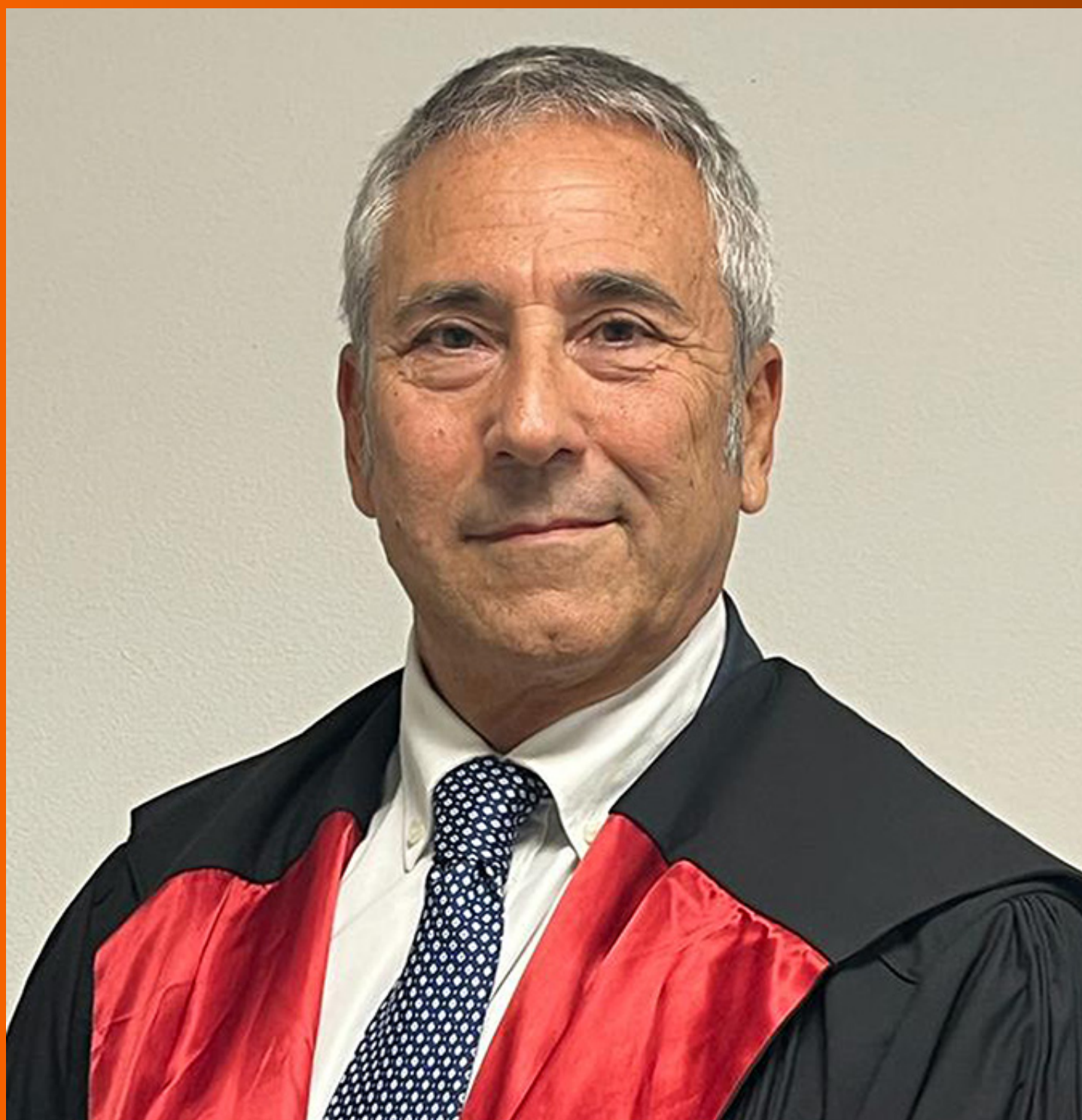


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ABOUT COVER

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The primary aim of *World Journal of Gastrointestinal Surgery* (WJGS, *World J Gastrointest Surg*) is to provide scholars and readers from various fields of gastrointestinal surgery with a platform to publish high-quality basic and clinical research articles and communicate their research findings online.

WJGS mainly publishes articles reporting research results and findings obtained in the field of gastrointestinal surgery and covering a wide range of topics including biliary tract surgical procedures, biliopancreatic diversion, colectomy, esophagectomy, esophagostomy, pancreas transplantation, and pancreatectomy, *etc.*

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Retrospective Study

Clinical observation of gastrointestinal function recovery in patients after hepatobiliary surgery

Hua-Jun Zeng, Jing-Jing Liu, Ying-Chun Yang

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Abstract

BACKGROUND

The liver is an important metabolic and digestive organ in the human body, capable of producing bile, clotting factors, and vitamins.

AIM

To investigate the recovery of gastrointestinal function in patients after hepatobiliary surgery and identify effective rehabilitation measures.

METHODS

A total of 200 patients who underwent hepatobiliary surgery in our hospital in 2022 were selected as the study subjects. They were divided into a control group and a study group based on the extent of the surgery, with 100 patients in each group. The control group received routine treatment, while the study group received targeted interventions, including early enteral nutrition support, drinking water before gas discharge, and large bowel enema, to promote postoperative gastrointestinal function recovery. The recovery of gastrointestinal function was compared between the two groups.

RESULTS

Compared with the control group, patients in the study group had better recovery of bowel sounds and less accumulation of fluids in the liver bed and gallbladder fossa ($P < 0.05$). They also had shorter time to gas discharge and first meal ($P < 0.05$), higher overall effective rate of gastrointestinal function recovery ($P < 0.05$), and lower incidence of postoperative complications ($P < 0.05$).

CONCLUSION

Targeted nursing interventions (early nutritional support, drinking water before gas discharge, and enema) can effectively promote gastrointestinal function recovery in patients undergoing hepatobiliary surgery and reduce the incidence of complications, which is worthy of promotion.

Key Words: Liver and gallbladder patients; Gastrointestinal function; Postoperative recovery

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Core Tip: The liver is an important metabolic and digestive organ in the human body, capable of producing bile, clotting factors, and vitamins. The bile duct mainly functions in the secretion and excretion of bile. This study was conducted in a retrospective manner. After undergoing the same surgical procedure, the patients in the control group received routine treatment and management, including relevant examinations of the liver and gallbladder, evaluation of the stage of disease development, and dietary guidance to maintain the balance of various bodily functions.

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INTRODUCTION

The liver, a vital organ involved in metabolism and digestion, plays a crucial role in the production of bile, clotting factors, and vitamins. The primary function of the bile duct is the secretion and excretion of bile[1]. Liver and gallbladder diseases, such as hepatitis, cirrhosis, and gallstones, are commonly observed conditions affecting these organs. The etiology of liver and gallbladder diseases often involves bacterial infections, excessive alcohol consumption, smoking, obesity, and irregular dietary patterns[2,3].

Liver and gallbladder diseases are prevalent surgical conditions in contemporary clinical practice in China. The primary treatment for these diseases involves surgical removal of the affected lesions or the unblocking of obstructed areas, which has demonstrated favorable efficacy. Notably, liver and gallbladder surgery is distinguished by prolonged operation durations, substantial blood loss, and the utilization of multiple postoperative drainage tubes[4-6]. Liver and gallbladder surgery is distinguished by prolonged operation duration, substantial blood loss, and the utilization of multiple postoperative drainage tubes[4-6]. Furthermore, factors such as patient stress response, pain, and hypoxemia have the potential to readily induce postoperative gastrointestinal dysfunction, inflammatory reactions, immune suppression, among other complications[7]. Simultaneously, a significant proportion of surgical procedures necessitate the administration of general anesthesia, encompassing the liver, gallbladder, pancreas, spleen, intestines, and other organs, all of which exhibit intricate associations with major blood vessels[8]. The anatomical structures are complex, and careless surgical manipulation can easily cause damage to the blood vessels. Clinical studies have shown that factors such as traction during surgery and general anesthesia can result in poor postoperative gastrointestinal function recovery in patients, which not only affects the patients' recovery outcomes but also their quality of life. Additionally, due to the large surgical incision, patients need to use pain pumps, further exacerbating gastrointestinal dysfunction[9]. For example, common clinical manifestations include cessation of flatulence and bloating, which require surgical intervention for treatment. Therefore, developing effective methods to promote the recovery of gastrointestinal function in patients is of great importance in clinical practice[10].

Many clinical reports have indicated that early enteral nutrition support therapy has a positive impact on the recovery of gastrointestinal function in patients undergoing liver and gallbladder surgery[11-13]. Research has shown that early enteral nutrition support is crucial. Within 24 h after surgery, providing scientific enteral nutrition support to patients is key to accelerating the recovery of physiological function and status post-surgery[14]. It can protect the gastrointestinal mucosa, effectively improve the patients' gastrointestinal function, and is also the most effective nutritional support method after surgery[15]. Therefore, this study aims to analyze the clinical effects of comprehensive treatment (early enteral nutrition support, enema, *etc.*) on the recovery of gastrointestinal function, including diet, flatulence, and bowel movements, in patients undergoing liver and gallbladder surgery. The purpose is to provide necessary interventions and guidance in the clinical setting to help patients regain gastrointestinal function as quickly as possible.

MATERIALS AND METHODS

General information

This study was conducted in a retrospective manner. A total of 200 patients with liver and gallbladder diseases admitted

to our hospital in 2022 were selected, all of whom underwent surgical treatment. They were randomly divided into a control group and a study group, with 100 patients in each group. The control group received routine treatment methods, while the study group received comprehensive treatment based on routine treatment methods. Both groups of patients underwent surgery performed by the same experienced doctor.

Inclusion criteria: (1) Diagnosed with surgical diseases of the liver and gallbladder based on physical signs, medical history, and laboratory examination results, meeting the requirements for surgical treatment of liver and gallbladder diseases; (2) Normal mental thinking and unobstructed communication; (3) Aware and voluntarily participated in the study, including understanding the content and risks involved; (4) Complete clinical data; and (5) Clear consciousness, normal thinking, and ability to communicate normally.

Exclusion criteria: (1) Concurrent malignancy; (2) Poor nutritional status and poor compliance; and (3) serious organ diseases.

Methods

After undergoing the same surgical procedure, the patients in the control group received routine treatment and management, including relevant examinations of the liver and gallbladder, evaluation of the stage of disease development, and dietary guidance to maintain the balance of various bodily functions. The main contents included postoperative fluid supplementation, correction of electrolyte imbalances, routine nutritional support, preoperative intestinal preparation, strict fasting, routine postoperative anti-infection treatment, and parenteral nutrition support.

The patients in the study group were provided with a comprehensive treatment approach, which included routine treatment methods as well as specific targeted interventions designed to facilitate the recovery of postoperative gastrointestinal function. They underwent routine cardiovascular, pulmonary, and brain function examinations, as well as liver and kidney function and electrolyte testing. If there were concurrent conditions such as hypertension, diabetes, or insufficient lung function, assistance from the corresponding departments was requested for consultation and treatment, ensuring that the coexisting diseases were controlled and the patients were able to tolerate the surgery. The specific measures included: (1) Detailed explanation of the surgical purpose and method to the patient before surgery to reduce their fear; placement of a nasogastric tube during surgery to closely monitor the patient's body temperature, with temperature measurements taken every 30 min to maintain a temperature of 36 °C or above; immediate notification of the anesthesiologist and surgeon if any abnormalities were discovered to prevent excessively low body temperature from affecting the pharmacokinetics of drugs in the body and reduce the occurrence of postoperative incision infection and cardiovascular complications; (2) Early postoperative rehabilitation nasogastric tube immediately after surgery, promoting gastrointestinal function-related activities for patients after 6 h postoperatively to exercise their chewing ability, and encouraging patients to chew gum to promote the secretion of digestive juices; (3) Early enteral nutrition support, such as administering pantoprazole orally and prophylactic antibiotics tailored to the patient's actual condition and type of disease, with enhanced assessment of the patient's underlying diseases, infection risks, and pain levels; when using anti-inflammatory drugs such as glucocorticoids, consideration should be given to the patient's actual situation and cautious use of drugs; (4) Enema using Da Cheng Qi Decoction once daily, stopping the enema after rectal gas is passed; and (5) Water intake and injection of Xinsideming at the acupuncture point of Zusanli before gas discharge after surgery. Throughout the treatment period, oral care was provided twice daily, including oral hygiene and moistening the lips with a disinfectant cotton swab to avoid adverse symptoms such as intestinal adhesions.

Observation indicators

Observation indicators mainly include detailed records of clinical symptoms and signs of two groups of patients before and after surgery, routine blood, urine, and stool tests, as well as electrolyte and blood routine tests. Liver and kidney function tests showed no abnormalities. The recovery of gastrointestinal function, restoration time of bowel sounds, time of passing gas, and time of first meal for patients were also observed.

Postoperative recovery criteria are as follows: (1) The recovery of gastrointestinal function is divided into three levels: Obvious effect, effective, and ineffective. Obvious effect: No abdominal pain, bloating, or diarrhea after surgery, normal anal gas discharge, and no complications; effective: Significant improvement in gas discharge function, improvement in clinical symptoms such as abdominal pain and bloating, slight diarrhea, and no other complications; ineffective: Failure to meet the above criteria or aggravation of the condition. The overall effectiveness rate = rate of obvious effect + rate of effectiveness; and (2) Postoperative recovery of gastrointestinal function and prognosis nutrition index: Restoration time of bowel sounds, time of first bowel movement, time of first gas discharge, and time of first meal.

Complications

The occurrence of related complications in the two groups was recorded, including oral ulcers, cracked lips, belching, and investigating the presence of hepatic and gallbladder effusion. The effusion was mainly classified as long diameter > 2 cm, long diameter ≤ 2 cm, and no effusion.

Statistical methods

The recorded data of the two groups were classified and summarized. Analysis was performed using SPSS 20.0 statistical software. Measurement data were expressed as (mean ± SD), and *t*-test was used for comparison. Count data were expressed as percentages (%), and χ^2 test was used for intergroup rate comparison. A difference with *P* < 0.05 was considered statistically significant.

RESULTS

Comparison of baseline characteristics of patients: The baseline data of age, gender, and body mass index of the two groups were compared, and no statistically significant differences were found ($P > 0.05$ for all; [Table 1](#)).

Postoperative gastrointestinal function recovery

Comparison of bowel sounds recovery time, gas discharge time, and first feeding time between two groups of patients. Compared to the control group, the research group had significantly shorter bowel sounds recovery time, gas discharge time, first defecation time, time to get out of bed, and first feeding time ($P < 0.001$; [Table 2](#)).

Overall therapeutic effectiveness

Comparison of treatment effectiveness between the two groups: After treatment, the overall effective rate of the research group was 98.00%, significantly higher than the overall effective rate of 68.00% in the control group, and the difference between the groups was significant ($P < 0.001$; [Table 3](#)).

Comparison of hospital stay duration between the two groups of patients

The research group had a shorter time for catheter removal, postoperative hospital stay, and postoperative pain score compared to the control group, and the differences were statistically significant ($P < 0.001$; [Table 4](#)).

Comparison of postoperative complications between the two groups

Comparison of postoperative complications between the two groups of patients. The total incidence rate of postoperative complications in the research group was 5.00%, significantly lower than the 34.00% in the control group, and the difference was statistically significant ($P < 0.001$; [Table 5](#)).

Comparison of prognosis nutritional index in the two groups of patients

The nutritional index for prognosis in the research group was significantly higher than that in the control group, and the difference between the two groups was statistically significant ($P < 0.001$; [Table 6](#)).

DISCUSSION

Presently, there is a gradual rise in the prevalence of liver and gallbladder diseases, and surgical interventions have proven to be an efficacious approach for managing liver diseases[16]. Nonetheless, post-surgery, patients may experience a decline in gastrointestinal function to a certain degree. This decline can manifest as clinical symptoms like abdominal pain and distension, which not only diminish their quality of life but also pose a potential risk to their overall well-being, particularly for individuals who develop deep vein thrombosis in the lower extremities[17]. The efficacy of early nutritional therapy in delivering nutritional support to patients with liver and gallbladder diseases has been substantiated, rendering it a more appropriate treatment modality[18]. In addition to that, early enteral nutrition support can significantly reduce the amount of intravenous fluid administration, thus reducing the incidence of diseases and effectively protecting the gastrointestinal mucosa, promoting recovery, and improving the quality of life[19]. Compared to other methods of nutrition support, early enteral nutrition support has certain advantages as it is relatively simple to implement and allows for customizing treatment plans based on the patients' own conditions, effectively improving treatment compliance and enhancing the recovery of gastrointestinal function. Many patients with liver and gallbladder diseases undergo surgery. If the gastrointestinal function does not recover in a timely manner, they may experience difficulties in defecation, bloating, and other symptoms, which can also affect wound healing and even lead to wound infection. Therefore, it is crucial for doctors to take appropriate postoperative measures to help patients restore gastrointestinal function after surgical treatment of liver and gallbladder diseases. Research has shown that early enteral nutrition support can effectively overcome the disadvantages of surgical treatment, such as intestinal dysbiosis and intestinal mucosal atrophy. Additionally, early enteral nutrition support can accelerate the body's metabolic function[20-25].

In this study, we used a treatment method targeting the recovery of gastrointestinal function in the study group. The study group received early enteral nutrition support, and the average nutritional index of the patients significantly improved, indicating its positive effect in the recovery of gastrointestinal function after surgery. After postoperative treatment, the overall effective rate of the study group patients was significantly higher than that of the control group, and the incidence of postoperative adverse reactions was low, which was beneficial for the patients' postoperative recovery. In addition, early nutrition support for patients with liver and gallbladder diseases also needs to be tailored to the individual's specific situation, including adjustment of the temperature of the nutrition solution and the infusion rate of the nutrients. At the same time, nursing staff should strengthen communication with patients, provide psychological counseling, and alleviate or eliminate any negative psychological reactions of patients (including anxiety and nervousness), allowing patients to maintain a positive mentality, thereby effectively improving their immune system and promoting rapid recovery of gastrointestinal function. After the surgery, patients need to take some oral medications to promote gastrointestinal motility, relieve symptoms such as gastric bloating and vomiting, accelerate the recovery of gastrointestinal function, and accelerate wound healing. This study aims to explore the effects of different treatments on the recovery of gastrointestinal function in patients with liver and gallbladder diseases after surgery. The control group

Table 1 Comparison of clinical data of the two groups of patients

Index	Study group (n = 100)	Control group (n = 100)	χ^2/t	P value
Gender (n)			0.022	0.883
Male	65	35		
Female	64	36		
Age (yr)	48.8 ± 4.5	49.5 ± 5.8	0.639	0.524
BMI (kg/m ²)	21.50 ± 3.12	22.01 ± 2.85	1.207	0.229
Surgical type (n)			0.088	0.993
Biliary-intestinal anastomosis	33	34		
Hepatic lobectomy	32	31		
Pancreaticoduodenectomy	19	18		
Pancreaticocaudectomy	16	17		
Complications (n)			0.795	0.672
Diabetes	4	5		
Hypertension	18	14		
Hyperlipidemia	9	11		
Smoking history (n)			0.189	0.664
Yes	16	18		
No	29	27		
Drinking history (n)			0.179	0.673
Yes	20	22		
No	25	23		

Table 2 Comparison of bowel sounds recovery time, gas discharge time, and first feeding time in two groups of patients (mean ± SD)

Index	Study group (n = 100)	Control group (n = 100)	t	P value
Feeding time (h)	32.15 ± 6.01	45.38 ± 5.63	16.065	< 0.001
Defecation time (h)	41.15 ± 9.46	55.38 ± 11.03	9.793	< 0.001
Bowel sound recovery time (h)	28.86 ± 8.46	47.71 ± 10.27	14.167	< 0.001
Anal first exhaust time (h)	39.14 ± 9.51	49.91 ± 8.53	8.431	< 0.001
First out of bed time (d)	2.16 ± 1.03	3.27 ± 1.62	5.782	< 0.001

Table 3 Comparison of overall therapeutic effectiveness between the two groups [n (%)]

Index	Study group (n = 100)	Control group (n = 100)	χ^2	P value
Remarkable	73 (73.00)	40 (40.00)		
Effective	25 (25.00)	28 (28.00)		
Invalidity	2 (2.00)	32 (32.00)		
Total effective rate	98 (98.00)	68 (68.00)	31.892	< 0.001

received routine treatment, while the study group received a special treatment plan to promote gastrointestinal function recovery. Special attention should be paid to the process of early nasogastric tube nutrition support in patients, adjusting the infusion rate based on different symptoms observed in patients, and providing psychological guidance to ensure patient compliance and promote effective recovery of gastrointestinal function. According to the results of this study, it was found that the recovery time for eating, defecation, bowel sounds, and flatulence in the study group patients were significantly shorter than those in the control group patients ($P < 0.001$). The overall effective rate of the control group

Table 4 Postoperative hospitalization status and pain analysis in the two groups (mean \pm SD)

Index	Study group (n = 100)	Control group (n = 100)	t	P value
Duration of hospitalization (d)	7.24 \pm 0.81	12.16 \pm 0.93	39.893	< 0.001
Postoperative pain score (s)	2.03 \pm 0.15	3.85 \pm 1.02	17.653	< 0.001
Catheter removal time (d)	2.16 \pm 0.31	3.97 \pm 0.52	29.898	< 0.001

Table 5 Comparison of postoperative complications between the two groups [n (%)]

Index	Study group (n = 100)	Control group (n = 100)	χ^2	P value
Intestinal obstruction	2 (2.00)	6 (6.00)		
Stomatitis	1 (1.00)	8 (8.00)		
Belch	1 (1.00)	9 (9.00)		
Chapstick	1 (1.00)	11 (11.00)		
Overall incidence rate	5 (5.00)	34 (34.00)	26.788	< 0.001

Table 6 Comparison of nutritional index before and after intervention in the two groups of patients (mean \pm SD)

Index	Study group (n = 100)	Control group (n = 100)	t	P value
Before intervention	32.15 \pm 3.83	31.95 \pm 3.28	0.397	> 0.05
After intervention	48.72 \pm 2.51	35.63 \pm 3.16	32.437	< 0.001

treatment was 98.00%, significantly higher than the 68.00% of the control group ($P < 0.001$). This indicates that specific treatment methods targeting gastrointestinal function recovery played a crucial role.

In addition, some studies have suggested abdominal massage as an important method to promote gastrointestinal peristalsis after liver and gallbladder surgery[26]. The mechanism is similar to traditional Chinese medicine's "massage", stimulating abdominal blood supply to restore gastrointestinal function. This study did not involve the application of abdominal massage in patients undergoing liver and gallbladder surgery. In future research, abdominal massage can be in postoperative care for patients and evaluate its clinical application effects. Integrating traditional Chinese medicine with Western medicine is also a focus of future research, combining scientific nursing and drug treatment with traditional Chinese medicine to observe its promoting effect on postoperative recovery[27,28].

This study has some limitations that cannot be ignored. Firstly, it is important to acknowledge that this study was conducted at a single-center, which means that the findings might not be fully representative of the broader population. Additionally, the small sample size used in this study limits the generalizability of the results and increases the likelihood of random variations impacting the outcome. It is crucial to consider that potential heterogeneity among the participants, such as demographic factors or underlying health conditions, could influence the observed effects. Therefore, it is essential to exercise caution and avoid overgeneralizing the conclusions drawn from this study.

CONCLUSION

In summary, comprehensive treatment is beneficial for the recovery of gastrointestinal function in patients undergoing liver and gallbladder surgery. Targeted interventions such as early nutritional support, postoperative enema, and rehabilitation training can shorten the recovery time of gastrointestinal function, improve immunity and resistance, reduce the risk of postoperative complications, help patients discharge from the hospital earlier, and have important clinical significance. It is worth promoting and popularizing.

ARTICLE HIGHLIGHTS

Research background

The etiology of hepatobiliary disease primarily stems from bacterial infection, excessive alcohol consumption and tobacco use, obesity, dietary irregularities, and various other contributing factors.

Research motivation

The motivation indicated notable enhancements in the duration of recovery for eating, defecation, bowel sounds, and flatulence. Additionally, patients displayed a favorable psychological perspective, which effectively bolstered their immune system and expedited the restoration of gastrointestinal function.

Research objectives

The objective is to offer essential interventions and guidance within the clinical setting in order to facilitate the prompt restoration of gastrointestinal function for patients.

Research methods

The participants were categorized into control and study groups based on the extent of surgical intervention.

Research results

The patient exhibited favorable recuperation of gastrointestinal function subsequent to the surgical procedure.

Research conclusions

The implementation of specific nursing interventions, such as early nutrition support, pre-exhaustion water intake, and enema administration, has been found to be highly effective in facilitating the recovery of gastrointestinal function in patients undergoing hepatobiliary surgery. Moreover, these interventions have demonstrated the potential to significantly decrease the occurrence of complications.

Research perspectives

The implementation of early enteral nutrition support therapy has been found to have a beneficial effect on the restoration of gastrointestinal function in individuals undergoing surgical interventions for hepatobiliary disorders.

FOOTNOTES

Co-first authors: Hua-Jun Zeng and Jing-Jing Liu.

Author contributions: Zeng HJ and Liu JJ designed the research; Yang YC, Zeng HJ and Liu JJ performed the research; Yang YC, Zeng HJ and Liu JJ contributed new reagents/analytic tools; Yang YC, Zeng HJ and Liu JJ analyzed the data; Zeng HJ and Liu JJ wrote the paper.

Institutional review board statement: This study protocol was approved by the Beijing Fengtai Hospital.

Informed consent statement: All the families have voluntarily participated in the study and have signed informed consent forms.

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Data sharing statement: Data generated from this investigation are available upon reasonable request from the corresponding author.

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