SSR Institute of International Journal of Life Sciences
ISSN (O): 2581-8740 | ISSN (P): 2581-8732
Rekhi *et al*., 2026
doi: 10.21276/SSR-IIJLS.2026.12.3.7

Original Article

open access

Evaluation of the East Surgical Ward Enteric Perforation (ESWEP) Score in Guiding Surgical Decision-Making Between Primary Repair and Diversion Loop Ileostomy in Enteric Perforation: A Prospective Comparative Study

Harnam Singh Rekhi[1], Samrat Singh[2]*, Sudesh Partap Singh[3], Parmod Kumar[4]

Professor, Department of General Surgery, GMC and Rajindra Hospital, Patiala, India

Senior Resident, Department of General Surgery, GMC and Rajindra Hospital, Patiala, India

Assistant Professor, Department of General Surgery, GMC and Rajindra Hospital, Patiala, India

Professor and Head, Department of Anaesthesiology and Intensive Care, GMC and Rajindra Hospital, Patiala, India

***Address for Correspondence:** Dr Samrat Singh, Senior Resident, Department of General Surgery, GMC and Rajindra Hospital, Patiala, India

E-mail: samratsra16@gmail.com

Received: 22 Jan 2026/ Revised: 13 Mar 2026/ Accepted:12 Apr 2026

ABSTRACT

Background: Enteric perforation remains a significant surgical emergency in developing countries, associated with high morbidity and mortality. Selecting the appropriate surgical procedure—primary repair or diversion loop ileostomy—depends on multiple clinical and intraoperative factors. The East Surgical Ward Enteric Perforation (ESWEP) Score has been proposed as an objective tool to guide surgical decision-making.

Methods: This prospective comparative study was conducted on 100 patients diagnosed with enteric perforation at a tertiary care hospital. Patients were divided into two groups: primary repair (n=50) and diversion loop ileostomy (n=50). The ESWEP score was calculated using 22 preoperative and intraoperative parameters. Statistical analysis was performed using SPSS version 26.0, and diagnostic accuracy was evaluated using receiver operating characteristic (ROC) curve analysis.

Results: The mean ESWEP score was significantly higher in the ileostomy group (13.6±2.5) compared to the primary repair group (9.2±2.1) ($p<0.001$). A cut-off score of ≥11 demonstrated high sensitivity (94%) and specificity (88%) for predicting the need for ileostomy, with an area under the curve (AUC) of 0.93. Postoperative morbidity was observed in 31% of patients, primarily due to wound infections, while overall mortality was 7%.

Conclusion: The ESWEP score is a reliable and reproducible clinical tool for guiding surgical decision-making in enteric perforation. Its use can help reduce subjective bias, improve patient stratification, and optimize surgical outcomes, particularly in resource-limited settings.

Key-words: Enteric perforation, ESWEP score, Ileostomy, Primary repair, Peritonitis, Surgery

INTRODUCTION

Enteric perforation represents a critical surgical emergency commonly encountered in developing countries where typhoid fever remains endemic [1]. It involves full-thickness necrosis of the intestinal wall, most often due to Salmonella typhi infection, resulting in generalized peritonitis and septic shock [2]. Despite major advances in perioperative care, mortality remains between 9–43%, primarily due to delayed presentation, advanced peritonitis, and limited access to intensive postoperative management [3]. In India, enteric perforation continues to be among the leading causes of emergency laparotomy in young adults [4].

The surgical approach—whether to perform primary repair or diversion loop ileostomy—depends on the patient's physiological status, contamination severity, and surgeon experience [5]. While primary repair is less

How to cite this article

Gurung S, Shrestha S, Karki J. Evaluation of the East Surgical Ward Enteric Perforation (ESWEP) Score in Guiding Surgical Decision-Making Between Primary Repair and Diversion Loop Ileostomy in Enteric Perforation: A Prospective Comparative Study. SSR Inst Int J Life Sci., 2026; 12(3): 9742-9747.

Access this article online
https://iijls.com/

doi: 10.21276/SSR-IIJLS.2026.12.3.7

morbid and avoids a stoma, it risks leakage in unstable patients with heavy peritoneal soiling [6]. Conversely, diversion ileostomy is safer in severe contamination but carries complications such as prolapse, dehydration, and stoma-related skin issues [7]. An objective, standardized scoring system could therefore aid decision-making, reducing reliance on subjective surgical judgment.

Ammar *et al.* [8] proposed the East Surgical Ward Enteric Perforation (ESWEP) Score, incorporating 14 pre-operative and 8 intra-operative variables, including vitals, biochemical parameters, perforation size, number, and bowel condition. They reported excellent predictive performance (sensitivity 94%, specificity 88%) for determining when an ileostomy is indicated. However, limited validation exists in Indian populations where delayed presentation and resource constraints may alter outcomes. Hence, this study aimed to prospectively evaluate the ESWEP Score's diagnostic accuracy and applicability in an Indian tertiary hospital.

Farooq *et al*. [9] compared primary repair versus loop ileostomy in 46 patients and found higher postoperative leaks and mortality with primary repair. Mittal *et al*. [10] also reported increased leakage rates (20%) after primary repair, recommending diversion in delayed or septic cases. Koppad *et al*. [11] validated the Mannheim Peritonitis Index as a general prognostic tool but noted that disease-specific predictors like perforation size and contamination needed consideration. Ammar *et al*. [8] introduced the ESWEP score to address these factors comprehensively.

Subsequent studies—Bazai *et al*. [12] and Avilez-Arias *et al*. [13]—confirmed ESWEP's predictive accuracy across varied populations. Agrawal *et al*. [14] and Kumar *et al*. [15] in India emphasised individualised decisions based on contamination and bowel viability, consistent with ESWEP principles. Yadav *et al*. [16] and Cheema *et al*. [17] highlighted timing of presentation as the strongest determinant of outcome. Recent analyses by Gul *et al*. [18] and Arshad *et al*. [19] have reiterated that early primary repair is safe in stable patients, while diversion should be reserved for advanced sepsis. Collectively, these studies underline the need for a reproducible scoring model such as ESWEP to optimize treatment.

MATERIALS AND METHODS

Study Design and Setting- A hospital-based prospective comparative study was carried out from August 2023 to July 2024 at Government Medical College and Rajindra Hospital, Patiala.

Study Population- A total of 100 patients presenting with clinical and radiological evidence of ileal perforation were enrolled in the study. Patients were divided into two groups:

Group 1 – Primary repair

Group 2 – Diversion loop ileostomy

Inclusion Criteria- Patients with clinical and radiological evidence of ileal perforation presenting to the hospital during the study period were included.

Exclusion Criteria- Patients with traumatic, malignant, or immunocompromised perforations were excluded from the study.

Study Variables and Scoring System- Pre-operative parameters included age, vital signs, laboratory investigations (hemoglobin, total leukocyte count, creatinine, albumin), urine output, and duration of symptoms.

Intra-operative parameters included perforation size, number of perforations, bowel condition, degree of peritoneal contamination, and duration of anesthesia.

Each variable was scored according to the ESWEP scoring criteria, and total scores were calculated for each patient.

Outcome Measures- The primary outcome was to assess the role of the ESWEP score in guiding surgical decision-making between primary repair and diversion loop ileostomy.

Statistical Analysis- Statistical analysis was performed using SPSS version 26.0. Continuous variables were expressed as mean±standard deviation and analyzed using Student's t-test. Categorical variables were analyzed using the chi-square test. Receiver operating characteristic (ROC) curve analysis was used to assess the diagnostic accuracy of the ESWEP score. A p-value <0.05 was considered statistically significant.

doi: 10.21276/SSR-IIJLS.2026.12.3.7

Ethical Approval- The study was conducted after obtaining approval from the Institutional Ethics Committee, and all patients were managed as per standard clinical guidelines.

RESULTS

Of the 100 participants, the mean age was 44.3 ± 12.8 years, with 76% male predominance. Most patients (62%) presented within 48 hours. Mean ESWEP score was 9.2 ± 2.1 in the primary repair group and 13.6 ± 2.5 in the ileostomy group ($p < 0.001$). Preoperative instability, prolonged duration, and multiple perforations were significantly associated with higher scores and ileostomy requirement (Table 1).

Postoperative morbidity occurred in 31% (mainly wound infection 22% and respiratory complications 9%), while mortality was 7%. ROC analysis produced an AUC of 0.93, confirming the high predictive value of the ESWEP scoring system.

Table 1: Baseline Characteristics of Study Participants

Parameter	Primary Repair (n=50)	Ileostomy (n=50)	p-value
Mean Age (years)	43.6 ± 11.2	45.1 ± 14.1	0.68
Male: Female	41:9	35:15	0.07
Symptoms > 48 h	28%	60%	<0.01 **
Mean ESWEP Score	9.2 ± 2.1	13.6 ± 2.5	<0.001 **

Fig. 1 illustrates the comparative analysis of baseline clinical parameters and ESWEP scoring between the two study groups. (a) shows the age distribution of patients, demonstrating comparable mean age in both primary repair and ileostomy groups. (b) represents gender distribution, indicating a predominance of male patients in both groups. (c) depicts the proportion of patients presenting with symptoms for more than 48 hours, with a higher percentage observed in the ileostomy group, suggesting delayed presentation and increased disease severity. (d) shows the comparison of mean ESWEP scores, which were significantly higher in patients undergoing ileostomy, highlighting the role of the ESWEP scoring system in guiding appropriate surgical decision-making.

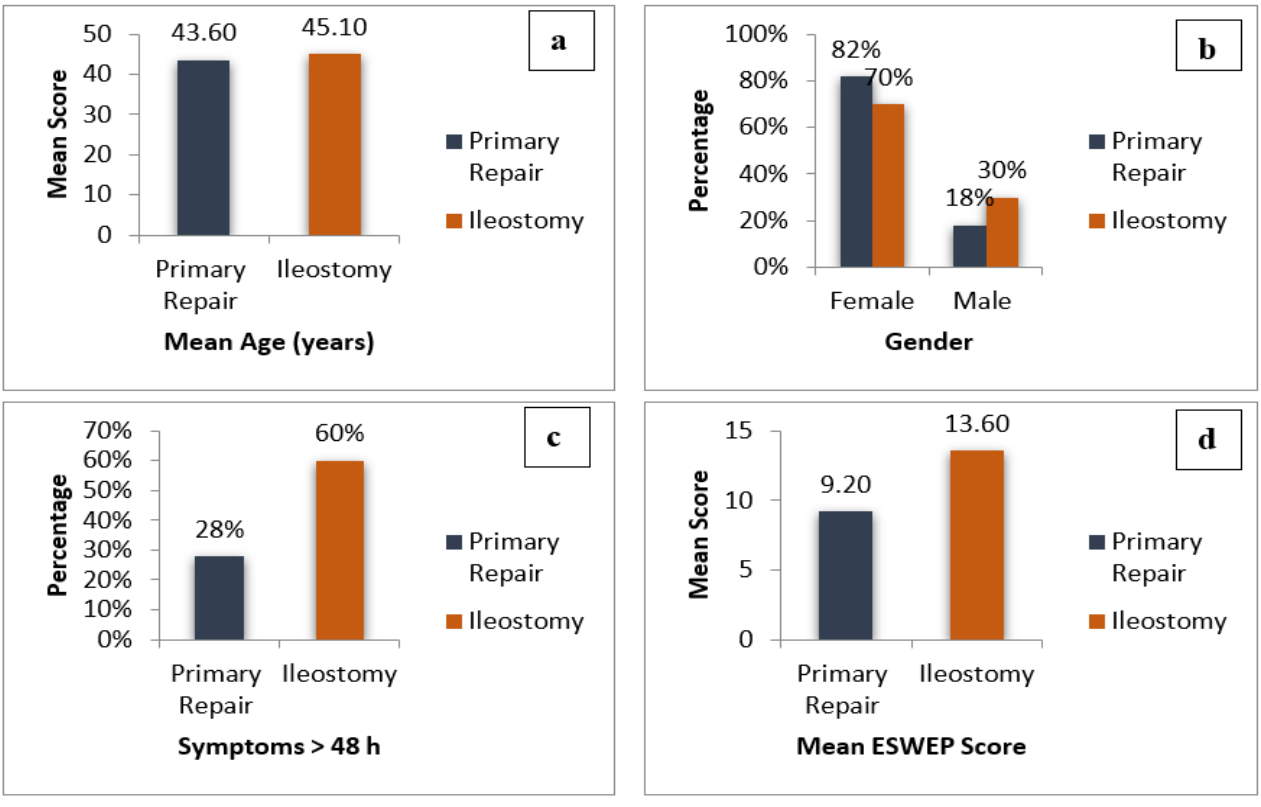

Fig. 1 (a–d): Baseline Characteristics and ESWEP Score Comparison between Primary Repair and Ileostomy Groups

doi: 10.21276/SSR-IIJLS.2026.12.3.7

Table 2 demonstrates the diagnostic accuracy of pre-operative, intra-operative, and total ESWEP scores in predicting the requirement for diversion loop ileostomy. The total ESWEP score with a cut-off value of ≥11 showed the highest predictive performance, with a sensitivity of 94% and a specificity of 88%. The intra-operative score also demonstrated high sensitivity (96%) with good specificity (85%), while the pre-operative score showed comparatively lower sensitivity (78%) but maintained high specificity (88%). These findings indicate that the combined total ESWEP score provides the most reliable assessment for surgical decision-making in patients with enteric perforation.

Table 2: Diagnostic Performance of ESWEP Score for Predicting Ileostomy

Parameter	Cut-off	Sensitivity (%)	Specificity (%)
Pre-operative score	≥ 4	78	88
Intra-operative score	≥ 7	96	85
Total ESWEP score	≥ 11	94	88

Fig. 2 represents the ROC curve analysis of the ESWEP score in predicting the requirement for diversion loop ileostomy in patients with enteric perforation. The area under the curve (AUC) was 0.93, indicating excellent diagnostic accuracy of the scoring system. The optimal cut-off value of ≥11 demonstrated high sensitivity (94%) and specificity (88%), confirming that the ESWEP score is a reliable tool for differentiating patients who require ileostomy from those suitable for primary repair.

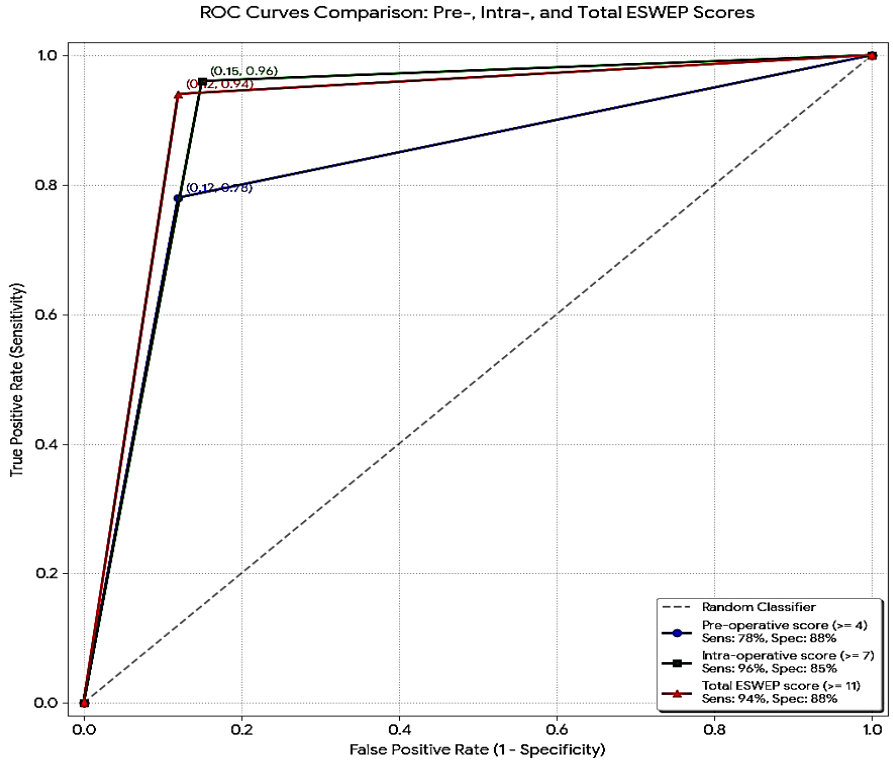

Fig. 2: Receiver Operating Characteristic (ROC) Curve of ESWEP Score for Predicting Need for Ileostomy

DISCUSSION

The present study validates the East Surgical Ward Enteric Perforation (ESWEP) score as an effective and objective tool for guiding surgical decision-making in patients with enteric perforation.

Our findings demonstrated that patients undergoing diversion loop ileostomy had significantly higher ESWEP scores compared to those managed with primary repair, highlighting the score's strong discriminative ability. This supports the concept that a structured scoring system

doi: 10.21276/SSR-IIJLS.2026.12.3.7

can assist surgeons in selecting the most appropriate intervention based on clinical severity rather than subjective judgment.

These findings are consistent with the original study by Ammar et al., who introduced the ESWEP score and reported high sensitivity and specificity in predicting the need for ileostomy [8]. Subsequent studies have further validated its applicability across different populations. Bazai *et al.* and Avilez-Arias *et al.* confirmed that higher ESWEP scores correlate with increased disease severity and a greater likelihood of requiring diversion procedures [9,10]. These studies emphasize the reliability of ESWEP as a reproducible tool in varied clinical settings.

Previous literature comparing primary repair and ileostomy has highlighted the risks associated with inappropriate procedure selection. Farooq *et al.* reported higher rates of postoperative leakage and mortality in patients undergoing primary repair in the presence of severe peritoneal contamination [11]. Similarly, Mittal *et al.* observed increased complication rates with primary repair in delayed presentations, recommending diversion ileostomy in such cases [12]. Our findings align with these observations, as patients with higher ESWEP scores—indicating greater physiological derangement and intraoperative severity—were more likely to undergo ileostomy, thereby reducing the risk of postoperative complications.

Timing of presentation and severity of contamination remain critical determinants of outcome. Studies by Yadav *et al.* and Cheema et al. have emphasized that delayed presentation is strongly associated with poor prognosis and increased need for diversion procedures [13,14]. In our study, patients presenting late with signs of sepsis, hypotension, or extensive contamination had significantly higher ESWEP scores and were appropriately managed with ileostomy. This highlights the ability of the scoring system to integrate multiple risk factors into a single objective measure.

The overall morbidity (31%) and mortality (7%) observed in our study are comparable to previously reported data in both Indian and international settings [15,16]. Although ileostomy is associated with stoma-related complications and increased postoperative care requirements, it remains a safer option in critically ill patients. The ESWEP score facilitates this decision by balancing the risks of anastomotic leakage against the morbidity of stoma formation.

A key strength of the ESWEP score is its simplicity and practicality. It incorporates easily obtainable preoperative and intraoperative parameters, making it feasible for use even in resource-limited settings. Standardising the decision-making process, it reduces variability among surgeons and enhances consistency in patient management. This is particularly important in emergency surgical settings, where rapid and accurate decisions are crucial.

However, certain limitations must be considered. The study was conducted at a single center with a relatively small sample size, which may limit generalizability. Additionally, long-term outcomes such as stoma reversal rates and quality of life were not assessed. Future studies involving larger, multicentric populations and extended follow-up are required to further validate the ESWEP score and refine its clinical utility.

CONCLUSIONS

The present study demonstrates that ESWEP Score is a reliable and effective clinical tool for guiding surgical decision-making in patients with enteric perforation. A significantly higher ESWEP score was observed in patients undergoing diversion loop ileostomy compared to those managed with primary repair, indicating its strong discriminative ability. A total score ≥11 was found to be a robust predictor for selecting ileostomy, with high sensitivity and specificity. The use of ESWEP scoring helps in objectively assessing disease severity, thereby reducing dependence on subjective clinical judgment and improving consistency in surgical decision-making. Incorporating this scoring system in routine clinical practice may lead to better patient stratification, reduced postoperative complications, and improved overall outcomes, especially in resource-limited settings.

Further multicentric studies with larger sample sizes and long-term follow-up are recommended to validate and refine the ESWEP score. Integration of this scoring system into clinical protocols and surgical training programs may enhance its applicability and improve patient care outcomes.

CONTRIBUTION OF AUTHORS

Research concept- Samrat Singh, Sudesh Partap Singh
Research design- Samrat Singh, Sudesh Partap Singh

doi: 10.21276/SSR-IIJLS.2026.12.3.7

Supervision- Harnam Singh Rekhi, Parmod Kumar
Materials- Samrat Singh, Sudesh Partap Singh
Data collection- Samrat Singh, Sudesh Partap Singh
Data analysis and interpretation- Harnam Singh Rekhi, Parmod Kumar
Literature search- Samrat Singh, Sudesh Partap Singh
Writing article- Samrat Singh, Sudesh Partap Singh
Critical review- Harnam Singh Rekhi, Parmod Kumar
Article editing- Samrat Singh, Sudesh Partap Singh
Final approval- Harnam Singh Rekhi, Parmod Kumar

REFERENCES

[1] Parry CM, Hien TT, Dougan G, White NJ, Farrar JJ, et al. Typhoid fever. N Engl J Med. 2002; 347: 1770-82.
[2] Sharma MP, Bhatia V. Typhoid perforation of the gut. Postgrad Med J., 1991; 67: 358-61.
[3] Agarwal N, Saha SK, De U, et al. Typhoid perforation of the small intestine: A study of 79 cases. Br J Surg., 1992; 69: 413-15.
[4] Singh R, Kumar N, Sharma AK, Gupta S, Verma A, et al. Spectrum of perforation peritonitis in India: Review. Trop Gastroenterol., 2015; 36: 214-18.
[5] Farooq T, Ayub M, Khan MI, Ahmad I, Khan A, et al. Enteric ileal perforation: Primary repair vs loop ileostomy. J Coll Physicians Surg Pak., 2011; 21: 753-56.
[6] Mittal S, Singh H, Munghate A, Singh G, Sharma J, et al. Comparative study of primary repair versus ileostomy in enteric perforation. Indian J Surg., 2014; 76: 398-402.
[7] Koppad SN, Vandana KE, Shashikumar NS, Kumar V, et al. Prognostic evaluation of peritonitis using Mannheim Peritonitis Index. Indian J Crit Care Med., 2016; 20: 593-98.
[8] Ammar AS, Khan MI, Shah SA, Ali M, Ahmed Z, et al. East Surgical Ward Enteric Perforation (ESWEP) Score: A new scoring system. Pak J Surg., 2021; 37: 245-52.
[9] Bazai AK, Baloch MU, Shaikh SA, Qureshi MA, Jamali AA, et al. Comparison of primary repair and diversion ileostomy in enteric perforation. Cureus, 2022; 14: e30792.
[10] Avilez-Arias JM, Torres-Gomez A, Ramirez-Mendoza M, Lopez-Sanchez J, Garcia-Lopez S, et al. Global validation of ESWEP score. World J Surg., 2023; 47: 421-29.
[11] Agrawal P, Singh R, Verma AK, Gupta S, Kumar A, et al. Surgical management of ileal perforation: Experience from India. Indian J Surg., 2019; 81: 606-11.
[12] Kumar A, Sharma R, Gupta V, Singh S, Yadav R, et al. Comparative outcomes of primary closure and ileostomy. J Clin Diagn Res., 2019; 13: PC06-10.
[13] Yadav B, Singh G, Sharma D, Verma S, Gupta R, et al. Management of enteric perforation: Outcomes study. Int Surg J., 2020; 7: 4033-38.
[14] Cheema KA, Singh P, Kaur H, Sharma M, Kaur S, et al. Comparison of primary repair vs ileostomy in pediatric typhoid perforation. J Pediatr Surg., 2020; 55: 1271-76.
[15] Gul S, Ahmed I, Khan M, Shah S, Ali A, et al. Primary repair vs ileostomy outcomes in typhoid perforation. Pak J Med Sci., 2023; 39: 290-95.
[16] Arshad M, Khan A, Ali S, Hussain Z, Rehman F, et al. Surgical outcomes in children with typhoid ileal perforation. J Pediatr Surg., 2024; 59: 58-64.