Am J Transl Res 2021;13(9):10758-10764
www.ajtr.org /ISSN:1943-8141/AJTR0132383

Original Article

Nursing effect of Nasoscopically assisted nasogastri tube and nasojejunal tube placement

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Received February 23, 2021; Accepted March 29, 2021; Epub September 15, 2021; Published September 30, 2021

Abstract: Objective: To investigate the nursing effect of nasoscopically assisted nasogastri tube and nasojejunal tube placement. Methods: 94 patients who need to place nasogastric tube and nasojejunal tube to establish enteral nutrition were randomly divided into two groups: the observation group (n=49) and control group (n=45). The patients in the observation group received nasogastric tube placement and jejunal nutrition tube placement, and the patients in the control group received general gastroscope and placed gastric tube and jejunal nutrition tube through mouth. Success rate of catheterization, catheter pain score, satisfaction score, vital signs, completion time of catheterization, and complication were collected. Results: the fluctuation of vital signs in control group was significantly higher than that in observation group. There was statistical significance between two groups in vital signs after intervention (P<0.05), mainly manifested in the heart rate, breathing and pulse pressure difference. On the other hand, there was no statistical significance between two groups in pulse oxygen after nursing intervention (P>0.05). The catheter pain score is obviously improved in the observation group compared with control group after intervention. The improvement score of satisfaction in the observation group was 91.47±7.65 points, and that in the control group was 83.64±5.24 points. The completion time of catheterization was improved in the observation group compared with control group. There was statistical significance between two groups in satisfaction score and completion time of catheterization (P<0.05). The rate of abdominal distention and diarrhea in the control group was higher than that in the observation group (P<0.05). Conclusion: Nasoscopically assisted nasogastri tube and nasojejunal tube placement has the advantages of simple and fast, short operation time, high success rate and few complications. It is the first choice of intubation method for enteral nutrition support treatment.

Keywords: Nasoscopically, nasogastri tube and nasojejunal tube placement, nursing effect

Introduction

Malnutrition is a common complication of critically illed patients [1-3]. 30%~60% of hospitalized patients are still malnourished and needed different nutritional support [4]. Fasting for more than one week would cause atrophy of intestinal mucosa, damage of intestinal barrier function, imbalance of digestive tract flora, bacterial translocation and ectopic changes. Therefore, early enteral nutritional support should be advocated [5]. Early jejunal nutrition can not only maintain the integrity of gastrointestinal function, protect intestinal mucosal barrier, but also improve immunity and reduce complications [6, 7].

At present, there are many ways to place nasojejunal nutrition tube, which is mainly categoried as surgical and non-surgical. Surgical placement is often applied in population who need long-term nutritional support in thoracic and abdominal surgery. There are three non-surgical methods: blind vision, X-ray fluoroscopy and endoscopic guidance. Endoscopic assisted tube placement is the most successful method, with a success rate of 100% [8]. Because of its simple, fast and high success rate, endoscopic placement of nasojejunal nutrition tube is the most improved method [9].

Nasojejunal nutrition tube is the most commonly used method for enteral nutrition, however,

due to different technical level of operators and the psychological reaction of patients, the failure rate of catheterization is very high. Therefore, nursing staff not only need to pass the technical standard in the placement of nasojejunal tube, but also they should give patients psychological counseling, which is very necessary in the operation.

Therefore, the purpose of this article was to investigate the psychological nursing effect of nasoscopically assisted nasogastri tube and nasojejunal tube placement, to provide a theoretical basis for clinical nursing work.

Data and methods

Clinical data

94 patients who need to place nasogastric tube and nasojejunal tube to establish enteral nutrition in our hospital from March 2019 to March 2020 were randomly divided into two groups: the observation group (n=49 cases) and the control group (n=45 cases). The researchers systematically explained the role, purpose and process of the study to their families. Their families voluntarily signed the informed consent form to participate in this study. This study followed Standard Operating Procedures ensuring compliance with the principles of Good Clinical Practice and the Declaration of Helsinki and any applicable regulatory requirements. This research was approved by the First Affiliated Hospital of Hainan Medical University Clinical Research Ethics Committee.

Inclusion and exclusion standard

Inclusive standard: ① Patients who need to place nasogastric tube and nasojejunal tube to establish enteral nutrition; ② Age: ≥ 18 years; ③ The subjects were willing to cooperate and implement the experiment.

Exclusion standard: ① Patients with severe coagulation dysfunction or thrombocytopenia; ② Patients with a history of mental illness; ③ Patients with serious cardiac disorder, severe iver malfunction or renal failure; ④ Unwilling to participate our research.

Method

The control group: The patients received general gastroscope and placed gastric tube and jejunal nutrition tube through mouth. Before intubation, routine gastroscopy was performed to find out whether there were contraindications. The patient was placed in the left supine position. After routine pharyngeal local anesthesia, the front end of the nutrient solution was fully lubricated with lubricating analgesic glue (lidocaine mucilage). The patient was intubated into the stomach through one side of the nasal cavity and temporarily fixed. Then the gastroscope was sent into the stomach through the mouth, and the head end of the nutrient tube was found. Then the foreign body forceps were sent through the gastroscope biopsy hole to clamp the front end of the nutrient tube, after observing for 1 min, release the foreign body forceps, feel out of the nutrition tube, and return the foreign body forceps to the stomach. Under the direct vision of the gastroscope, clamp the nutrition tube with the foreign body forceps again, and enter the duodenum with the gastroscope again, so many times, the catheterization was stopped about 105 cm. After observing that there was no tortuosity in the stomach, paraffin oil was injected into the guide tube, the guide wire was gradually withdrawn to the gastric antrum, the foreign body forceps were still used to fix the retroversion mirror, and then the foreign body forceps were withdrawn, and the gastroscope was gradually withdrawn from the body. Finally, the guide wire was withdrawn and fixed in vitro after the water injection test verified that the catheter was unobstructed. After the catheterization, the position of the nutrition tube in the small intestine was confirmed by routine X-ray fluoroscopy. If necessary, a small amount of 60% meglumine diatrizoate could be injected for further confirmation. Before dripping nutrition tube, first inject a little warm water, and then drip nutrition liquid, nutrition liquid can be used.

The observation group: The patients received nasogastric tube placement and jejunal nutrition tube placement. The patient fasted 8 hours before operation. The patient took the left lateral position, and was given ECG monitoring, oxygen monitoring, etc. The degree of risk control. Before placing the tube, the gastroscope device was lubricated and the gastroscope was inserted through the nasal cavity. Observe the patients' nasal mucosa and nasal cavity. If the nasal cavity is dry, help patients apply glycerin, soften and lubricate, so as to reduce the risk of nasal bleeding. When the gastroscope enters

Table 1. Comparison of clinical data between the two groups

	Observation group (n=49)	Control group (n=45)	t/X^2	*P*
Age (years)	57.95±10.97	54.6±8.87	3.211	0.31
Sex			2.156	0.35
Male (n%)	23 (46.9%)	28 (62.2%)		
Female (n%)	26 (53.1%)	17 (37.8%)		
BMI	19.7±1.14	20.1±0.77	3.39	0.35
Esophageal cancer	10 (20.4%)	8 (17.8%)	0.036	0.849
Gastric cancer with pyloric obstruction	5 (10.2%)	9 (20%)	0.145	0.204
Anastomotic stenosis after gastric cancer surgery	8 (16.3%)	7 (15.6%)	0.220	0.883
Duodenal ulcer with stenosis	9 (18.4%)	6 (13.3%)	0.760	0.385
Proliferative lesions of descending duodenum	4 (8.2%)	6 (13.3%)	1.234	0.269
Severe acute pancreatitis	6 (12.2%)	5 (11.1%)	1.415	0.236
Gastroparesis	7 (14.3%)	4 (8.9%)	0.021	0.993

Note: Significant difference as P<0.05.

into the stomach, it directly enters into the duodenum through the pylorus. In order to further ensure the effect of catheterization, it is usually more than the entrance, and the distance is controlled at about 30 cm. Using the biopsy hole, the guide wire was inserted into it. After fixing the guide wire, the gastroscope was slowly retracted. At the same time, nurse give patients psychological nursing, Patients are afraid of enteral nutrition, especially the discomfort of nasal intubation, which makes patients not easy to accept and even produce resistance. Therefore, nurses should first explain the purpose, necessity and method of catheterization, intraoperative cooperation and postoperative precautions to patients and their families, so as to obtain their cooperation.

Evaluation index

① *Success rate of catheterization*: Number of successful catheterization at one time/total number. ② *Catheter pain score*: Visual analogue scale (VAS) was used to evaluate the degree of pain before and after catheterization, respectively [10]. The score range was 0-10, and the degree of pain increased with the increase of the score. ③ Satisfaction score: Patient satisfaction with catheterization. ④ *vital signs:* Heart rate, respiration, blood pressure, pulse oxygen, etc. were collected before and after catheterization. ⑤ *Completion time of catheterization:* The time before and after catheterization was recorded. ⑥ C*omplication:* The complications were recorded. The symptoms include sore throat, cough, vomiting, food reflux, abdominal pain, perforation and gastrointestinal bleeding, etc.

Statistical analysis

All data were analyzed by SPSS 25.0. The statistical results are expressed by mean ± standard deviation ($\bar{x}$ ± s), the data comparison is conducted by t-test and the correlation analysis is conducted by person linear phase, P<0.05 was the difference with statistical significance. Analyses were performed using Graph Pad Prism 7 Software (Graph Pad Prism, San Diego, CA).

Results

Clinical data

As shown in the **Table 1**, which was the characteristics of the participants. The research included 94 patients were included this study. There were 49 cases in the observation group, a mean age (57.95±10.97) years, while in the control group, a mean age (54.6±8.87) years. The number of patients who dignosed nervous system diseases in the shallow sputum suction group was 30 (42.3%), and in the deep sputum suction group was 32 (43.8%), there was no statistical significance between two group (P= 0.849). The number of patients who dignosed esophageal cancer in the observation group was 10 (20.4%), and that in the control group was 8 (17.8%). The number of patients who dig-

Table 2. Comparison of *vital signs* between the two groups after treatment

group	Number of cases	Heart rate difference	Breathing difference	Pulse pressure difference	Pulse oxygen difference
Observation group	49	4.1±6.8	2.3±0.6	5.7±2.7	2.1±0.1
Control group	45	8.0±6.1	3.1±1.0	8.5±2.5	2.2±0.1
t	-	13.325	4.737	11.245	3.175
P	-	0.003	0.021	0.003	0.516

Note: Significant difference as P<0.05.

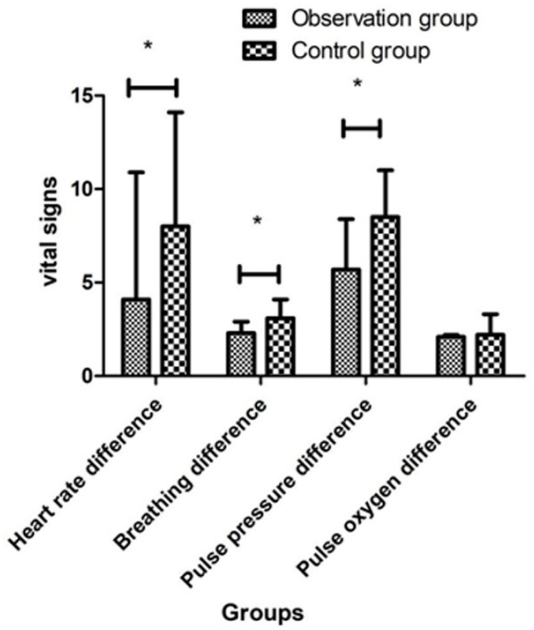

Figure 1. Comparison of *vital signs* between the two groups. Note: Compared with control group, **P<0.05*.

nosed gastric cancer with pyloric obstruction in the observation group was 5 (10.2%), and that in the control group was 9 (20%). The number of patients who dignosed anastomotic stenosis after gastric cancer surgery in the obstruction group was 8 (16.3%), and that in the control group was 7 (15.6%). The number of patients who dignosed duodenal ulcer with stenosis in the obstruction group was 9 (18.4%), and that in the control group was 6 (13.3%). The number of patients who dignosed proliferative lesions of descending duodenum in the observation group was 4 (8.2%), and that in the control group was 6 (13.3%). The number of patients who dignosed severe acute pancreatitis in the obstruction group was 6 (12.2%), and that in the control group was 5 (11.1%). The number of patients who dignosed gastroparesis in the obstruction group was 7 (14.3%), and that in the control group was 4 (8.9%). There were no statistical significance between two groups (P>0.05).

Vital signs

As shown in **Table 2** and **Figure 1**, the heart rate difference in the observation group was (4.1±6.8), and that in the control group was (8.0±6.1). The pulse pressure difference in the observation group was (5.7±2.7) mmHg, and that in the control group was (8.5±2.5) mmHg. The breathing difference in the observation group was (2.3±0.6), and that in the control group was (3.1±1.0), there had statistical significance between two group in the heart rate, breathing and pulse pressure difference after intervention (P<0.05). However, the pulse oxygen difference in the observation group was (2.1±0.1), and that in the control group was (2.2±0.1), there was no statistical significance between two group in pulse oxygen after intervention (P>0.05).

Catheter pain score

As shown in **Table 3** and **Figure 2**, the score of VAS score before intervention in the observation group was (1.09±0.48) points, and that in the control group was (1.13±0.54) points; while the score of VAS at catheter in the observation group was (3.9±0.74) points, and that in the control group was (4.02±0.81) points, there had statistical significance between two group (P<0.05).

Analysis of catheterization

The success rate of catheterization in the observation group was 47 (95.9%), and that in the control group was 39 (86.7%). The satisfaction score in the observation group was (91.47±7.65) points, and that in the control group was (83.64±5.24) points, which was lower than that in the observation group. Furthermore, the completion time of catheteriza-

Table 3. Comparison of *VAS score* between the two groups ($\bar{x} \pm s$)

group	Number of cases	Before intervention	After intervention
Observation group	49	1.09±0.48	3.9±0.74
Control group	45	1.13±0.54	4.02±0.81
t	-	1.198	2.817
P	-	0.312	0.019

Note: Significant difference as P<0.05.

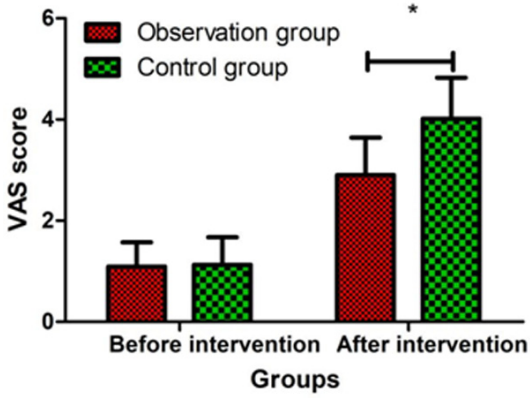

Figure 2. Comparison of *VAS score* between the two groups before and after intervention. Note: Compared with control group, **P<0.05*.

tion in the observation group was (19.7±8.2) min, and that in the control group was (23.9±9.1) min. There had statistical significance between two group in the satisfaction score and completion time of catheterization (P<0.05) (**Table 4**).

Complication

The number of patients who occurred mild epigastric pain in the observation group was 7 (14.3%), and that in the control group was 13 (28.9%). The rate of occurred abdominal distention in the observation group was 10.2% (5/49), and that in the control group was 33.3% (15/45). The rate of occurred diarrhea in the observation group was 8.2% (4/49), and that in the control group was 22.2% (10/45). There had statistical significance between two group in abdominal distention and diarrhea (P<0.05) (**Table 5**).

Discussion

In our present study, there were significant differences between the two groups in heart rate, breath, pulse pressure difference, VAS score, satisfaction score and completion time of catheterization (P<0.05). However, There was no statistical difference between the two groups in success rate of catheterization and pulse oxygen difference (P>0.05).

At present, there are many ways to place nasojejunal nutrition tube, which is mainly divided into two categories: surgical and non-surgical [11]. Surgical placement is often applied in population who need long-term nutritional support in thoracic and abdominal surgery. There are three non-surgical methods: blind vision, X-ray fluoroscopy and endoscopic guidance. Endoscopy assisted intubation is the most successful method [12], because it is simple and fast, high success rate, clinically, spiral nasojejunal nutrition tube has smooth, flexible, impermeable X-ray, simple operation, not easy to block the tube and other characteristics, and has spiral memory function, so that it can stay in the small intestinal cavity and fixed in an ideal state. In our study, all patients had upper gastrointestinal stenosis (including benign and malignant stenosis), the success rate of catheterization was 95.9% in observation group, no complications such as vomiting, gastrointestinal bleeding, perforation were found. During the process of catheterization, the placement of guide wire to jejunum position, nasogastric endoscopy, guide wire guided nasojejunal nutrition tube and the speed of guide wire withdrawal are the key to successful catheterization [13]. The fixation of postoperative nutrition tube and reasonable infusion of nutrient solution are the important guarantee for effective enteral nutrition [14]. After enteral nutrition treatment, the nutritional status and laboratory indexes of 49 patients were greatly improved, which provided an important way for systemic nutritional support and primary disease treatment.

Attention should be paid during the catheterization: ① It is not suitable to insert the nutrition tube too deep before the endoscopy, otherwise the nutrition tube is easy to bend and fold in the gastric cavity. It is appropriate to push the nutrition tube to 35~40 cm away from the incisor teeth, so that the head end of the nutrition tube can be seen at the cardia or gastric fundus after the endoscopy, which is convenient for further advancement [15]; ② The assistant can assist slowly under the clear field

Table 4. Comparison of analysis of *Catheterization* between the two groups ($\bar{x}$ ± s)

group	Number of cases	Success rate of catheterization	Satisfaction score	Completion time of catheterization
Observation group	49	47 (95.9%)	91.47±7.65	19.7±8.2
Control group	45	39 (86.7%)	83.64±5.24	23.9±9.1
t	-	3.188	14.274	6.235
P	-	0.392	0.003	0.024

Note: Significant difference as P<0.05.

Table 5. Comparison of analysis of *Complication* between the two groups ($\bar{x}$ ± s)

group	Number of cases	Mild epigastric pain	Abdominal distention	Diarrhea
Observation group	49	7 (14.3%)	5 (10.2%)	4 (8.2%)
Control group	45	13 (28.9%)	15 (33.3%)	10 (22.2%)
t	-	4.578	11.372	7.165
P	-	0.095	0.012	0.044

Note: Significant difference as P<0.05.

of vision while pushing the nutrition tube, otherwise it is easy to cause the nutrition tube to bend and discount in the gastric cavity [16]; ③ The assistant "following method" to make use of the friction force between the body and the tube to make the tube enter the duodenum step by step with the gastroscope. When the gastroscope is withdrawn, the assistant can fix the tube outside the body without the tube prolapse; ④ The assistant should not blindly push the nutrition tube too much. Before withdrawing the mirror, it is necessary to observe whether there is any tortuosity or discount of the nutrition tube at the body and fundus of the stomach. If there is, it is necessary to straighten the nutrition tube. Operation method: clamp the nutrition tube with a rat toothed forceps at the gastric antrum to prevent it from prolapse. Under direct observation, the assistant should draw back the nutrition tube to straighten it [17]; ⑤ The position of the nutrient tube is straight in the greater curvature of the stomach, and it is not easy to follow out when withdrawing the mirror; on the contrary, it is easy to follow out when the nutrient tube is in the lesser curvature of the stomach [18]; ⑥ After entering the jejunum, 30-50 ml of 0.9% sodium chloride injection was injected into the jejunum through the end of the guide wire, which was beneficial to further push the nutrition tube down through the intestinal peristalsis [19]; ⑦ When the gastroscope is withdrawn to the gastric antrum near pylorus, the head end of the nutrition tube is opened at the distal end of the duodenum to prevent the displacement and prolapse of the nutrition tube [20].

In conclusion, nasoscopically assisted nasogastri tube and nasojejunal tube placement has the advantages of simple and fast, short operation time, high success rate and few complications. It is the first choice of intubation method for enteral nutrition support treatment.

Disclosure of conflict of interest

None.

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