR group and 17 (65.4%) males and 9 (34.6%) females in the PR+I group as shown in **Figure 1**. The mean pre-operative ESWEF score in the PR group was 5±0.78 and in the PR+I group it was 16±1.72. Mean per-operative ESWEF score in the PR group was 6±0.77 and in the PR+I group it was 14±4.17. The mean total ESWEF score in PR group was 11±1.23 and in the PR+I group it was 30±4.06. The PR group's mean length of hospital stay was 6±0.74 days, while the PR+I group's was 9±0.83 days. A comparison of the two groups showed a statistically significant difference in the mean length of hospital stay, as shown by $t=15.291$ and less than $p=0.001$ (**Table 1**).

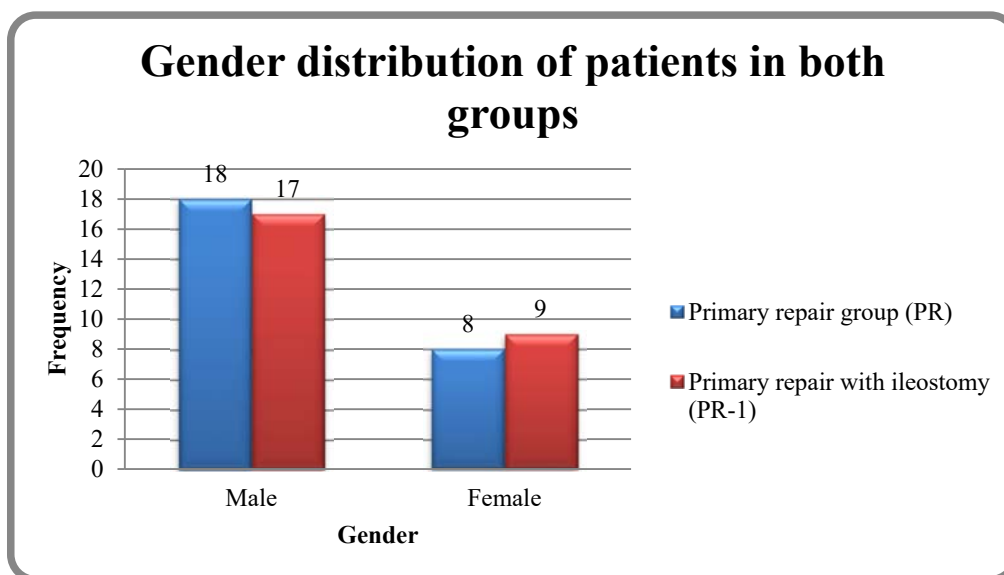


Figure 1: Gender distribution of patients in both groups.**Table 2: Comparison of both groups in terms of Wound Infections, Wound Dehiscence, Anastomotic Leakage and Systemic Complications (n1=26, n2=26).**

Characteristics		Group		p-value
		Primary Repair	Primary Repair +Ileostomy	
Wound Infection	Yes	3 (11.5%)	9 (34.6%)	0.048
	No	23 (88.5%)	27 (65.4%)	
Wound Dehiscence	Yes	2 (7.7%)	8 (30.8%)	0.035
	No	24 (92.3%)	18 (69.2%)	
Anastomotic Leakage	Yes	6 (23.1%)	1 (3.8%)	0.042
	No	20 (76.9%)	25 (96.2%)	
Systemic Complications	Yes	1 (3.8%)	7 (26.9%)	0.021
	No	25 (96.2%)	19 (73.1%)	

Wound infection occurred in 3 (11.5%) patients in the PR group compared to 9 (34.6%) patients in the PR+I group and comparison of wound infection revealed the difference was statistically significant (p-value 0.048). Wound dehiscence occurred in 2 (7.7%) patients in the PR group and in 8 (30.8%) patients in the PR+I group and statistically significant difference was (p-value 0.035). Anastomotic leakage occurred in 6 (23.1%) patients in the PR group and 1 (3.8%) patient in the PR+I group and statistically significant difference was (p-value 0.042). In terms of systemic complications, it was found that 1 (3.8%) patient in the PR group and 7 (26.9%) patients in the PR+I group developed systemic complications the difference was also statistically significant (p-value of 0.021) (**Table 2**).

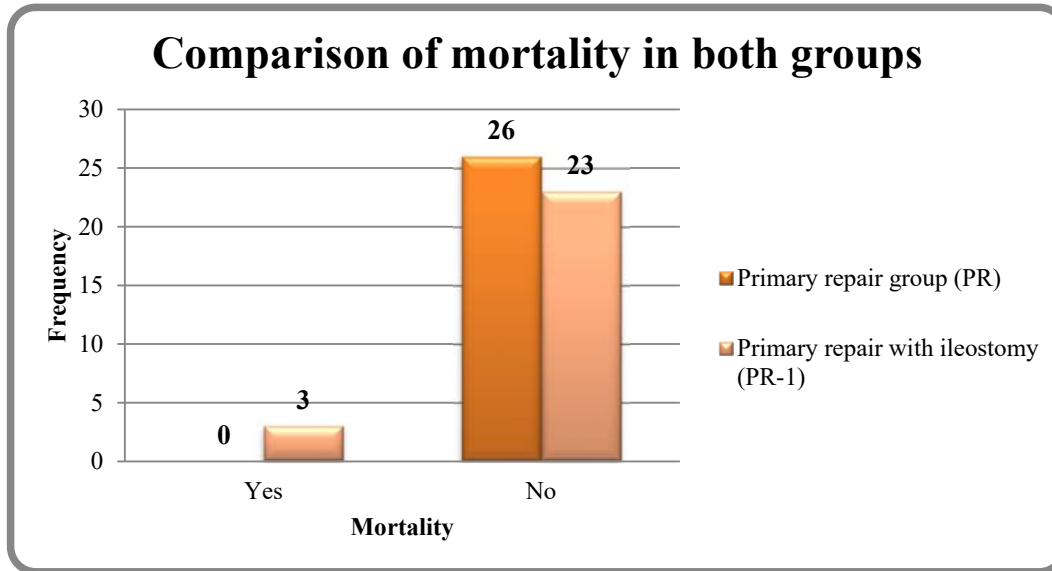


Figure 2: Comparison of mortality after surgery in both groups.

With respect to mortality, none of the patients in the PR group died, whereas 3 (11.5%) patients in the PR+I group died, however, this difference did not reach statistical significance (p value 0.074).

DISCUSSION

A surgical emergency involving enteric perforation has a significant fatality rate up to 30–50%, according to published data. Sepsis is brought on by delayed diagnosis and treatment. It is considered a public health concern since it is thought to impact millions of people each year and contribute to a 1:3 mortality rate among those impacted. At present, there exist patient-dependent variables that alter the prognosis about the administered treatment, hence increasing the risk of dehiscence from primary closure technique¹⁶.

Patients who have an intestinal perforation need to be operated on immediately. While preventing sepsis progression through contamination control is the primary aim, definite therapy is required once the site is identified. Stomas, primary closures involving excision and anastomosis and primary closure procedures without these steps are among the therapeutic possibilities. Despite the fact that intestinal diversion prevents primary closure dehiscence, it is a treatment that is not without complications and has a detrimental effect on the patient's quality of life. Taking the foregoing into account, some writers claim that primary closure procedures can be applied to up to 90% of abdominal trauma perforations. Keeping this in view, our study compared the outcomes of primary repair versus PR with ileostomy based on the division of patients on ESWEF scores¹⁷.

Our study results revealed that patients who underwent primary repair because of lower ESWEF scores had significantly lower rates of wound infection compared to patients who underwent PR with ileostomy i.e. 11.5% versus 34.6% ($p=0.048$), respectively. A study revealed that wound infections occurred in 21.8% individuals in the PR group and in 43.6% individuals in the ileostomy group, and dehiscence of wounds occurred in 3.6% of the PR group and in 9.1% of the individuals in the ileostomy group¹⁸. These findings support our study findings that PR is associated with lesser wound dehiscence rate. They compared patients with TP in terms of outcomes of PR versus ileostomy and revealed that wound infection occurred in 40% patients in the PR group and 24% patients¹⁹. Another study revealed that wound infection occurred in 42.9% patients in the PR group versus 34.5% in PR+I group. Systemic complications were significantly higher in the PR+I group compared to the PR group i.e. 26.9% versus 3.8% ($p=0.021$). They revealed that systemic complications occurred in 23.8% patients who underwent PR versus 17.2% patients who had ileostomy²⁰. These findings do not support our study results as these studies showed a higher rate of wound infection in the PR group. The difference may be due to the surgical expertise, proper antibiotic coverage and adequate sterilization.

In terms of anastomotic leakage, 3.8% patients in the PR group had anastomotic leakage compared to 23.1% patients who underwent PR+I and the difference was statistically significant ($p=0.042$). In a study determined the frequency of anastomotic leakage was significantly lower in the ileostomy group compared to the PR group i.e. 20% versus 6.7%, respectively²¹. On the contrary, an author revealed that the frequency of anastomotic leakage was significantly higher in the PR group compared to the ileostomy group²².

With respect to mortality, the results showed that although PR+I was associated with a higher rate of mortality i.e. 11.5% compared to 0% in the PR alone group, the difference between the PR versus PR+I group did not reach statistical significance in terms of mortality ($p=0.074$). In a previous study a author justified that in individuals with typhoid perforation, the rate of mortality was higher in the ileostomy group compared to the PR alone group i.e. 10% versus 0%²³. In comparison to patients in the PR Group, ileostomy patients had a higher rate of mortality i.e. 19%²⁴. These findings support our study findings that PR is associated with lower frequency of mortality compared to ileostomy. However, another author revealed that the rate of mortality was almost double in the patients and complications were found in 42.5% patients in post-operative duration, whereas ileostomy was found to be considerably safe in emergency settings²⁵. Likewise, another study concluded in their study that Ileostomy closure is always associated with a significant morbidity rate, which can exceed 30%²⁶.

CONCLUSION

Based on a cut off value of 13 used of ESWEP score for determining whether to go for PR or PR with ileostomy, our study results showed that the outcomes based on selection of procedure on the cut off value revealed that the ESWEP score was a useful scoring system for making surgical decisions and led to better outcomes in patients who had lower scores compared to those who had higher scores. Our study concluded that in patients with typhoid perforation, ESWEP score was a useful guide for the surgeons for making decisions regarding primary repair alone or primary repair with ileostomy. Patients who had a lower ESWEP score and underwent primary repair alone had better outcomes compared to those who had higher scores and underwent primary repair plus ileostomy.

ACKNOWLEDGEMENT

None

FUNDING

None

CONFLICT OF INTEREST

None

ETHICAL APPROVAL

Ethical approval was obtained from the Advance Board and Research Studies, LUMHS, Jamshoro, (Letter No. LUMHS/REG/ACD/-28867-79 dated 21-07-2023).

AUTHORS' CONTRIBUTION

All authors contributed equally as per ICMJE.

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