

## Original Article

# Effect of comprehensive nursing care on patients undergoing duodenoscopy-assisted biliary drainage for biliary tract disease

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**Abstract:** Objective: We aimed to explore the effect of comprehensive perioperative nursing care on patients undergoing duodenoscopy-assisted biliary drainage for biliary tract disease in order to improve the treatment effect and decrease the operative complications. Methods: Patients with biliary diseases who were treated in the Department of Gastroenterology of Zhongnan Hospital of Wuhan University from December 2019 to July 2020 were selected for this prospective study. All the patients were treated with duodenoscopy-assisted biliary drainage. The patients were randomly divided into the control group and the observation group, with 64 cases in each group. The patients in the control group received routine nursing, while the patients in the observation group received comprehensive nursing care. The total effective rate, nursing quality score, incidence of complications, and patient satisfaction with the nursing care were observed and compared between the two groups. Results: The total effective rate in the control group was lower than that in the observation group (78.13% vs. 92.19%,  $P < 0.05$ ). Compared with the control group, the scores of the all the aspects of nursing quality in the observation group were generally higher ( $P < 0.05$ ). In addition, the observation group achieved better results than control group in terms of patient satisfaction and overall complication rate ( $P < 0.05$  and  $P < 0.01$ ). Conclusion: Comprehensive nursing care can improve the treatment effect and decrease the incidence of adverse reactions in patients undergoing duodenoscopic-assisted biliary drainage for biliary tract diseases, which can be recommended for clinical application.

**Keywords:** Duodenoscopy, biliary drainage, biliary tract diseases, clinical nursing

## Introduction

Biliary tract disease is a common gastroenterology disease, which is mainly caused by stones, infection, tumor, deformity or biliary tract injury. Biliary tract diseases include extrahepatic biliary obstruction or tumor of the biliary duct caused by benign and malignant diseases [1, 2]. Traditional surgery for treating biliary tract disease has some disadvantages such as long operation time, trauma, and high postoperative complications and recurrence rates which can bring much pain and mental pressure to patients, especially to elderly patients with systemic diseases. Moreover, traditional surgery cannot achieve excellent outcomes and the patients' quality of life after surgery is poor [3-5].

Duodenoscopy is a new minimally invasive approach to the treatment of biliary diseases. This technique is usually employed to examine lesions and assist in the treatment of the liver, gallbladder, pancreas, duodenum and other diseases with the use of a duodenal side-view mirror, which can reduce the surgical trauma [6, 7]. Duodenoscopy is safe and convenient and can achieve good clinical results, and it has been accepted by a growing number of clinicians [8]. Biliary drainage is an effective method for relieving biliary obstruction, reducing jaundice, and improving liver function. The method shows advantages especially in treating patients with malignant biliary tumors who are intolerant to traditional surgery or undergoing palliative treatment, and it can reduce the incidence of postoperative inflammatory reac-

tion [9]. It has been reported that a systematic nursing care program has positive clinical significance for the rehabilitation of patients after the surgery for biliary tract diseases, as it can reduce the incidence of postoperative complications, improve the quality of life of patients, and have a high degree of acceptance among the patients [10]. Therefore, in the present study, patients with biliary diseases who were treated in the Department of Gastroenterology of Zhongnan Hospital of Wuhan University from December 2019 to July 2020, were selected as clinical the subjects, in whom we aimed to explore the effect of comprehensive perioperative nursing care in patients undergoing duodenoscopy-assisted biliary drainage for biliary tract diseases, in an effort to provide clinical guidance for improving the surgical outcome and postoperative quality of life of patients.

### Materials and methods

#### *General information*

Patients with biliary diseases who were treated in the Department of Gastroenterology of Zhongnan Hospital of Wuhan University from December 2019 to July 2020 were selected for this prospective study. All the patients were treated with duodenoscopy-assisted biliary drainage. The patients were randomly divided into the control group and the observation group, 64 cases in each. The control group received routine nursing, whereas the observation group received comprehensive nursing care. All the patients signed an informed consent, and the study was approved by the Ethics Committee of Zhongnan Hospital of Wuhan University.

Inclusion criteria were as follows: 1) Patients underwent biliary drainage for treating biliary diseases, including cholecystolithiasis, bile duct tumor, intrahepatic cholelithiasis, and choledocholithiasis. The diagnosis was confirmed by transabdominal ultrasonography, upper abdominal CT and/or magnetic resonance imaging (MRI) [11]; 2) patients who had complete medical records and clear pathological results; 3) patients who were intolerant to traditional surgery and duodenoscopy-assisted therapy was their preferred choice; 4) patients who were followed-up on time and had complete records; 5) patients with good mental state and could communicate normally.

Exclusion criteria were: 1) patients over 80 years old; 2) patients who underwent surgery after endoscopic biliary drainage; 3) patients with severe respiratory or cardiovascular diseases; 4) withdrawal caused by various reasons.

#### *Nursing methods*

The patients in the control group received routine nursing care including preoperative cardiopulmonary function tests and laboratory examination, 8-hour food fasting and 4-hour water fasting prior to the surgery, explanation of the treatment plan, postoperative routine nursing care, and postoperative evaluation of related markers.

The patients in the observation group received the comprehensive nursing care including preoperative, intraoperative, and postoperative nursing as follows.

**Preoperative nursing:** The patients received psychological nursing care. The nursing staff actively communicated with the patients to reduce patients' anxiety and fear. Also, the nursing staff provided the patients with health education and educated them about the disease to increase the patients' confidence in overcoming the disease and improve the patients' compliance with treatment. After hospital admission, the nursing staff closely monitored patients' vital signs and whether there was yellowing of the skin and sclera. The patients were also instructed to eat a high-protein and low-fat diet before the operation.

**Intraoperative nursing:** The patients were placed in a left lateral recumbent position or supine position for the operation. The nurses were arranged to provide surgical items and record the changes in patients' respiration, oxygenation, heart rate, and blood pressure. The nasobiliary duct was fixed with T-shaped cross-wrapping, and any risk of suffocation caused by vomiting due to endoscopic stimulation was avoided. The secretions were removed in real time by the medical staff [12]. The medical staff were also trained in advance on the cleaning, maintenance and operation of the duodenoscope and were familiarized with the functions and usage of various accessories of the duodenoscope to ensure a smooth cooperation in the surgery [13].

Postoperative nursing: After operation, the initial fixation of the drainage tube was performed in the Digestive Endoscopy Center, and the drainage tube was fixed and connected closely to avoid leakage. Attention to aseptic operations of the drainage tube was made. The drainage bag was changed every 24 hours and the drainage bag was set up in a position to avoid backflow and infection. Meanwhile, the handover between the Digestive Endoscopy Center and the ward nurses was strengthened. After operation, the patients rested in bed and fasted for 24 hours. Patients' hemodiastase level was detected 2 hours after the operation, and the routine blood examination was performed the next morning after the operation. The nursing staff also monitored closely whether the patients had any abdominal distension or fever one day after operation. Two days after operation, a routine liver examination was performed to observe whether the patient's liver function was improved and the bilirubin level elevated. The nasobiliary duct was also examined, with the aid of X-ray if necessary, to check if the duct was displaced or blocked. The patients fasted for 1-2 days after operation and were allowed to eat if they had normal level of amylase and no abdominal pain, fever, jaundice or other conditions. The patients' diet progressed from a clear fluid diet to a low-fat fluid diet, and then to a low-fat semi-solid diet. Crude fiber food was avoided to prevent bleeding caused by friction on the duodenal papilla after operation. The patients could eat normal food one week after operation and were encouraged to get out of bed for activity as early as possible [14]. Postoperative monitoring was performed to observe if there was hyperamylasemia in the patients, and good discharge care was provided to prevent acute pancreatitis and other complications. Regular follow-up was also conducted.

### *Outcome measures*

*Main outcome measures:* The total effective rate, nursing quality, and incidence of complications (referring to the adverse reactions after treatment, including hyperamylasemia, acute cholangitis, pancreatitis, gastrointestinal bleeding, wound infection, perforation. Incidence of complications = number of complications/total number of cases \* 100%) of the two groups were observed. The effectiveness of the treatment was divided into markedly effective,

effective, and poorly effective. If the patients recovered well after surgery and corresponding nursing care, and no postoperative adverse reactions occurred, the treatment was considered as markedly effective. If the patients got better or healed with mild complications and prolonged rehabilitation, the treatment was considered as effective. If the surgical result was not good and further treatment was required, the treatment was considered as poorly effective. The total effective rate of treatment = number markedly effective and effective cases/total number of cases \* 100%. The self-designed nursing quality scoring table was used to score the nursing quality, which was based on five aspects: specialist nursing, ward nursing, basic nursing, safety management, and medication care, with 10 points in each item. The Cronbach's  $\alpha$  coefficient of the overall internal consistency of the questionnaire was 0.94 and the content validity was 0.81. Blood sample (3 mL) was collected from the patients for detecting the serum amylase level with an automatic biochemical analyzer (AU5400, OLYMPUS, Japan) 2 hours after operation.

*Secondary outcome measures:* Patient satisfaction with the nursing care was evaluated by a self-designed questionnaire (Cronbach's  $\alpha$  was 0.92; the total variance explained was 68.88%, and the validity was good). The satisfaction level was divided into satisfied, almost satisfied, and dissatisfied. Patient satisfaction rate = (number of satisfied cases + number of almost satisfied cases)/total number of cases \* 100%.

### *Statistical analysis*

Statistical software, SPSS 16.0, was used for statistical analysis. Count data are presented as percentage and number and were examined by Chi-square test. Measurement data in accordance with a normal distribution are presented as mean  $\pm$  standard deviation. Independent t-test was used for comparison between groups, and non-parametric rank-sum test (Z) was used to analyze ranked data.  $P < 0.05$  indicated a statistically significant difference.

## **Results**

### *Baseline data*

There were no differences in gender, age, type of disease, and incidence of complications

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**Table 1.** Baseline data in the two groups (n,  $\bar{x} \pm sd$ )

Groups	Control Groups	Observation group	t/ $\chi^2$ /Z	P
Cases (n)	64	64		
Gender			0.281	0.596
Male	34	31		
Female	30	33		
Average age (years)	52.4±6.8	54.1±7.2	1.360	0.176
Disease type			-0.253	0.800
Cholecystolithiasis	8	6		
Bile duct tumor	10	9		
Hepatoolithiasis	12	17		
Choledocholithiasis	34	32		
Complication			0.303	0.582
High blood pressure	39	42		
Diabetes	25	22		

**Table 2.** Effective rates in the two groups (n, %)

Groups	Cases (n)	Markedly effective	Effective	Poorly effective	Effective rates
Control Groups	64	18 (28.13)	32 (50.00)	14 (21.87)	50 (78.13)
Observation Group	64	20 (31.25)	39 (60.94)	5 (7.81)	59 (92.19)
$\chi^2$		0.150	1.550	5.183	5.006
P		0.699	0.213	0.023	0.025

**Table 3.** Nursing quality in the two groups ( $\bar{x} \pm sd$ )

Groups	Control Groups	Observation group	$\chi^2$	P
Cases (n)	64	64		
Specific nursing	7.52±1.41	8.43±1.84	3.140	0.002
Ward nursing	7.75±1.63	8.54±1.21	3.113	0.002
Basic nursing	8.29±0.88	8.80±0.92	3.205	0.002
Safety management	8.11±1.72	8.72±1.12	2.378	0.019
Drug nursing	8.73±1.26	9.13±0.91	2.059	0.042

between the two groups ( $P>0.05$ ), and the results of our study were comparable. See **Table 1**.

### *Effective rate in the two groups*

The observation group had higher total effective rate than the control group (92.19%, 59/64 vs. 78.13%, 50/64;  $P<0.05$ ). See **Table 2**.

### *Nursing quality in the two groups*

The nursing quality of the two groups was scored using a self-designed table. The scores of the nursing quality in the aspects of specialist nursing, ward nursing, basic nursing, safety

management, and drug nursing in the observation group were higher than those in the control group (all  $P<0.05$ ). See **Table 3**.

### *Complications in the two groups*

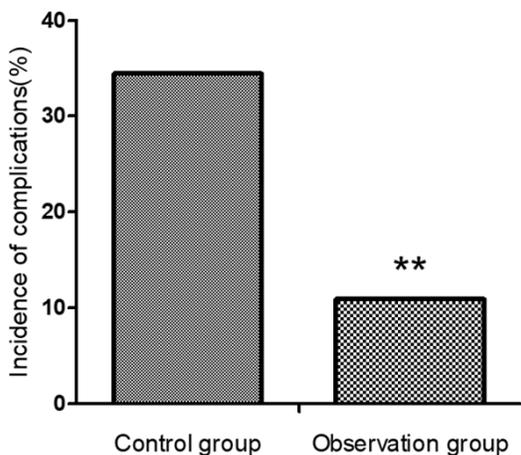
There was no intergroup difference in the incidence of complications ( $P>0.05$ ). The total incidence of complications in the control group was higher than that in the observation group (34.38% vs. 10.94%,  $P<0.01$ ). See **Table 4** and **Figure 1**.

### *Patient satisfaction with the nursing care*

The observation group had higher nursing satisfaction than the control group (89.06%,

**Table 4.** Complications in the two groups

Groups	Control Groups	Observation group	$\chi^2$	P
Cases (n)	64	64		
Wound infection	6 (9.38)	2 (3.13)	2.133	0.144
Hyperamylasemia	7 (10.94)	2 (3.13)	2.988	0.084
Gastrointestinal bleeding	5 (7.81)	2 (3.13)	1.360	0.244
Postoperative cholangitis	4 (6.25)	1 (1.56)	1.873	0.171
Total incidence of complications	22 (34.38)	7 (10.94)	10.031	0.002



**Figure 1.** Incidence of complications in the two groups. Compared with the control group, \*\*P<0.01.

57/64 vs. 75.00%, 48/64; P<0.05). See **Table 5**.

**Discussion**

Biliary disease has a high prevalence in the elderly. As China has been turning into an aging society, the incidence of biliary diseases such as cholecystolithiasis, intrahepatic cholelithiasis, and severe cholangitis has been rising. Biliary diseases can easily lead to poor bile flow, which can seriously affect the health of patients, and even endanger lives. Therefore, timely and effective biliary drainage is the main priority of treatment [15]. Traditional surgery in the treatment of biliary tract diseases has the disadvantages such as long operation time, great surgical trauma, relatively high risks, complex and difficult nursing, high incidence of complications after treatment, and poor treatment effects [16]. Duodenoscopy is a new technology for the treatment of biliary diseases in recent years, which provides the diagnosis and minimally invasive treatment of biliary diseases [17]. It has been reported that scientific

and effective nursing intervention for patients undergoing duodenoscopy for treating biliary disease can help to reduce the incidence of complications and significantly improve the quality of nursing and it has a high patient satisfaction with the nursing [18, 19].

In this study, the overall effective rate in the observation group was 92.19%, and the symptoms of patients such as jaundice, hepatic obstruction, and impaired liver function were significantly relieved within 1 week of treatment, suggesting a high efficiency of duodenoscopic drainage. Zhang et al. also reported that by applying endoscopic nasobiliary drainage for bile duct obstruction, most of the bile could be drained out of the body, and the liver function recovered well [20]. Forbes et al. conducted a prospective clinical study on the postoperative complications of patients undergoing duodenoscopy-assisted biliary drainage [21]. It was found that the incidence of complications in the patients receiving comprehensive nursing care was lower than those receiving the routine nursing care. In this study, we found that the overall incidence of complications in the observation group was lower than that in the control group. This may be due to the fact that in the control group, the disinfection of the endoscope or other instruments was inadequate, the systematic training was not performed, and the aseptic operation was not well carried out during catheterization, resulting in infection and postoperative cholangitis. Fazal et al. also reported that an effective nursing model has great clinical significance for patients undergoing biliary drainage and can significantly improve the nursing quality [22]. In this study, the nursing quality score in the observation group was significantly higher than that in the control group. Detailed management was performed in the comprehensive nursing care. For example, the patients were instructed to lie in a supine position for duodenoscopy to reduce

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**Table 5.** Patient satisfaction with the nursing care (n, (%))

Groups	Cases (n)	Satisfied	Basically satisfied	Dissatisfied	Satisfaction rate
Control Groups	64	19 (29.69)	29 (45.31)	16 (25.00)	48 (75.00)
Observation group	64	24 (37.50)	33 (51.56)	7 (10.94)	57 (89.06)
$\chi^2$		0.876	0.500		4.293
P		0.349	0.479		0.038

the risk of dyspnea; preoperative psychological counseling was provided to improve treatment compliance; the training on the usage of surgical instruments was enhanced to standardize the aseptic operations and cooperation between medical staff; also the patient's head was laid on the left side during the operation, and the vomit and secretions were removed in time to prevent asphyxia; the level of blood amylase after operation and the occurrence of wound infection or gastrointestinal bleeding were closely monitored. These practices in the comprehensive nursing significantly increased the effectiveness of the treatment and reduced the incidence of postoperative complications.

There were still some limitations to the study. The sample size was small and there were insufficient types of diseases. Therefore, more studies need to be carried out in the future for verification of our study.

To sum up, comprehensive nursing care can achieve good clinical effects in patients undergoing duodenoscopy-assisted biliary drainage for biliary diseases. The nursing care can improve the therapeutic effects, improve the clinical symptoms, and reduce the occurrence of complications, which can be recommended for clinical application.

### Disclosure of conflict of interest

None.

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