## Original Article

# Comparison of vancomycin enema vs normal saline enema in patients with Hirschsprung-associated enterocolitis

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## ABSTRACT

**Background**: Hirschsprung-associated enterocolitis (HAEC) is a serious complication of Hirschsprung's disease, often leading to significant morbidity and prolonged hospitalization. While vancomycin enemas are commonly used, evidence comparing them with normal saline enemas remains limited, making it important to determine whether antibiotic enemas offer added benefit.

**Methods**: This study was conducted in the Department of Pediatric Surgery at the University of Child Health Sciences, Lahore, over 9 months following ethical approval. Sixty patients diagnosed with HAEC were randomly assigned to Group A (vancomycin enema) or Group B (normal saline enema), with 30 patients in each group. Data were analyzed using SPSS version 24.

**Results**: Of the 60 patients, 80% were male and 20% were female, with no significant age difference between groups (p = 0.144). Both groups demonstrated significant reductions in HAEC scores after treatment (8.37 and 8.16, respectively). Overall, 81.6% of patients responded to treatment, while 18.4% required diversion colostomy. Treatment success did not differ significantly between groups (p = 0.897). The mean time to full remission was 6.33 ± 2.426 days. Average hospital stay was 9.89 days in the normal saline group and 8.43 days in the vancomycin group (p = 0.071).

**Conclusion:** Vancomycin enemas do not offer a significant advantage over normal saline enemas in symptom resolution or hospital stay for patients with HAEC.

**Keywords:** Enterocolitis, Hirschsprung's disease, HAEC, Vancomycin enema, Normal saline enema.

## INTRODUCTION

Hirschsprung-associated enterocolitis (HAEC) is a serious and potentially life-threatening complication of Hirschsprung disease, occurring both before and after definitive surgery. Clinically, it presents with abdominal distension, explosive diarrhea, vomiting, fever, lethargy, rectal bleeding, and, in severe cases, shock [1]. The pathophysiology of HAEC is multifactorial, involving impaired intestinal motility, fecal stasis, mucosal barrier dysfunction, immune dysregulation, and microbial imbalance within the gut [2]. These mechanisms contribute to bacterial overgrowth, toxin production, and mucosal inflammation, predisposing patients to recurrent or severe episodes.

Acute management centers on aggressive fluid resuscitation, bowel decompression, and broad-spectrum intravenous antibiotics [3]. Rectal saline irrigation plays a crucial role in decompressing and clearing harmful bacteria and toxins [4,5]. Vancomycin enemas are also being used for

rectal irrigation considering Clostridium difficile as an important cause of enterocolitis [6,7]. However, HAEC is not solely attributable to Clostridium difficile, and part of the therapeutic benefit may derive from mechanical rather than antimicrobial effects. Despite their use, few studies compared vancomycin enemas with saline enemas, highlighting a significant gap in evidence-based management [7]. Accordingly, this study aimed to evaluate and compare the effectiveness of vancomycin enemas and saline enemas in the treatment of acute HAEC.

## METHODS

This randomized controlled trial using an adaptive design was conducted in the Department of Pediatric Surgery, University of Child Health Sciences Lahore. Institutional approval was obtained from the Children's Hospital Lahore Review Board as well as the Advanced Studies and Research Board (ASRB) of the University of Health Sciences, Lahore. The study was carried out from April 2022 to January 2023.

This study enrolled 60 pediatric patients through non-probability purposive sampling. Patients were randomly allocated by lottery method into two groups: Group A (vancomycin enema) and Group B (normal saline enema), with 30 patients in each group, following a 1:1 allocation ratio. After the diagnosis of Hirschsprung-associated enterocolitis (HAEC) was confirmed, patients were assigned to one of the two treatment groups. Pediatric patients aged 1 month to 14 years presenting with HAEC (pre- or postoperative) were included after obtaining informed written consent. Patients were excluded if they had known hypersensitivity to vancomycin, toxic megacolon requiring diverting stoma, or were critically ill on arrival.

The study assessed days required for remission, success of therapy, need for surgery, and length of hospital stay. In Group A, patients received vancomycin enemas, while Group B received normal saline enemas. All patients were initially stabilized with fluid resuscitation to correct fluid and electrolyte imbalance. Both groups were administered similar intravenous antibiotics. Decompression of the bowel was achieved through nasogastric tube placement and insertion of a rectal drain. HAEC scoring was performed, and patients with a score ≥10 were managed with the assigned enema according to randomization.

For Group A, vancomycin enemas were administered with the patient in the left lateral or knee-chest position. The solution was prepared at 20–30 mg/kg mixed in crystalloid (20 mL/kg), delivered as a retention enema via an 18-French Foley catheter. The balloon was inflated, the solution instilled, and the catheter clamped for 45–60 minutes before removal. This was repeated every 8 hours. In Group B, normal saline enemas (20 mL/kg) were administered similarly, with adjustments in volume as clinically required. The same catheter technique and retention time were used.

Guardians were trained to continue rectal irrigation at home if needed. Children were monitored clinically, and HAEC scores were recorded using a predesigned proforma. Adverse effects of the enemas were documented. Patients were discharged once clinically stable with an HAEC score <10. Follow-up in the outpatient department was advised.

Data were analyzed using SPSS v25. Mean and standard deviation were calculated for quantitative variables such as age, weight, and days to remission. Frequencies and percentages were computed for qualitative variables such as success of therapy and need for surgery. Independent t-tests were used for comparisons of quantitative variables, while chi-square tests assessed associations between qualitative variables. A p-value <0.05 was considered statistically significant.

## RESULTS

Both groups were comparable with respect to age of presentation ($p = 0.144$), and gender distribution ($p = 0.605$). The mean hospital stay was 9.89 days in the vancomycin group and 7.43 days in the normal saline group, with a statistically significant p-value of 0.031, indicating a meaningful difference in length of stay following HAEC management (Table 1).

At presentation, the mean HAEC scores in the vancomycin and normal saline groups were 13.13 and 12.51, respectively. After treatment, scores decreased to 8.37 and 8.16. Both groups demonstrated statistically significant improvements in HAEC scores, with p-values of 0.016 and 0.018, respectively (Table 2). Only one patient in each group required colostomy with one death in Vancomycin enema group (Table 3).

Table 1: Age, Gender Distribution and Hospital Stay in Study Population

| | Group A (vancomycin enema) | | Group B (normal saline enema) | | P value |
|---|---|---|---|---|---|
| Age | Mean | SD | Mean | SD | 0.144 |
| | 38.9828 | 28.71799 | 41.1645 | 34.49462 | |
| Gender | Male | Female | Male | Female | 0.605 |
| | 24 | 6 | 47 | 13 | |
| Hospital Stay | Mean | SD | Mean | SD | 0.031 |
| | 9.89 | 6.76 | 7.43 | 2.89 | |

Table 2: HAEC Scores Before and After Treatment

| Study Group | Pre score | Post score | p-value |
|---|---|---|---|
| Vancomycin enema | 13.13±1.186 | 8.37±0.67685 | 0.016 |
| normal saline enema | 12.51±1.33 | 8.16±0.637 | 0.018 |

The vancomycin group required an average of 6.79 days to achieve full remission, compared with 5.9 days in the normal saline group. A p-value of 0.157 showed that this difference was not statistically significant (Table 4).

Table 3: Success of therapy

| | | Successful therapy | Need for surgery | Mortality | P value |
|---|---|---|---|---|---|
| Study Group | Vancomycin enema | 24(80%) | 5 (16.67%) | 1 (3.33%) | 0.897 |
| | normal saline enema | 25(83.3%) | 5(16.7%) | 0 (0%) | |
| | Total | 49 (81.66%) | (10) 16.67% | 1(1.66 %) | |

## DISCUSSION

Hirschsprung-associated enterocolitis (HAEC) remains the most life-threatening complication of Hirschsprung disease (HD). Although its pathogenesis is multifactorial, the mainstays of management continue to include aggressive fluid resuscitation, broad-spectrum antibiotics, and effective gastrointestinal decompression. Rectal irrigations—commonly performed with saline or vancomycin—play a crucial role in this decompression strategy. While oral vancomycin has been frequently described for severe HAEC, limited literature evaluates vancomycin rectal irrigation, and only few studies directly compare it with normal saline irrigation [6,7].

In our study, 70% of HAEC cases were preoperative, which is substantially higher than previously reported. Guillaume et al. documented only 5.7% preoperative enterocolitis [8]. This disparity likely reflects delayed diagnosis and restricted access to specialized pediatric surgical services in our setting. Such delays increase the risk of fecal stasis, bacterial overgrowth, and subsequent inflammatory complications.

Rectal irrigation contributes to HAEC improvement by providing decompression and mechanically clearing pathogenic bacteria and toxins [9-11]. In our study, mean HAEC scores at presentation were similar in both groups (13.13 in the

vancomycin group and 12.51 in the saline group). After therapy, scores decreased significantly in both groups (8.37 and 8.16, respectively). The importance of decompression is well documented; it relieves obstruction and removes infectious contributors including Clostridium difficile [6,7]. Marty et al. showed that routine postoperative irrigations reduced both the incidence and severity of enterocolitis by 92.5% [12]. No major complications occurred in our study, and minor issues such as irritability, abdominal discomfort, or mild rectal bleeding were managed conservatively.

Table 4: showing days for complete remission

| | Study Group | Mean | Std. Deviation | P value |
|---|---|---|---|---|
| Complete remission (days) | Vancomycin enema | 6.79 | 2.193 | 0.157 |
| | normal saline enema | 5.90 | 2.586 | |
| | Total | 6.33 | 2.426 | |

In total, 81.6% of patients responded successfully to rectal washouts. This aligns with previous work: Marty et al. reported postoperative enterocolitis in 36% of patients without irrigation versus only 8% in those treated with irrigation [12]. Despite this, some patients require diversion due to persistent symptoms. In our study, 16.67% required colostomy.

Mortality in HAEC ranges from 1–10% and has been reported as high as 18% historically [13,14]. Only one patient (1.8%) in our study died; however, this low figure likely reflects our exclusion of critically ill patients requiring immediate diversion or intensive care, and therefore does not represent true disease severity.

Importantly, vancomycin enemas did not demonstrate clinical superiority over normal saline. The vancomycin group required 6.79 days for remission versus 5.9 days in the saline group, with no statistically significant difference. Several authors therefore argue that the primary benefit of vancomycin enemas is mechanical decompression rather than antimicrobial action. With systemic antibiotics already in place, additional rectal antibiotics may be unnecessary. Rectal irrigation remains a fundamental and effective component of HAEC management [15], and Vieten et al. similarly emphasize decompression as the cornerstone of therapy [15].

Our study is a randomized controlled trial conducted in a tertiary care hospital and provided valuable data on the use of vancomycin as an enema. Small sample size and single centered study are its limitations.

## Conclusion

To conclude, vancomycin enema did not provide additional benefit over saline enema in managing HAEC. We recommend rectal washout with normal saline for the effective management of HAEC.

**Consent to Publication**: Author(s) declared taking informed written consent for the publication of clinical photographs/material (if any used), from the legal guardian of the patient with an understanding that every effort will be made to conceal the identity of the patient, however it cannot be guaranteed.

**Authors Contribution**: Author(s) declared to fulfill authorship criteria as devised by ICMJE, the authors confirm contribution to the paper as follows. **FM**: Conception, Data acquisition final drafting, editing, result interpretation, approving final draft **AA:** Data collection,Drafting , submission, approving final draft.

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