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Application of spiral nasointestinal tube in enteral nutrition support for patients with extensive burn

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ABSTRACT

Objective: To observe the effect of spiral nasointestinal tube on enteral nutrition support in patients with extensive burn. **Methods:** A total of 60 patients with extensive burn who were admitted in our hospital from January, 2014 to June, 2015 were included in the study and divided into the observation group and the control group with 30 cases in each group according to different catheter indwelling methods. The patients in the observation group were given spiral nasointestinal tube for enteral nutrition support, while the patients in the control group were given routine gastric tube for enteral nutrition support. The nutrition status and the occurrence rate of complications before catheter indwelling, 3, 6, and 10 d after catheter indwelling in the two groups were recorded. **Results:** The levels of ALB, HB, PA, and Scr 6, 10 d after catheter indwelling in the observation group were significantly higher than those in the control group (P<0.05). The occurrence rate of complications during the treatment period in the observation group was significantly lower than that in the control group (P<0.05). **Conclusions:** The spiral nasointestinal tube can provide the patients with extensive burn a better effective enteral nutrition support and improve the nutrition support, with a lower occurrence rate of complications, which is beneficial for the patients' rehabilitation.

1. Introduction

Some researches demonstrate that the gastrointestinal mucosal structures in patients with extensive burn can be destroyed in a different degree, leading to increased intestinal permeability, immigration of intestinal bacteria and endotoxins, and body in a enterogenous hypermetabolism state[1−3]; therefore, how to effectively improve the nutrition status can play a positive role in the prognosis[4]. The enteral nutrition is a support scheme which can improve the nutrition state in patients unable to feed themselves independently in the clinic, with an accurate efficacy[5]. The enteral nutrition support is commonly used for patients with extensive burn, but the traditional gastric tube nutrition support is easy to cause aspiration, reflux, inhaled pneumonia, and other complications; thus, the feeding intolerance is produced[6]. Therefore, looking for a catheter indwelling scheme which can not only maintain the enteral nutrition, but also can reduce the occurrence rate of complications has been a research hotspot for the burn department. The study is aimed to explore the effect of spiral nasointestinal tube in the enteral nutrition support in patients with extensive burn in order to provide an evidence for selecting an effective enteral nutrition pathway.

2. Materials and methods

2.1. Clinical data

A total of 60 patients with extensive burn who were admitted in our hospital from January, 2014 to June, 2015 were included in the study, among which 31 were male, and 29 were female; aged from 10 to 76 years old, with an average age of (32.7±5.4) years old; with a total burn area of 45%-90%. The patients were divided into the observation group and the control group with 30 cases in each group according to different catheter indwelling methods. The difference of the general materials between the two groups was comparable

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(P>0.05) (Table 1).

2.2. Methods

The patients in the observation group were given spiral nasointestinal tube for enteral nutrition support, while the patients in the control group were given routine gastric tube for enteral nutrition support. Catheter indwelling methods: The patients in the observation group were given No. 12 spiral nasointestinal tube (produced by Netherland Nutricia Company) for enteral nutrition support. The spiral nasointestinal tube end is in a micro-spiral shape, and is made of polyurethane, with stainless steel wire inside the tube. The catheter indwelling was performed in the guidance of gastroscope. The forceps were used to push the nasointestinal tube to about 135-145 cm inferior to Treitz ligament. The patients in the control group were given the traditional gastric tube for enteral nutrition support. The gastric tube was produced by Hanzhou Fushan Medical Applicances Co. Ltd. Before indwelling, the anterior segment of the gastric tube was lubricated. Then the gastric tube was inserted in a depth of 50-55 cm from one side nostril, was inserted into the stomach after confirming the accurate gastric tube, and finally was fixed. Nutrison fibre, Peptison, or Ruidai nutrition was adopted. The nasal feeding was given 24 h after admission, with a volume from 500 mL/d gradually to 1 500 mL/d, and pumping speed from 50 mL/h gradually to 150 mL/h, which could make the patients gradually tolerate. The nutrition dosage was adjusted according to the actual burn area.

2.3. Observation of indicators

The levels of ALB, HB, PA, and Scr before nutrition support and 3, 6, 10 d after nutrition support in the two groups were compared. The occurrence of complications in the two groups was observed.

2.4. Statistical analysis

SPSS 13.0 software was used for the statistical analysis. t test and chi-square test were used for the measurement data and enumeration data, respectively. P<0.05 was regarded as statistically significant difference.

3. Results

3.1. Comparison of nutrition status at each timing point

The difference of ALB, HB, PA, and Scr levels before catheter indwelling between the two groups was not statistically significant (P>0.05). The levels of ALB, HB, PA, and Scr 6, 10 d after catheter indwelling in the observation group were significantly higher than those in the control group (P<0.05) (Table 2).

3.2. Comparison of complications during treatment period between two groups

The occurrence rate of abdominal distension, reflux, aspiration, and pulmonary infection during the treatment period in the observation group was significantly lower than that in the control group (P<0.05) (Table 3).

Table 1
Comparison of clinical data.

Groups	n	Gender		Age		Burn area	
		Male	Female	<30 years old	>30 years old	<50%	>50%
Observation group	30	15	15	22	8	5	25
Control group	30	16	14	24	6	6	24

Table 2
Comparison of nutrition status at each timing point.

Groups	n		ALB (g/L)	Hb (g/L)	PA (mg/L)	Scr (μ mol/L)
Observation group	30	Before indwelling	27.9±2.6	133.6±14.3	198.6±12.3	59.5±12.5
		3 d after indwelling	29.4±3.0	126.9±18.3	213.8±14.5*	77.3±9.8*
		6 d after indwelling	36.4±2.6*	118.4±23.3*	256.9±13.5*	75.3±11.0*
		10 d after indwelling	37.1±4.2*	129.3±20.2*	298.5±135.9*	76.3±14.2*
Control group	30	Before indwelling	28.6±3.5	136.1±18.5	201.4±10.2	58.6±11.3
		3 d after indwelling	31.7±2.9	123.5±22.1	224.6±11.2	62.5±15.2
		6 d after indwelling	33.1±4.0	103.7±16.5	236.7±15.3	64.7±11.4
		10 d after indwelling	33.5±3.2	122.7±13.2	280.1±9.8	65.2±7.8*

*P<0.05, when compared with the control group.

Table 3
Comparison of complications during treatment period between two groups[n (%)].

Groups	n	Abdominal distension	Diarrhea	Reflux	Aspiration	Pulmonary infection
Observation group	30	1 (3.3)	4 (13.3)	1 (3.3)	0 (0.0)	1 (3.3)
Control group	30	5 (16.7)	3 (10.0)	9 (30.0)	6 (20.0)	9 (30.0)
χ^2 vlaue		5.36	2.66	7.41	9.12	11.40
P value		<0.05	>0.05	<0.05	<0.05	<0.05

4. Discussion

The enteral nutrition is a common nutrition support means for patients with gastrointestinal dysfunction and severe burn in that it is suitable for the body physiological property, can not only retain the nutrition, but also reduce the intestinal mucosal permeability, inhibit the displacement of bacteria and endotoxins, and prevent the metabolic complications and infections, which is beneficial for the rehabilitation[7-10].

Some researches demonstrate that[1] the enteral nutrition metabolism is more suitable for the body physiological property, can contribute to maintain the integrity of intestinal mucosal barrier, and promote the absorption of nutrient substances. For critically ill patients requiring nutrition support, the enteral nutrition support is preferred. The enteral nutrition support is mainly realized by the traditional nasogastric tube and nasointestinal feeding nutrients[12]. After extensive burn, the patients are in an enterogenous hypermetabolism state; therefore, an early and effective nutrition support is of great significance in improving the prognosis. The spiral nasointestinal tube is a kind of polyurethane tube which can not penetrate X ray, can pass the pylorus with a normal gastrointestinal mobility, and can directly provide the intestinal tract with nutrient substances, which can contribute to maintain the intestinal integrity, promote the intestinal mobility, reduce the hypermetabolism level, and is beneficial to the nutrient absorption for patients with extensive burn[13,14]. ALB, Hb, PA, and Scr are the common detection indicators to evaluate the nutrition status, and can accurately reflect the nutrition status[15]. The results in the study showed that the levels of ALB, HB, PA, and Scr 6, 10 d after catheter indwelling in the observation group were significantly higher than those in the control group (P<0.05), suggesting that the spiral nasointestinal tube can provide a better nutrition support for patients with extensive burn. Some scholars argue that[16] the traditional nasogastric tube feeding is easy to cause gastric emptying delay, gastric retention, gastric content reflux, aspiration, and inhaled pneumonia, which is not beneficial for the rehabilitation. The results in the study showed that the occurrence rate of abdominal distension, reflux, aspiration, and pulmonary infection during the treatment period in the observation group was significantly lower than that in the control group (P<0.05), with a successful nutrition process and preferable tolerance, indicating that adoption of spiral nasogastric tube nutrition support for patients with extensive burn can effectively avoid the occurrence of aspiration, gastric emptying delay, and other complications.

In conclusion, the spiral nasointestinal tube can provide the patients with extensive burn a better effective enteral nutrition support and improve the nutrition support, with a lower occurrence rate of complications, which is beneficial for the patients' rehabilitation.

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