

Ultrasonography Facilitated Enteral Feeding Tube Implantation Among People with Severe Acute Pancreatitis: A Clinical Study Was Done at Shyam Shah Medical College Rewa (M.P.)

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Abstract

Background: Clinical guidelines and more recent research advocate enteral nutrition (EN) as the mainstay of therapy for those with severe acute pancreatitis (SAP). A variety of strategies must begin EN within 24 to 48 hours following ICU admission.

Aim and Objectives: To evaluate how a novel approach, including real-time ultrasonography, could assist with nasojejunal tube installation at the bedside in SAP patients.

Materials and Methods: In the 15-bed surgery intensive care unit of a university hospital, a single-center, prospective descriptive study was carried out. In the study were forty SAP patients. The entire process of placing a nasojejunal tube at the patient's bedside and using ultrasonography to direct tube positioning was carried out by a single doctor. An abdominal radiograph verified the final position of the nasojejunal tube. The procedure's success rate, the time required, the period between the decision to use enteral feeding and the start of feeding, and the problems were all noted.

Results: Forty-six intubations were conducted at the bedside on 40 patients utilizing an ultrasonography-assisted approach. In 38 of 40 patients (93.3%), nasojejunal tubes were successfully inserted. The average successful placement time was 22.07 ± 5.78 minutes. The median period between the physician's decision to implant a feeding tube and the start of feeding was 5.5 hours (2, 24). All patients experienced no adverse events.

Conclusion: Nasojejunal tube implantation with this innovative technique is quick, easy, and reliable.

Keywords: Severe Acute Pancreatitis, Doppler, Nasojejunal Tube Placement, Ultrasound, Early Enteral Nutrition.

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Introduction

Clinical guidelines and more recent research both advocate enteral nutrition (EN) as the mainstay of therapy for those with severe acute pancreatitis (SAP). [1-5]

However, GIT dysfunction is widespread in these patients, and they cannot tolerate being fed on their stomachs or have an elevated risk of aspiration; hence, a

nasojejunal tube put distal to the Treitz ligament should be used in those patients. [4] On the other hand, clinical research and recommendations recommend that enteral feeding start 24 to 48 hours following ICU admission for patients who are in a severe condition. [5-7] Placing a nasojejunal tube is thus an essential but complex technique.

The nasojejunal tube is installed using a variety of methods, including bedside placement, endoscopic placement, electromagnetic placement, and fluoroscopic guidance. [8] However, nasojejunal tube installation is a challenging task in actual practice because these techniques have technological limitations, like being expensive or complicated. Placing a nasojejunal tube guided by fluoroscopy is time-consuming, labor-intensive, and frequently limited by equipment. The critical issue with the blind approach is identifying tube position in

real-time because a misplaced tube can have disastrous consequences. [9] Various techniques have time constraints to commence EN within 24 to 48 hours of ICU admission. [6]

We created a unique technique to implant a nasojejunal tube at the bedside and continuously track ultrasound. To evaluate the method's efficiency and safety, a prospective study was carried out.

Methods

This study was conducted in the Department of Surgery's surgery intensive care unit (SICU) at Shyam Shah Medical College in Rewa, MP. The protocol was authorized by the hospital's institutional review board (Fig.1), and each patient or next of kin provided informed consent. There were no commercial components used in any phase of this study.

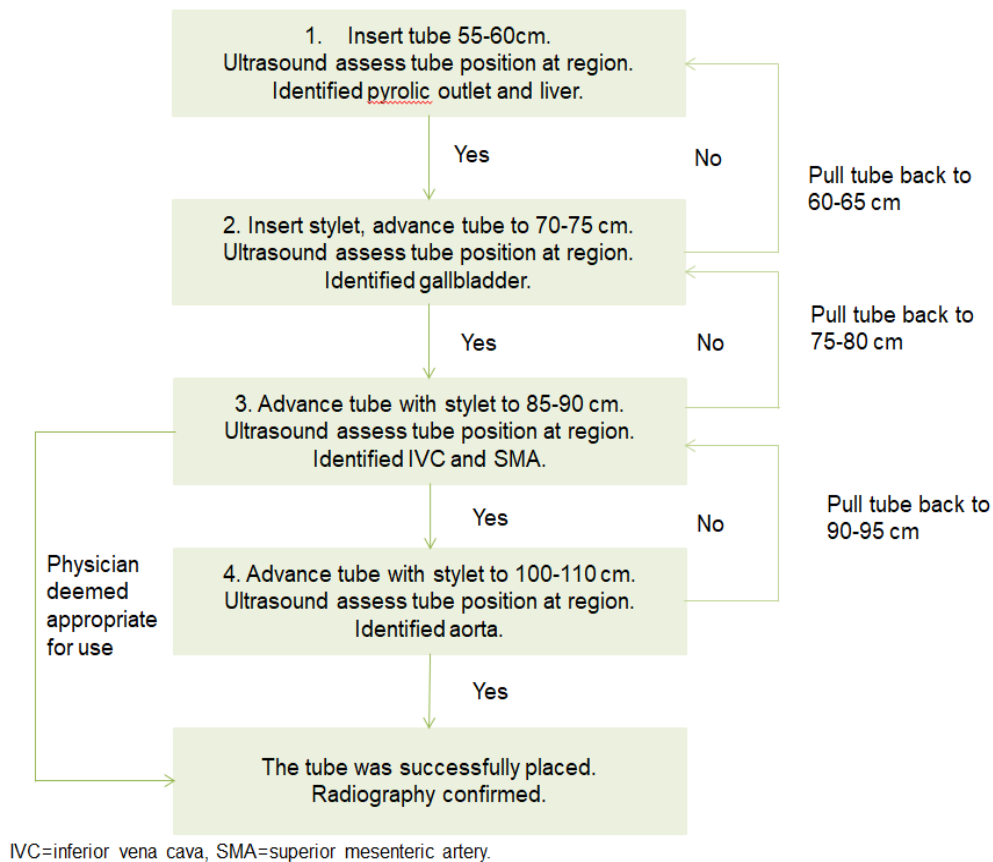


Figure 1: Protocol of the procedure involved

The study included forty individuals (20 male and 20 female) aged 21 to 78 years (median 46 years), with BMIs ranging from 18.34 to 37.89 (mean 25.63). At the time of the study, thirty percent (12/30) of these

patients were mechanically ventilated. For severity classification, the APACHE II and SOFA scores were reported. Table 1 displays all of the information, including additional traits of the enrolled group.

Table 1: Characteristics of the enrolled patients

Characteristics	
No. of patients	40
Male/ Female (n)	20/20
Age, median (low, high)	46 (21-78)
Phases of acute pancreatitis	
Early (<1 week) (n)	25
Later (>1 week) (n)	15

The data are expressed as numbers and mean±SD

The revised Atlanta classification was used to diagnose severe acute pancreatitis.¹⁰ Patients suffering from any of the following circumstances were barred from taking part: upper GI hemorrhage; coagulopathy; heart pacemakers; or pregnancy.

A multi-doctor team completed the nasojejunal tube placement procedure. Patients were positioned semi-upright and given metoclopramide (10 mg) via IV methods 10 minutes prior to the surgery. A nasojejunal tube (CORPAK MedSystems, 10FR 5500, Buffalo Grove and Illinois) is first inserted along the naris, and the team progressively reaches the posterior pharynx. If the patient was aware and willing to consent, they were instructed to swallow to encourage esophageal placement repeatedly. The nasojejunal tube should be progressed to 55 to 65 cm before being placed in the stomach. The nasojejunal tube was then found using a standard 3.5-MHz curvilinear array probe implanted at the epigastrium and below the xiphoid.

It was discovered that the nasojejunal tube had a delicate, long, and slightly hyperechoic structure. However, we cannot locate a clear structure in a vast proportion of the study participants. We employed color Doppler to scan the area before injecting 5 mL of normal saline (NS) into the nasojejunal tube. The presence of a

nasojejunal tube is seen by color Doppler imaging. Transabdominal bowel ultrasonography was conducted concurrently with nasojejunal tube insertion. We typically focused on the following four locations to ensure nasojejunal tube position: The second portion of the duodenum typically lies very close to the gallbladder neck in an axial scan, the third portion lies in front of the inferior vein cava and behind the superior mesenteric artery, and the fourth portion is visible in axial scans along the third portion once the aorta is visualized. The pyloric outlet has a ring appearance in a scanned longitudinal section and lies anteriorly as it crosses the spine.

As the gold standard, an abdominal radiograph validated the final nasojejunal tube location. The location was accurate when the distal end reached the Treitz ligament, according to the abdominal radiograph data. Enteral feeding was started after the surgery was determined to be successful. We timed the time between the physician's order for tube installation and the start of feeding.

Results

According to the diagnoses, all of the subjects in this study had severe acute pancreatitis. The demographics of the patients are shown in Table 1. Forty-six nasojejunal tube placement attempts were

made in those enrolled patients: three patients had the attempt abandoned because of edema around the pylorus after three unsuccessful procedures each; four patients required reinsertion after the first was obstructed; and two patients required reinsertion after the nasojejun tube had accidentally come out. In the group we included, the success rate for installing nasojejun tubes is 84.78 (39 procedures/46 procedures), and we successfully established nutritional access for 93.3% (38/40) of the patients using this method.

The average procedure time was 215 minutes, ranging from 15 to 40 minutes (n=39 successful procedures). Within 24 hours of SICU admission, all patients were started on early EN. The median interval (2–24 hours) between a doctor's prescription for tube installation and the beginning of feeding was 5.5 hours. In two individuals, nasojejun tube insertion failed, and the tube stayed in the stomach; instead, the nasojejun tube was implanted endoscopically. There were no difficulties or adverse outcomes from the surgeries.

Discussion

Our findings show that inserting a nasojejun tube successfully involves employing bedside ultrasonography to guide intestinal tube placement. Furthermore, we demonstrate that this technique dramatically shortens the time required to commence early EN assistance in SAP patients. Additionally, we showed the method's high sensitivity in ICU patients, even when a doctor used it without ultrasound experience. [10,11]

Gas interposition, which continues to be an essential limitation of ultrasonography, was the sole cause of our series' failure. There are several different techniques for treating SAP with enteral feeding, and many different kinds of nasojejun tubes are available. The jejunal tube can be accessible through the nose, mouth, or abdominal wall. The equipment required

for each technique of placement varies as well. Earlier, radiography or endoscopy was used to aid in nasojejun tube implantation. Recently, reports have been made on techniques for blind bedside placement, including physical examination, electromyography, electrocardiography, and electromagnetic guidance. However, these approaches are inappropriate for all SAP patients, particularly those in critical condition. The success rate of the radiological method, for instance, depends on the investigator's skill and anatomical factors and is time-consuming, expensive, and dangerous due to radiation exposure. Endoscopic approaches (endoscopic nasojejun tube implantation or endoscopic, percutaneous endoscopic gastrostomy) is much more expensive because the procedures necessitate the services of a competent endoscopist as well as an experienced anaesthesiologist.

Furthermore, SAP patients in the acute phase face numerous hazards during transit or the placement operation, which include respiratory insufficiency, abdominal distention, aspiration, and anesthesia-related complications. Many constraints and disadvantages are associated with various solutions for bedside nasojejun tube placement, including blind order and positioning of the nasojejun tube using electromagnetic guidance. In our institute, bedside procedures with real-time ultrasound are the first choice for patients with severe acute pancreatitis, and from January 2022 to December 2023, we placed nasojejun tubes in SAP patients utilizing this technique. The visualization of the pylorus could be done in a substantial proportion of patients who underwent this approach, and it eliminates the problem of no real-time controls of tip location while putting a nasojejun tube at the bedside, as well as saving time and money.

According to this study, this novel approach has a high success rate with no complications. Patients who are obese or have gas in the intestinal loop may have

technical problems. In those patients, we used the ultrasonography color Doppler approach by injecting NS into the nasojejunal tube and displaying indirect information that the nasojejunal tube is in particular bowel loops.

Our study, however, has several drawbacks. First, the same medical team performed all procedures in the center; we should have looked at the success rate of operators with short-term training. Second, in B-mode ultrasonography, the morphology of the nasojejunal tube could not be detected clearly due to gastrointestinal tract characteristics. We had to concurrently use a color Doppler scan and a scale mark in the tube to infer the tube tip's position indirectly. Third, doing Type-B ultrasonic exams on patients with laparotomies, an open abdomen, an abdominal wall deformity, or drainage tubes was challenging.

Conclusion

This study reveals that inserting a nasojejunal tube aided by USG at the bedside is of tremendous clinical utility, as it can efficiently establish a nasojejunal feeding route, encouraging patients with severe acute pancreatitis to receive early EN support treatment.

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