



Effect of PDCA model on nutritional status in patients after laparoscopic repair of perforated peptic ulcer

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ABSTRACT

Objective: To explore the effect of PDCA model on the nutritional status in patients after laparoscopic repair of perforated peptic ulcer. **Methods:** A total of 83 patients with gastric perforation who were admitted in our hospital from October, 2014 to December, 2015 for laparoscopic repair of perforated peptic ulcer were included in the study and randomized into the observation group ($n=42$) and the control group ($n=41$). The patients in the two groups were given routine treatments after operation. On this basis, the patients in the observation group were given additional PCDA model nursing. The gastrointestinal hormone levels and nutritional indicators after operation in the two groups were compared. **Results:** The difference of VIP, CCK, and GAS levels before operation between the two groups was not statistically significant ($P>0.05$). VIP, CCK, and GAS levels 3 d after operation were significantly reduced when compared with before operation ($P<0.01$). VIP, CCK, and GAS levels 15 d after operation were significantly lower than those 3 d after operation ($P<0.05$). VIP, CCK, and GAS levels 3 d and 15 d after operation in the observation group were significantly lower than those in the control group ($P<0.05$). The difference of WBC, TP, Hb, Alb, TRF, and BMI before operation between the two groups was not statistically significant ($P>0.05$). WBC 1 d after operation in the observation group was significantly reduced, while TP, Hb, Alb, TRF, and BMI were significantly elevated ($P<0.05$) and were significantly higher than those in the control group ($P<0.05$). WBC 7 d after operation in the two groups was significantly lower than that 1 d after operation ($P<0.05$), while TP, Hb, Alb, TRF, and BMI were significantly higher than those 1 d after operation ($P<0.05$), and the difference between the two groups was not statistically significant ($P>0.05$). **Conclusions:** PDCA nursing intervention can effectively improve the early nutritional status in patients after laparoscopic repair of perforated peptic ulcer and contribute to the postoperative rehabilitation.

1. Introduction

Gastric perforation is one of the most common and most serious complications of gastric ulcer, whose most common pathogenesis is associated with engorgement on the basis of gastric ulcer. When there is an attack, a sudden and acute abdominal pain occurs, usually in a knife-cutting or burning feeling, which can then induce nausea, vomiting, and even shock[1]. Operation is preferred in the treatment of gastric perforation, with an accurate efficacy, but due

to fasting and water deprivation after operation, postoperative pain, and immobilization, the gastrointestinal function recovery and nutrition intake can be affected[2]; therefore, how to promote the postoperative function recovery in patients with gastric perforation is of great significance in promoting the rehabilitation. The study is aimed to explore the effect of PDCA model on the nutritional status in patients after laparoscopic repair of perforated peptic ulcer.

2. Materials and methods

2.1. General materials

A total of 83 patients with gastric perforation who were admitted in our hospital from October, 2014 to December, 2015 for laparoscopic repair of perforated peptic ulcer were included in the study, among which 42 were male, and 41 were female; aged from 46 to 72

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years old, with an average age of (58.54±4.79) years old; with an onset time of (39.75±5.31) h and operation time of (66.33±22.15) h. All the patients were in accordance with the related diagnosis of surgery[4], and were confirmed by the imaging examination. Those who had severe heart, liver, and renal insufficiency, blood disease, and malignant tumors were excluded from the study.

2.2. Methods

The patients were randomized into the observation group ($n=42$) and the control group ($n=41$). The patients in the two groups were performed with the operation under a general anesthesia, and were given anti-inflammation, acid-inhibiting, fasting, gastrointestinal decompression, parenteral nutrition support, regular turnover and expectoration, ECG monitoring, and water-electrolyte balance maintenance. On the routine treatments, the patients in the observation group were given PDCA model nursing. The specific contents were in the following[5]: (1) P represents the specifically formulated nursing planning: according to the patients' psychological status and physiological quality, the individualized comprehensive analysis was performed, the pathogenesis, condition, and possible complications were highlighted, the strict quality control criteria were drawn up, the specific psychological intervention planning was formulated, and the treatment compliance was improved; (2) D represents active and favorable nursing intervention: adequate preparations were made before operation, and vital signs and overall stress levels were strictly monitored during operation; (3) C represents checking the implementation of nursing intervention: the patients' conditions and self-complaints were recorded in detail to improve the nutrition support therapy and the rationality of medication; (4) A represents quality control and processing of each nursing detail: a comprehensive examination of clinical medication was performed, the patients' bad living habits were limited, the fundamental diseases were radically treated, and an individualized nursing was conducted.

2.3. Observation indicators

The fasting venous blood before operation, 3 d and 15 d after operation in the two groups was collected. ELISA was used to detect

VIP, CCK, and GAS levels. WBC, Alb, Hb, TP, TRF, and BMI before operation, 1 d and 7 d after operation in the two groups were compared.

2.4. Statistical analysis

SPSS 18.0 software was used for the statistical analysis. The measurement data were expressed as mean±SD. The paired t test was used for the intra-group comparison, while the independent t test was used for the comparison between the two groups. The enumeration data were expressed as percentage, and χ^2 -square test was used. $P<0.05$ was regarded as statistically significant difference.

3. Results

3.1. Comparison of VIP, CCK, and GAS levels before and after operation between two groups

The difference of VIP, CCK, and GAS levels before operation between the two groups was not statistically significant ($P>0.05$). VIP, CCK, and GAS levels 3 d after operation were significantly reduced when compared with before operation ($P<0.01$). VIP, CCK, and GAS levels 15 d after operation were significantly lower than those 3 d after operation ($P<0.05$). VIP, CCK, and GAS levels 3 d and 15 d after operation in the observation group were significantly lower than those in the control group ($P<0.05$) (Table 1).

3.2. Comparison of nutritional indicators before and after operation between two groups

The difference of WBC, TP, Hb, Alb, TRF, and BMI before operation between the two groups was not statistically significant ($P>0.05$). WBC 1 d after operation in the observation group was significantly reduced, while TP, Hb, Alb, TRF, and BMI were significantly elevated ($P<0.05$) and were significantly higher than those in the control group ($P<0.05$). WBC 7 d after operation in the two groups was significantly lower than that 1 d after operation ($P<0.05$), while TP, Hb, Alb, TRF, and BMI were significantly

Table 1

Comparison of VIP, CCK, and GAS levels before and after operation between two groups.

Groups	n	Time	VIP ($\mu\text{mol/L}$)	CCK (pg/mL)	GAS ($\mu\text{mol/L}$)
Observation group	42	Before operation	1.99±0.21	8.94±1.22	70.47±4.34
		3 d after operation	1.87±0.18 [▲]	7.63±1.07 [▲]	67.36±4.18 [▲]
		15 d after operation	3.38±0.25 ^{##▲}	12.77±1.15 ^{##▲}	82.91±4.28 ^{##▲}
Control group	41	Before operation	1.98±0.17	8.92±1.21	70.47±4.47
		3 d after operation	1.75±0.16 [°]	5.40±1.08 [°]	61.31±4.23 [°]
		15 d after operation	2.24±0.23 ^{°#}	9.84±1.15 ^{°#}	75.73±4.18 ^{°#}

[°] $P<0.05$, when compared with before operation; [#] $P<0.05$, when compared with 3 d after operation; [▲] $P<0.05$, when compared with the control group.

Table 2

Comparison of nutritional indicators before and after operation between two groups.

Groups	n	Time	WBC (10 ⁹ /L)	TP (g/L)	Hb (g/L)	Alb (g/L)	TRF (g/L)	BMI (kg/m ²)
Observation group	42	Before operation	8.61±2.39	27.99±3.19	91.56±10.26	61.87±5.63	1.89±0.30	19.19±1.04
		1 d after operation	7.07±2.28 [°]	37.01±2.92 [▲]	108.43±9.76 [▲]	70.66±5.24 [▲]	2.29±0.31 [▲]	19.93±1.07 [▲]
		7 d after operation	6.23±2.14 [#]	40.17±2.85 [#]	116.42±9.94 [#]	73.26±4.77 [#]	2.52±0.33 [#]	22.97±0.93 [#]
Control group	41	Before operation	8.65±2.41	28.25±3.17	91.47±10.01	62.34±5.84	1.87±0.31	19.31±1.06
		1 d after operation	7.89±2.16	33.46±2.96 [°]	98.25±9.93 [°]	64.47±5.73	1.96±0.31	19.46±1.08
		7 d after operation	6.33±2.15 [#]	39.66±2.87 [#]	114.20±9.88 [#]	72.04±5.17 [#]	2.51±0.38 [#]	22.07±1.01 [#]

[°] $P<0.05$, when compared with before operation; [#] $P<0.05$, when compared with 1 d after operation; [▲] $P<0.05$, when compared with the control group.

higher than those 1 d after operation ($P<0.05$), and the difference between the two groups was not statistically significant ($P>0.05$) (Table 2).

4. Discussion

Due to the continuous development of minimally invasive technology, the laparoscopic repair of perforated peptic ulcer has been widely applied in the treatment of gastric perforation, and been accepted by extensive physicians and patients due to its advantages of small surgical trauma and satisfactory repair effect. The minimally invasive surgery has a small trauma, but still belongs to the traumatic operation. The intraoperative and postoperative procedures can make a certain effect on the body; moreover, fasting and immobilization after laparoscopic repair of perforated peptic ulcer can affect the gastrointestinal function to a certain degree, which can influence the rehabilitation; therefore, combination with efficient nursing after operation can contribute to enhance the surgical efficacy and improve the prognosis[6].

PDCA can timely summarize the experience for continuous correction through evaluating various process, details, and inadequacy of nursing during operation and after operation, and continuously improve the nursing quality through quality circulation control[7]. Moreover, PDCA nursing model is a kind of dynamic management method with continuously improved quality, and focuses on nursing details, with comprehensive and effective nursing interventions to promote the postoperative recovery[11-14]. The gastrointestinal hormone level is closely associated with the laparoscopic repair of perforated peptic ulcer, and can effectively reflect the trauma degree of gastrointestinal function status. GAS is a main excitable gut peptide to regulate the gastrointestinal mobility, and can promote the secretion of gastric acid and pepsin[8]. VIP is a main inhibitory gut peptide, can dilate the gastrointestinal sphincter, and stimulate the secretion of intestinal juice. CCK is an effective indicator to reflect the secretion function of gall bladder[9]. The results in the study showed that the difference of VIP, CCK, and GAS levels before operation between the two groups was not statistically significant ($P>0.05$); VIP, CCK, and GAS levels 3 d after operation were significantly reduced when compared with before operation ($P<0.01$); VIP, CCK, and GAS levels 15 d after operation were significantly lower than those 3 d after operation ($P<0.05$); VIP, CCK, and GAS levels 3 d and 15 d after operation in the observation group were significantly lower than those in the control group ($P<0.05$), indicating that PDCA nursing intervention can significantly improve the serum gastrointestinal hormone level, and promote the recovery of gastrointestinal peristalsis and biliary secretion, which is consistent with the results reported by Gao[10]. The laparoscopic repair of perforated peptic ulcer belongs to the minimally invasive surgery, but can easily induce the gastrointestinal dysfunction after operation, which can affect the gastrointestinal peristalsis and nutrition absorption[15]. In the study, PDCA nursing was performed during operation, with patient oriented, to objectively evaluate the therapeutic effect and physical state, and guide their diet and bad living habits in order to improve the perioperative nutritional status. The results in the study showed that WBC 1 d after operation in the observation group was significantly reduced, while TP, Hb, Alb, TRF, and BMI were significantly elevated ($P<0.05$) and were significantly higher than those in the control group ($P<0.05$); WBC 7 d after operation in the two groups was significantly lower than that 1 d after operation ($P<0.05$), while TP, Hb, Alb, TRF, and BMI

were significantly higher than those 1 d after operation ($P<0.05$), and the difference between the two groups was not statistically significant ($P>0.05$), indicating that laparoscopic repair of perforated peptic ulcer in combined with PDCA can effectively improve the recent nutritional status, and contribute to the postoperative rehabilitation[16].

In conclusion, laparoscopic repair of perforated peptic ulcer in combined with PDCA can contribute to the nutritional status in perioperative patients, recover the gastrointestinal hormone level, and is beneficial for the postoperative rehabilitation.

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