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Original Research Article

A COMPARATIVE STUDY OF NASOGASTRIC VERSUS NASOJEJUNAL FEEDING IN CRITICALLY ILL PATIENTS ADMITTED TO A TRAUMA CARE UNIT

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ABSTRACT

Background: Enteral nutrition is a cornerstone in the management of critically ill patients. While nasogastric (NG) feeding is commonly used, it is associated with complications such as feed intolerance and aspiration. Nasojejunal (NJ) feeding may offer advantages by bypassing the stomach and improving nutrient delivery. The aim is to compare the efficacy and safety of nasogastric and nasojejunal feeding in critically ill patients admitted to a trauma care unit.

Materials and Methods: This prospective observational study was conducted in a trauma care unit over a period of two years. A total of 120 critically ill patients requiring enteral nutrition were included and divided equally into NG (n=60) and NJ (n=60) feeding groups. Parameters assessed included time to achieve target nutrition, gastric residual volume, serum albumin levels, achievement of feeding goals, complications, ICU stay, and mortality.

Results: The NJ group achieved target nutrition significantly faster than the NG group (23.6 ± 6.8 vs 35.6 ± 3.4 hours, $p<0.05$). Gastric residual volume was significantly lower in the NJ group (517.8 ± 107.9 vs 917.4 ± 155.3 mL, $p<0.05$). Post-feeding serum albumin levels were significantly higher in the NJ group (3.76 ± 1.05 vs 3.12 ± 0.78 g/dL, $p<0.05$), and a higher proportion achieved feeding goals (88.3% vs 65.0%, $p<0.05$). No significant differences were observed in ICU stay, mortality, or complication rates between the groups.

Conclusion: Nasojejunal feeding improves nutritional delivery and feeding efficiency compared to nasogastric feeding but does not significantly affect clinical outcomes such as mortality or ICU stay. It may be preferred in patients at high risk of feed intolerance.

Keywords: Enteral nutrition; Nasogastric feeding; Nasojejunal feeding; Critical care; Trauma ICU.

INTRODUCTION

Adequate nutritional support is a fundamental component in the management of critically ill patients, particularly those admitted to intensive care and trauma units. Enteral nutrition is preferred over parenteral nutrition as it preserves gut integrity, maintains mucosal barrier function, and reduces infectious complications, as recommended by major international guidelines.[1,2] Early initiation of enteral feeding has also been shown to reduce septic morbidity in surgical and trauma patients.[3,4]

Nasogastric (NG) feeding remains the most commonly used method of enteral nutrition due to its simplicity, ease of placement, and cost-effectiveness. However, gastric feeding is frequently associated with delayed gastric emptying, increased gastric residual volumes, and feed intolerance in critically ill patients.[5,6] These factors may compromise adequate nutritional delivery and increase the risk of regurgitation and aspiration, particularly in patients with impaired consciousness or those requiring mechanical ventilation.

Nasojejunal (NJ) feeding, a form of post-pyloric feeding, bypasses the stomach and delivers nutrients

directly into the small intestine. This approach may improve feeding tolerance, reduce gastric residual volume, and enhance delivery of prescribed nutrition. Randomized studies and meta-analyses have demonstrated that post-pyloric feeding improves achievement of nutritional targets and may reduce the risk of pneumonia, although its effect on major clinical outcomes such as mortality and ICU stay remains uncertain.[7-9]

Despite these potential advantages, evidence comparing nasogastric and nasojejunal feeding in critically ill patients, particularly in trauma care settings, remains limited. Trauma patients have increased metabolic demands and are at higher risk of complications related to inadequate nutrition and aspiration. Therefore, identifying the optimal route of enteral feeding in this population is of significant clinical importance.

Hence, the present study was undertaken to compare the efficacy and safety of nasogastric and nasojejunal feeding in critically ill patients admitted to a trauma care unit, with emphasis on nutritional adequacy, feeding-related complications, and clinical outcomes.

MATERIALS AND METHODS

This prospective observational study was conducted in the Trauma Care Unit of the Department of General Surgery at Lokmanya Tilak Municipal Medical College and General Hospital, Mumbai, over a period of two years from January 2016 to December 2017. The study included critically ill patients requiring enteral nutritional support. The sample size was calculated using G*Power software (version 3.1.7) with an effect size of 0.5, alpha error probability of 0.05, and power of 80%, resulting in a total sample size of 120 patients. These patients were equally divided into two groups: nasogastric (NG) feeding (n=60) and nasojejunal (NJ) feeding (n=60). Written informed consent was obtained from patients or their legal representatives prior to inclusion in the study. The study protocol was approved by the Institutional Ethics Committee.

All critically ill patients admitted to the trauma care unit who required enteral feeding support, irrespective of age and ventilatory status, were included in the study. Patients with contraindications to nasogastric or nasojejunal tube placement, those with pre-existing septicemia or hospital-acquired pneumonia at admission, and those whose relatives refused consent were excluded. Patients were enrolled consecutively, and the route of enteral feeding (NG or NJ) was determined by the treating clinical team based on clinical judgment and feasibility. Standard institutional protocols for patient management were followed throughout the study period. All patients were followed from admission until discharge or death.

Baseline demographic and clinical data, including age, gender, primary diagnosis, requirement of mechanical ventilation, APACHE II score, and Glasgow Coma Scale (GCS), were recorded at admission. Nutritional parameters assessed included time to achieve target enteral nutrition, gastric residual volume at 48 hours, serum albumin levels at baseline and after enteral feeding, and achievement of target feeding goals. Clinical outcomes such as duration of ICU stay, duration of enteral nutritional support, and mortality were documented. Feeding-related complications, including pneumonia, vomiting, diarrhea, constipation, and radiological evidence of chest infiltrates, were also recorded and analyzed.

Statistical analysis was performed using SPSS software version 21. Quantitative variables were expressed as mean ± standard deviation and compared using the independent Student's t-test. Categorical variables were expressed as frequencies and percentages and analyzed using the chi-square test. A p-value of less than 0.05 was considered statistically significant.

RESULTS

A total of 120 critically ill patients admitted to the trauma care unit and requiring enteral nutrition were included in the study. The patients were equally distributed into two groups: nasogastric (NG) feeding (n=60) and nasojejunal (NJ) feeding (n=60).

The baseline demographic and clinical characteristics of the study population are summarized in [Table 1]. The mean age of patients in the NG group was 57.3 ± 2.9 years, while in the NJ group it was 58.7 ± 3.6 years, with no statistically significant difference (p = 0.79). The gender distribution was comparable between the two groups, with males constituting 61.7% in the NG group and 60.0% in the NJ group (p = 1.00).

The requirement for mechanical ventilation was similar in both groups (88.3% in NG vs 90.0% in NJ, p = 1.00). There was no significant difference in the distribution of primary diagnoses between the groups (p = 0.79). Additionally, disease severity scores, including APACHE II (22.3 ± 2.9 vs 21.8 ± 3.6, p = 0.89) and GCS (8.9 ± 3.3 vs 10.0 ± 2.9, p = 0.32), were comparable between the NG and NJ groups.

Table 1. Baseline Characteristics of the Study Population

Variable	Nasogastric (NG) (n=60)	Nasojejunal (NJ) (n=60)	p-value
Age (years), mean ± SD	57.3 ± 2.9	58.7 ± 3.6	0.79
Gender, n (%)			1.00
• Male	37 (61.7%)	36 (60.0%)	
• Female	23 (38.3%)	24 (40.0%)	
Mechanical ventilation, n (%)			1.00

• Yes	53 (88.3%)	54 (90.0%)	
• No	7 (11.7%)	6 (10.0%)	
Primary diagnosis, n (%)			0.79
• Cardiogenic shock	10 (16.7%)	11 (18.3%)	
• Septicemia	13 (21.7%)	13 (21.7%)	
• Respiratory failure	12 (20.0%)	12 (20.0%)	
• Liver disease	8 (13.3%)	9 (15.0%)	
• Spinal cord injury	9 (15.0%)	5 (8.3%)	
• Neurological illness	6 (10.0%)	7 (11.7%)	
• Multiple trauma	2 (3.3%)	3 (5.0%)	
APACHE II score, mean ± SD	22.3 ± 2.9	21.8 ± 3.6	0.89
GCS score, mean ± SD	8.9 ± 3.3	10.0 ± 2.9	0.32

Nutritional Delivery and Feeding Outcomes: Nutritional outcomes are presented in Table 2. Patients in the NJ group achieved target enteral nutrition significantly faster than those in the NG group (23.6 ± 6.8 hours vs 35.6 ± 3.4 hours, $p < 0.05$). The mean gastric residual volume at 48 hours was significantly lower in the NJ group (517.8 ± 107.9 mL) compared to the NG group (917.4 ± 155.3 mL, $p < 0.05$).

Baseline serum albumin levels were comparable between the two groups (2.23 ± 1.10 g/dL vs 2.35 ± 0.89 g/dL, $p = 0.78$). However, post-enteral feeding serum albumin levels were significantly higher in the NJ group (3.76 ± 1.05 g/dL) compared to the NG group (3.12 ± 0.78 g/dL, $p < 0.05$).

A significantly higher proportion of patients in the NJ group achieved target feeding goals compared to the NG group (88.3% vs 65.0%, $p < 0.05$).

Table 2. Nutritional Delivery and Feeding Outcomes

Variable	Nasogastric (NG) (n=60)	Nasojejunal (NJ) (n=60)	p-value
Time to reach target nutrition (hours), mean ± SD	35.6 ± 3.4	23.6 ± 6.8	<0.05*
Gastric residual volume at 48 hours (mL), mean ± SD	917.4 ± 155.3	517.8 ± 107.9	<0.05*
Serum albumin (g/dL), mean ± SD			
• Pre-feeding	2.23 ± 1.10	2.35 ± 0.89	0.78
• Post-feeding	3.12 ± 0.78	3.76 ± 1.05	<0.05*
Achievement of target feeding goal, n (%)			<0.05*
• Yes	39 (65.0%)	53 (88.3%)	
• No	21 (35.0%)	7 (11.7%)	

Clinical outcomes are summarized in Table 3. The mean duration of ICU stay was shorter in the NJ group (10.10 ± 3.63 days) compared to the NG group (12.23 ± 2.90 days), although this difference was not statistically significant ($p = 0.17$). Similarly, there was no significant difference in the duration of enteral nutritional support between the two groups (8.20 ± 1.30 days vs 8.90 ± 1.10 days, $p = 0.82$).

Mortality rates were comparable between the two groups, with 30.0% in the NJ group and 28.3% in the NG group ($p = 1.00$).

Table 3. Clinical Outcomes

Variable	Nasogastric (NG) (n=60)	Nasojejunal (NJ) (n=60)	p-value
ICU stay (days), mean ± SD	12.23 ± 2.90	10.10 ± 3.63	0.17
Duration of enteral support (days), mean ± SD	8.90 ± 1.10	8.20 ± 1.30	0.82
Mortality, n (%)			1.00
• Yes	17 (28.3%)	18 (30.0%)	
• No	43 (71.7%)	42 (70.0%)	

The incidence of feeding-related complications is presented in Table 4. The occurrence of pneumonia was lower in the NJ group (15.0%) compared to the NG group (21.7%), although this difference was not statistically significant ($p = 0.46$).

No statistically significant differences were observed between the NG and NJ groups in the incidence of diarrhea (15.0% vs 18.3%, $p = 0.73$), vomiting (26.7% vs 20.0%, $p = 0.17$), or constipation (23.3% vs 15.0%, $p = 0.54$).

Radiological evidence of chest infiltrates was present in 28.3% of patients in the NG group and 23.3% in the NJ group, with no significant difference between the groups ($p = 0.49$).

Table 4. Feeding-Related Complications

Complication	Nasogastric (NG) (n=60)	Nasojejunal (NJ) (n=60)	p-value
Pneumonia, n (%)	13 (21.7%)	9 (15.0%)	0.46
Diarrhea, n (%)	9 (15.0%)	11 (18.3%)	0.73
Vomiting, n (%)	16 (26.7%)	12 (20.0%)	0.17
Constipation, n (%)	14 (23.3%)	9 (15.0%)	0.54
Chest X-ray infiltrates, n (%)	17 (28.3%)	14 (23.3%)	0.49

DISCUSSION

In the present study, nasojejunal (NJ) feeding demonstrated significant advantages over nasogastric (NG) feeding in terms of nutritional delivery, while no statistically significant differences were observed in major clinical outcomes such as ICU stay and mortality. These findings are consistent with existing evidence on enteral nutrition practices in critically ill patients.

A key observation in this study was the significantly shorter time required to achieve target enteral nutrition in the NJ group compared to the NG group. This is supported by previous studies demonstrating improved feeding efficiency with post-pyloric feeding. Hsu et al. reported that patients receiving duodenal feeding achieved higher caloric intake compared to gastric feeding in critically ill patients.[5] Additionally, meta-analyses have shown that post-pyloric feeding improves the likelihood of achieving prescribed nutritional targets.[8,9] The improved performance of NJ feeding can be attributed to bypassing gastric dysmotility, which is commonly observed in critically ill patients.

The present study also demonstrated significantly lower gastric residual volumes in the NJ group. Elevated gastric residual volume is a marker of delayed gastric emptying and is associated with feeding intolerance. Montejo et al. reported that gastrointestinal complications, including high gastric residual volumes, occur in a substantial proportion of critically ill patients receiving enteral nutrition.[6] By bypassing the stomach, nasojejunal feeding reduces gastric stasis and facilitates uninterrupted nutrient delivery.

In terms of biochemical outcomes, NJ feeding was associated with a significantly greater improvement in serum albumin levels compared to NG feeding. Although serum albumin is influenced by multiple factors such as inflammation and disease severity, improved protein delivery due to better feeding tolerance may contribute to this observation. Previous guidelines and clinical studies have emphasized that improved nutritional adequacy is associated with better biochemical markers of nutrition.[1,2]

A significantly higher proportion of patients in the NJ group achieved target feeding goals in the present study. This finding is consistent with systematic reviews demonstrating that small bowel feeding enhances nutritional delivery and reduces interruptions in enteral feeding.[8,9] These findings support the role of NJ feeding in optimizing nutritional support in critically ill patients.

Despite these advantages in nutritional delivery, no statistically significant differences were observed in clinical outcomes such as ICU stay and mortality between the two groups. Similar findings have been reported in previous studies. Marik and Zaloga, in a systematic review, found no significant reduction in mortality with post-pyloric feeding compared to gastric feeding.[7] More recent meta-analyses have also reported that although post-pyloric feeding improves nutritional delivery, it does not significantly impact ICU length of stay or survival.[8,9] This suggests that while adequate nutrition is essential, major clinical outcomes in critically ill patients are influenced by multiple factors including disease severity and overall critical care management.

The incidence of feeding-related complications, including pneumonia and gastrointestinal symptoms, was comparable between the two groups in the present study. Although pneumonia was lower in the NJ group, the difference was not statistically significant. Previous evidence has suggested a possible reduction in pneumonia with post-pyloric feeding; however, results have not been consistent across all studies.[7,8] These findings indicate that factors such as ventilatory care, aspiration precautions, and infection control measures may have a greater influence on complication rates than the route of enteral feeding alone.

CONCLUSION

Nasojejunal feeding is superior to nasogastric feeding in critically ill patients admitted to a trauma care unit in terms of achieving early and adequate nutritional delivery. It is associated with faster attainment of target nutrition, lower gastric residual volumes, improved biochemical nutritional parameters, and a higher rate of achieving feeding goals.

However, these advantages do not translate into significant improvements in major clinical outcomes such as ICU stay, mortality, or overall complication rates.

Nasojejunal feeding may therefore be preferred in patients at high risk of gastric feed intolerance, delayed gastric emptying, or aspiration. Routine use in all critically ill patients is not warranted, and the choice of feeding route should be individualized based on patient condition, risk factors, and available resources.

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