Original Article

Association between the Duration of Early Feeding and Gastrointestinal Symptoms in Intensive Care Settings: FAST HUG

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Abstract

The objective of this study is to relationship between early feeding durations on gastrointestinal symptoms in post-surgical patients admitted to intensive care. The study sample consisted of 80 patients admitted to post-operative intensive care units between February 1 and April 30, 2023. Data was collected by the researchers using the Patient Information Form and the ‘‘Gastrointestinal Symptom Rating Scale’’ (GSRS). Data analysis was conducted using the free trial version of SPSS. Reliability analysis was performed to assess the consistency of the scales utilized. The patients had an average age of 60.43±16.87, with 45% being women and 55% being men. The average time to mobilization for patients was 2.24±1.20, and the average length of hospital stay was 13.09±9.65 days. Among the patients, 63.8% were receiving enteral nutrition, while 36.3% were receiving parenteral nutrition. The average day of initiating feeding was calculated as 1.90 ± 0.92. On the GSRS, patients had a total mean score of 24.35±8.76, indicating a low level of symptom severity. There was no statistically significant relationship observed between the GSRS-diarrhea score, GSRS-abdominal pain score, GSRS-reflux score, and the nutritional status of the patients ($p>0.05$). However, a positive correlation was found between the GSRS-constipation score (r: .271; $p<0.05$) and the GSRS-indigestion score (r: .269; $p<0.05$) on the day of patient mobilization. Our study findings indicated that patients who received feeding in the intensive care unit exhibited minimal gastrointestinal symptoms. Furthermore, we observed that delaying patient mobilization was associated with a higher prevalence of constipation and indigestion symptoms.

Keywords: Fast hug, Intensive care, Gastrointestinal symptoms, Enteral nutrition

Introduction

Coding is utilized in various aspects of the healthcare field, including in the Intensive Care Unit (ICU), where patients with complex conditions receive treatment, requiring regular monitoring and invasive procedures. The purpose of implementing coding systems is twofold: to minimize errors and enhance the quality of patient care [1, 2]. The ICU may present patients with various complications such as deep vein thrombosis (DVT), stomach ulcers, malnutrition, ventilator-associated pneumonia, delirium, hypoglycemia, and hyperglycemia. To mitigate these complications, ICUs implement the FASTHUG coding system. FAST HUG is an acronym that encompasses the following parameters: F (Feeding), A (Analgesia), S (Sedation), T (Thromboembolism prophylaxis), H (Head of bed elevation), U (Ulcer prophylaxis), and G (Glucose control) [3].

It is crucial to consider whether patients should receive oral or enteral feeding and, if enteral feeding is not possible, whether parenteral nutrition is warranted [4, 5]. In the realm of ICU patient care, nutrition plays a pivotal role. Unfortunately, many of these patients are unable to receive sufficient nutritional support. As a result, the prevalence of malnutrition among hospitalized patients is estimated to range between 22% and 43%, while in the ICU, the rate surpasses 50% [6]. Malnutrition not only disrupts homeostasis and induces stress, particularly in surgical patients, but also increases mortality and morbidity rates [7, 8]. The clinical guidelines of the “European Association of Clinical Nutrition and Metabolism” stipulate that enteral nutrition (EN) should commence within the initial 24-48 hours following surgical intervention [9, 10].

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Enteral nutrition is the preferred feeding method for patients in the ICU, as it has demonstrated numerous benefits. Research has shown that when patients are fed within the first 24-72 hours, there is a decrease in gastrointestinal system (GIS) permeability, a decrease in the activation and release of inflammatory cytokines, and a decrease in systemic endotoxemia when compared to patients who are fed after 72 hours [1, 11]. Furthermore, enteral feeding has been associated with accelerated wound healing, prevention of bedsore formation, and reduced duration of stay in mechanical ventilation, as well as infection-related complications [12-15]. Conversely, parenteral nutrition (PN) is recommended only when the gastrointestinal system is unable to fulfill its function. While PN can be effective in these cases, it carries the risk of infection and increased costs [8, 16, 17]. Patients often experience various gastrointestinal symptoms, such as abdominal pain, indigestion, constipation, diarrhea, and reflux, which can be attributed to medications used, prolonged bed rest, surgical experiences, and the intensive care environment [2]. By carefully evaluating the patient's nutritional status and implementing early enteral nutrition, it appears that disease severity can be reduced, gastrointestinal functions can be protected, the immune system can be regulated, and the risks of infection, mortality, and morbidity can be lowered [15, 18].

The objective of this study is to assess the timing of initiating feeding in postoperative patients in the ICU and to examine the potential association between early feeding and gastrointestinal symptoms.

Materials and Methods

Research Purpose and Type

This study aimed to conduct a descriptive investigation into the effects of early feeding periods on the gastrointestinal system of patients undergoing surgery in intensive care.

Research Population and Sample

The research sample for this study consisted of 80 patients over the age of 18 who were hospitalized in intensive care after surgery between February 1 and April 30, 2023. The study included patients who underwent EN and PN, and who were treated in the Surgical Intensive Care and Anesthesia and Reanimation ICU of a university hospital. Patients who were unable to communicate effectively and those who had a duration of intensive care stay of less than one week were excluded from the study.

Data Collection Tools and Methods

The data for this study were collected by the researchers from patients who underwent EN and PN and received treatment in the Surgical ICU and Anesthesia and Reanimation ICU of a university hospital. Two instruments, namely the "Patient Information Form" and the "Gastrointestinal Symptom Rating Scale," were utilized for data collection purposes.

Patient Information Form

The "Patient Information Form" included 9 questions, such as age, gender, diagnosis, comorbidity status, previous surgery history, postoperative mobilization duration, hospital stay duration, enteral or parenteral nutrition administration, and nutrition start date.

Gastrointestinal Symptom Rating Scale (GSRS)

GSRS was initially developed by Revicki *et al*. [19] to assess common symptoms associated with gastrointestinal disorders. Turan *et al*. [2] performed the Turkish validation and reliability testing of the scale. The GSRS is a 15-item Likert-type scale that measures an individual's experience of GI symptoms over the past week. It comprises five subcategories: ''abdominal pain, reflux, diarrhea, indigestion, and constipation''. In terms of specific item breakdown, the 1st, 4th, and 5th questions pertain to abdominal pain, while the 2nd and 3rd questions focus on reflux. Diarrhea is evaluated through the 11th, 12th, and 14th questions, whereas indigestion is assessed using the 6th, 7th, 8th, and 9th questions. Lastly, constipation is measured by the 10th, 13th, and 15th questions. The scale consists of a total of 15 items. Responses to the scale's questions are categorized as follows: "No discomfort," "Very little discomfort," "Mild discomfort," "Moderate discomfort," "Somewhat severe," "Severe," and "Very severe discomfort."

Ethical Dimension of the Research

The necessary written permission was acquired from the corresponding author to utilize the Gastrointestinal Symptom Rating Scale, which was determined to have Turkish validity and reliability through the study conducted by Turan *et al*. [2]. Following the receipt of this permission, further written consent was obtained from the Van Yüzüncü Yıl University Non-Interventional Clinical Research Ethics Committee under decision number 2023/01-15.

Statistical Analysis

The collected data in this study were analyzed using the free trial version of the SPSS program. To assess the reliability of the scales employed, a "Reliability Analysis" was conducted. Descriptive statistical methods, including the calculation of frequencies, percentages, minimum and maximum values, median, mean, and standard deviation, were utilized to evaluate the data. The normal distribution of the measurement tools was examined using the Kolmogorov-Smirnov test, and it was found that the variables followed a normal distribution. Consequently, parametric tests were employed to assess the variables. The relationships between the variables were explored using the Spearman correlation coefficient.

Results and Discussion

Table 1 provides information on the socio-demographic and medical characteristics of the patients participating in the study. The average age of the patients was 60.43±16.87, with 45% being women and 55% being men. Furthermore, 48.8% of the patients had comorbidities, while 51.3% did not have

any comorbidities. Among the patients, 53.8% had undergone surgery in the past, whereas 46.3% had no history of previous surgery. The average time for patients to mobilize was recorded as 2.24 ± 1.20, and the average duration of their hospital stay was 13.09 ± 9.65 days. In terms of nutrition, 63.8% of the patients received enteral nutrition, while 36.3% received parenteral nutrition. The average day when patients began feeding was calculated as 1.90 ± 0.92.

Table 1. Socio-demographic and Medical Characteristics of Intensive Care Patients

	Mean ± SD	Min ± Max	
Age	60.43±16.87	19-90	
Time to Mobilization	2.24±1.20	1-7	
Duration of Hospital Stay (days)	13.09±9.65	2-81	
Start of feeding (days)	1.90±0.92	1-5	
	Variables	**n**	**%**
Gender	Female	36	45
	Male	44	55
Diagnosis	GIS	48	59.8
	Respiratory	2	2.5
	Musculoskeletal System	1	1.3
	Urinary System	3	3.8
	Hepatobiliary System	11	13.8
	Endocrine System	2	2.5
	Cranial System	11	13.8
	Sepsis	2	2.5
Comorbidity Status	Present	39	48.8
	Absent	41	51.3
Surgery History	Present	43	53.8
	Absent	37	46.3
Nutrition Type	Enteral	51	63.8
	Parenteral	29	36.3

Table 2 illustrates the distribution of GSRS (Gastrointestinal Symptom Rating Scale) scores among intensive care patients. The overall mean score of patients on the GSRS was 24.35±8.76, indicating a low level of symptom severity. The specific subscale scores were as follows: abdominal pain (1.80±0.89), reflux (1.33±0.70), indigestion (2.00±1.36), constipation (2.00±1.37), and diarrhea (1.35±0.82).

Table 2. Distribution of Gastrointestinal Symptom Rating Scale (GSRS) and Subscale Scores among Intensive Care Patients (n=80)

Variables	Mean ± SD
Age	60.43 ±16.87
Time to Mobilization	2.24 ±1.20
Duration of Hospital Stay (days)	13.09 ±9.65
Start of feeding (days)	1.90 ±0.92
Abdominal pain	1.80 ±0.89
Reflux	1.33 ±0.70
Diarrhea	1.35 ±0.82
Indigestion	2.00 ±1.36
Constipation	2,00 ±1.37
GSRS Total Score	24.35 ±8.76

Table 3 presents the distribution of GSRS mean scores based on the sociodemographic characteristics of the patients. Upon examining the table, notable differences emerge between the day of mobilization for patients and the sub-dimensions of constipation (r: 0.271; $p<0.05$) and indigestion (r: 0.269; $p<0.05$), as well as the overall scale score (r: 0.324; $p<0.05$). These findings indicate a statistically significant positive relationship between the variables.

Table 3. Pearson Correlation Analysis Results of Patient Variables and Gastrointestinal Symptom Rating Scale (GSRS) and Sub-Dimensions

		Abdominal pain	Reflux	Diarrhea	Constipation	Indigestion	GSRS Total Score
Age	r	-,070	,034	-,090	,220	,216	,066
	p	,535	,764	,429	,051	,054	,560
Time to Mobilization	r	,141	,180	,131	,271	,269*	,324*
	p	,211	,110	,246	,016	,016	,003
Duration of Hospital Stay (days)	r	,178	,019	-,002	,039	-,039	,097
	p	,115	,868	,983	,731	,730	,390
Start of feeding (days)	r	,047	-,045	-,003	,126	,122	,059
	p	,676	,694	,981	,269	,283	,602

*p<0.05

This study aimed to investigate the association between early feeding times and gastrointestinal (GI) symptoms in patients receiving EN and PN in the ICU. The study compared the

occurrence of GI symptoms with variables such as patient age, length of hospital stay, day of mobilization, and history of hospitalization day. Among the patients included in the study, 63.8% received EN, while 36.3% received PN. International guidelines recommend initiating nutrition within the first 24 hours of ICU admission, preferably via the enteral route, if feasible [20-25]. A separate study revealed that patients who received early feeding in the ICU had a mortality rate of 8.6% compared to 28.2% for those who were not fed within the first 24 hours [26]. In our study, 36.3% of the patients began feeding within the first 24 hours, while 82.6% started within 48 hours. A multicenter retrospective study involving 1174 intensive care patients demonstrated that initiating EN within 48 hours led to significantly lower intensive care and hospital mortality rates [11]. Stewart *et al*. also reported that 33.3% of patients in the intensive care unit were started on EN within the first 48 hours, while 66.7% started after the initial 48-hour period [27]. Similarly, in a study conducted by Williams *et al*. with 653 patients, it was found that 88% of patients began feeding within the first 48 hours [28]. Several studies indicate that early EN, initiated within 48 hours after surgery, promotes bowel movements, eliminating the need to wait for them before transitioning to EN [1, 7, 16, 29, 30].

GI symptoms are commonly observed in patients admitted to the ICU, with approximately 60% of these patients experiencing at least one GI symptom [31, 32]. The severity of these symptoms was found to be moderate in our study. Additionally, a study indicated that the severity of GI symptoms was higher among patients who received parenteral nutrition [33]. It was reported that patients who consumed 50% or more of their target calories enterally had a lower incidence of GI symptoms [8]. Another study, conducted among 775 patients, reported that more than one GI symptom was present in 36.2% of the cases [26]. Further insights were obtained regarding the relationship between GI symptoms and the length of stay in the ICU. Specifically, patients without GI symptoms during the first 24 hours of their ICU stay had an average length of stay of 3 days. In contrast, the length of stay increased to 6 days for patients experiencing one GI symptom, 8 days for those with two GI symptoms, and 11 days for individuals with three GI symptoms. Notably, patients with five or six symptoms were observed to remain in the ICU for over 30 days. The role of nutritional intake in the occurrence of GI symptoms was highlighted in two studies. Conversely, another study found that 86.5% of patients experienced some form of GI symptoms [26, 34].

According to existing literature, constipation is reported as the most common GI symptom among patients in the ICU who receive EN. The prevalence of constipation in ICU patients ranges widely, reported as 15-85% in some studies [2, 31, 32, 35]. However, a specific range of 34-83% has also been documented [36]. Our study found that patients who experienced delayed mobilization had a higher incidence of constipation and indigestion. Similarly, Gozukucuk *et al*. discovered that bowel movements started earlier in patients who were mobilized within the first 24 hours of their ICU stay [34]. One study reported that constipation was present in 41.3% of ICU patients [26], while another study found a constipation rate of 56.2% [37]. In a study conducted in medical and surgical ICUs, constipation was observed in 83% of patients [32]. Furthermore, constipation was detected in 22% of patients receiving EN in an ICU study. Comparing patients without constipation to those with constipation, it was observed that the latter group received more enteral nutrition [38]. The transition to early EN has been shown to decrease the incidence of constipation in the ICU [39].

Diarrhea is a common symptom in ICU patients [6]. Studies have shown that the occurrence of diarrhea in enterally fed ICU patients ranges between 30.8% and 48.33% [40], and %50-75 [32]. Danielis *et al*. reported a 44% incidence of diarrhea among enterally fed ICU patients in their study [38]. Similarly, another study found that 22.7% of ICU patients experienced diarrhea [26], while Liu *et al*. observed diarrhea in 48.33% of their study participants [40]. A meta-analysis involving 4243 patients revealed that 12.5% of them had diarrhea [41]. Sahiner *et al*. discovered that diarrhea occurred in 16.4% of their study sample, and significantly fewer patients who consumed 50% or more of their target calories enterally experienced diarrhea [8]. Another study reported a wide range in the incidence of diarrhea related to enteral nutrition, varying between 2% and 95% [32]. In a patient cohort where enteral feeding was administered to more than half of the ICU patients, a 10% rate of diarrhea was recorded over 9 months [42]. Our study did not find any association between the occurrence of diarrhea and the patient's feeding duration or type of nutrition.

Interventions commonly used in critically ill patients, such as sedation, mechanical ventilation, tracheal tubes, enteral feeding, and certain medications, along with specific patient characteristics and comorbid conditions, increase the susceptibility of reflux in intensive care patients. Opioids, particularly when utilized for pain management, have been found to elevate gastric emptying and gastric residual volumes in enterally fed patients. A noticeable reduction in reflux incidence has been observed when elevating the head of the bed from 0º to 30º [43, 44]. A study has also indicated that reflux is more prevalent among patients who are unable to consume at least 50% of their target calories through enteral nutrition [8]. Avcı *et al*. reported that abdominal pain symptoms were present in 1.8% of patients in their study [45]. Furthermore, another study found that abdominal pain symptoms were experienced by 9.2% of patients [41]. In our study, we did not identify a significant association between reflux, abdominal pain symptoms, and the number of feeding days or type of nutrition the patient received.

Conclusion

In this study, it was discovered that patients receiving enteral feeding in intensive care exhibited low GI motility. The

findings also revealed that the delay in patient mobilization was associated with a higher likelihood of experiencing symptoms such as constipation and indigestion. Based on these findings, it is hypothesized that early mobilization of patients in intensive care can effectively decrease the incidence of GI symptoms. Therefore, it is recommended to provide adequate support and encouragement for patient mobilization to promote better GI motility and mitigate the occurrence of related symptoms.

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