

Received: 2022.11.23  
Accepted: 2023.02.06  
Available online: 2023.02.10  
Published: 2023.02.24

# Effects of Nursing Care Using a Fast-Track Surgery Approach in 49 Patients with Early-Stage Hepatocellular Carcinoma Undergoing First-Line Treatment with Radiofrequency Ablation: A Retrospective Study

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**Financial support:** This study was supported by the Science and Technology Bureau of Jiaxing City (No. 2019AD32262)

**Conflict of interest:** None declared

**Background:** Fast-track surgery (FTS), also known as enhanced recovery after surgery (ERAS), includes a coordinated perioperative approach to patient care that aims to facilitate postoperative recovery. The role of nursing care is central to the concept of FTS. This retrospective study aimed to evaluate the effects of nursing care using an FTS approach in 49 patients with early-stage hepatocellular carcinoma (HCC) undergoing first-line treatment with radiofrequency ablation (RFA).

**Material/Methods:** A retrospective analysis was made of 49 patients with early-stage hepatocellular carcinoma who underwent first-line treatment with radiofrequency ablation in the Department of Hepatobiliary Surgery in our hospital from January 2020 to December 2021. The nurses have been nursing the patients in accordance with the requirements of FTS from 2021. Compared with the data of patients receiving traditional nursing, the detailed differences in postoperative recovery, pain score, complication rate, liver and kidney function, and nursing satisfaction were analyzed.

**Results:** After applying the FTS nursing model, the patients had significantly shorter time to first flatus, infusion, postoperative hospital stay, and lower total hospitalization expenses ( $P < 0.05$ ). Moreover, the Numerical Pain Rating Scale score was lower than that in the control group, the postoperative complications in the 2021 group were lower than those in the 2020 group, and the nursing satisfaction was also better than that of the 2020 group ( $P < 0.05$ ).

**Conclusions:** Nursing care using a fast-track surgery approach with early-stage hepatocellular carcinoma patients undergoing first-line treatment with radiofrequency ablation is better than conventional nursing, and improves recovery of patients.

**Keywords:** **Enhanced Recovery After Surgery • Liver Neoplasms • Nursing Methodology Research • Radiofrequency Ablation**

**Full-text PDF:** <https://www.medscimonit.com/abstract/index/idArt/939044>

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## Background

Since the Danish surgeon Kehlet proposed the concept of fast-track surgery (FTS) in 2001, it has been gradually developed around the world, combined with the multidisciplinary progress in anesthesiology, minimally invasive surgery, and nursing technology in recent years [1]. The basic tenet of FTS is to treat the patient's disease by minimal disturbance of their physiology. The protocol encompasses preoperative, intraoperative, and postoperative interventions, which when carried out together show maximal benefits [2].

Hepatocellular carcinoma (HCC) is one of the most common malignant tumors treated in clinical practice. In recent years, the incidence rate has been increasing yearly, ranking sixth in the global tumor incidence rate and the fourth in the global tumor mortality rate [3], which seriously threatens people's lives and health.

Radiofrequency ablation (RFA) is a safe, minimally invasive, and efficient new surgical method. It uses electric current to make ions in cancer tissue oscillate at high speed and generate local high temperature to cause coagulation necrosis of cancer tissue. RFA is accepted as the best therapeutic choice for patients with early-stage hepatocellular carcinoma when liver transplantation or surgical resection are not suitable options according to the Cardiovascular and Interventional Radiological Society of Europe [4], and it has been widely used in patients with liver cancer [5]. Many previous studies have shown the advantages of rapid rehabilitation surgery in hepatobiliary surgery [6,7]. However, its application in radiofrequency ablation is rarely reported. Therefore, this retrospective study aimed to evaluate the effects of nursing care using an FTS approach in 49 patients with early-stage hepatocellular carcinoma (HCC) undergoing first-line treatment with radiofrequency ablation (RFA).

## Material and Methods

### General Information

There were 49 HCC patients diagnosed as hepatocellular carcinoma by pathological or imaging examination, which was in line with surgical indications of ablative therapy. Of these, 24 patients were in the 2020 group, including 19 males and 5 females, aged 52-80 years, with an average of (64.4±9.3) years. Liver function Child grading: Grade A 18 cases, grade B 6 cases. In the 2021 group, 25 patients were enrolled, including 20 males and 5 females, aged 47-87 years, with an average age of (63.8±10.1) years. Liver function Child grading: 19 cases of grade A, 6 cases of grade B. There were no significant differences in age, sex, liver function Child grade, or other general

data between the 2 groups ( $P>0.05$ ), indicating comparability. This study was approved by the Research Ethics Committee of the Affiliated Hospital of Jiaxing University. All the patients in this study provided written informed consent.

### Measures

The concept of fast tract surgery was introduced in our hospital January 2021, and the department has taken care of patients in accordance with the requirements of rapid rehabilitation surgery. Since FTS has been widely shown to benefit patients in many other departments, we regard this model of care positively [8,9].

Patients in the 2021 group received more health education and psychological care, and the nurses told the patients all about the FTS process and encouraged them to do preoperative pulmonary function exercises and early postoperative activities. These patients had shorter preoperative fasting and faster postoperative resumption of eating. During the operation, a warm blanket was used to keep patients warm, fluid infusion was limited, attention was paid to oxygen inhalation and oxygen saturation maintenance, blood pressure was maintained, and liver perfusion was ensured. Patients could quickly determine the analgesic effect, and the reasons for poor analgesic effect were examined and dealt with. The indications to use antibiotics were stricter. Furthermore, improved postoperative monitoring and discharge evaluation were applied. More details of differences in nursing care between the 2 groups are shown in **Table 1**.

### Observation Indicators

- 1) Postoperative recovery: including postoperative time to first flatus, infusion time, hospital stay, and total expenses.
- 2) NRS (Numerical Rating Scale) was used to assess pain at each time point after the operation. The higher the number, the more severe the pain.
- 3) Postoperative complications: including fatigue, nausea and vomiting, abdominal pain and distension, bleeding, and abnormal liver and kidney function.
- 4) Three mL of peripheral blood was extracted from patients after surgery to assess liver and kidney function indexes, including serum albumin, glutamic-pyruvic transaminase, glutamic-oxalacetic transaminase, creatinine, and urea nitrogen.
- 5) Satisfaction. The questionnaire of nursing quality and patient satisfaction prepared by our hospital was used for telephone follow-up evaluation of patients 3 days after discharge. The patients were divided into 4 grades: satisfied, relatively satisfied, neutral, and dissatisfied, and the satisfaction of patients in the 2 groups was compared.

**Table 1.** Comparison of nursing measures between the 2 groups.

Nursing measures	2021 group	2020 group
Health education	Inform the fast recovery process about the preoperative fasting time, understand the surgical method and process, preoperative pulmonary function exercise, early postoperative activities, and expected discharge time	Only inform patients about relevant surgical precautions
Psychological care	We accurately assessed the psychological state of patients of different ages and different family situations, and carried out pertinent psychological counseling	There was no aspect of psychological care involved
Bowel preparation	No intestinal preparation was required and 200-500 ml carbohydrate was given orally 2 hours before surgery	Fasting the night before surgery
Intraoperative care	During the operation, a warm blanket was used to keep patients warm, fluid infusion was limited, attention was paid to oxygen inhalation and oxygen saturation maintenance, blood pressure was maintained, and liver perfusion was ensured. After the operation, ropivacaine was injected into the skin around the puncture site for infiltration	Routine rehydration without special measures
Pain care	Non-steroidal analgesic drugs were given regularly and quantitatively, and the analgesic effect was known to the patients in time, and the reasons for poor analgesic effect were examined and dealt with. The pain assessment process was standardized and evaluated every 6 hours after surgery	Temporary analgesics are given when the patient was in pain
Early nutrition	After surgery, chewing gum was used to stimulate saliva secretion and gastrointestinal motility, and a liquid diet could be given 6-8 hours after bowel sounds, without waiting for flatus	Change to a liquid diet after first flatus and defecation
Early activity	After waking up, patients were guided to move their limbs and turn over in bed to prevent the formation of deep vein thrombosis. At 6 h after the operation, patients were helped to get out of bed in the mode of "supine for 30 seconds – sitting up for 30 seconds – standing for 30 seconds" to prevent postural hypotension. With help from nursing staff, the activity time and activity amount were gradually increased with the patient's recovery	Based on the patient's own subjective wishes, the nurse guides the activities
Postoperative medication	Prophylactic antibiotics were administered for 24 hours, hemostatic drugs were administered once after surgery, fluid replacement was limited according to dietary conditions, and sodium bicarbonate was used to alkalize urine to reduce the damage to renal function caused by surgical stress	Antibiotics are routinely applied for 1-2 days, and antibiotics were upgraded according to body temperature and test indicators
Postoperative monitoring	Postoperative blood routine, liver and kidney function, electrolytes, etc. were checked; vital signs were assessed every 60 minutes, and continuous monitoring was performed for 6 hours. After that, the measurement interval could be extended as prescribed by the doctor, and monitoring was stopped at 12 hours. After returning to the ward, we checked the bedside B-ultrasound for 2 hours. Re-examination was performed within 24 hours, and patients with no obvious abnormalities could be discharged	Routine level I nursing monitoring for 3 days

## Statistical Analysis

For data analyzed with a two-sample *t* test, the data are presented as mean±standard error. Pearson's  $\chi^2$  test or Fisher's exact test was used to compare qualitative variables. Statistical analyses were performed using SPSS 21.0. Test level  $\alpha=0.05$ ,  $P<0.05$  indicated a statistically significant difference.

## Results

### Comparison of Postoperative Recovery Conditions

The postoperative time to first flatus, infusion time, hospitalization time, and total cost the 2021 group were significantly better than those in the 2020 group, and the difference between

**Table 2.** Comparison of postoperative recovery.

Group	Postoperative time to first flatus (h)	Infusion time (days)	Hospitalization time (days)	Total cost (yuan)
2020 group	24.08±7.66	2.79±1.53	3.17±1.93	25754±7076
2021 group	15.84±7.05	1.88±1.01	2.24±0.93	21700±4509
t	3.92	2.47	2.13	2.38
P	<0.05	<0.05	<0.05	<0.05

$P < 0.05$  is considered statistically significant.

**Table 3.** Comparison of postoperative pain scores.

Group	Pain scores at different postoperative time points		
	6 h	12 h	24 h
2020 group	2.63±0.71	2.38±0.49	2.08±0.29
2021 group	2.04±0.68	1.92±0.49	1.84±0.37
t	2.95	3.22	2.56
P	<0.05	<0.05	<0.05

$P < 0.05$  is considered statistically significant.

**Table 4.** Comparison of postoperative complications.

Group	Number of cases	Fatigue	Nausea and vomiting	Severe pain	Fever	Abnormal liver and kidney function
2020 group	24	6	5	4	7	20
2021 group	25	2	2	2	3	14
$\chi^2$				11.54		
P				<0.05		

$P < 0.05$  is considered statistically significant.

the groups was statistically significant, as shown in **Table 2**. The postoperative time to first flatus (15.84±7.05 vs 24.08±7.66 h,  $P < 0.05$ ), the infusion time (1.88±1.01 vs 2.79±1.53 days,  $P < 0.05$ ), and the hospitalization time (2.24±0.93 vs 3.17±1.93 days,  $P < 0.05$ ) were shorter in the 2021 group and the cost was lower (21700±4509 vs 25754±7076 yuan,  $P < 0.05$ ).

### Comparison of Postoperative Pain

The pain scores of patients at 6 h (2.04±0.68 vs 2.63±0.71,  $P < 0.05$ ), 12 h (1.92±0.49 vs 2.38±0.49,  $P < 0.05$ ) and 24 h (1.84±0.37 vs 2.08±0.29,  $P < 0.05$ ) after surgery in the 2021 group were lower than those in the 2020 group, and the difference between the groups was statistically significant, as shown in **Table 3**.

### Comparison of Postoperative Complications

The incidence of postoperative complications in the 2021 group was lower than that in the 2020 group, and the difference between the groups was statistically significant ( $\chi^2 = 11.54$ ,  $P < 0.05$ ), as shown in **Table 4**.

### Comparison of Postoperative Liver and Kidney Functions

The postoperative ALB of the patients in the 2021 group was better than that of patients in the 2020 group, and the difference between the groups was statistically significant (36.66±3.66 vs 34.20±4.13 g/L,  $P < 0.05$ ), but the liver and kidney function indicators such as ALT (82.40±60.85 vs 105.96±52.54 umol/L), AST (149.24±108.53 vs 195.71±112.46 umol/L), SCR (65.64±12.22 vs 60.74±14.58 umol/L), and BUN (4.71±1.07 vs

**Table 5.** Comparison of postoperative liver and kidney function indicators.

Group	ALT (umol/L)	AST (umol/L)	ALB (g/L)	SCR (umol/L)	BUN (mmol/L)
2020 group	105.96±52.54	195.71±112.46	34.20±4.13	60.74±14.58	5.24±1.72
2021 group	82.40±60.85	149.24±108.53	36.66±3.66	65.64±12.22	4.71±1.07
t	1.45	1.47	-2.20	-1.28	1.30
P	>0.05	>0.05	<0.05	>0.05	>0.05

$P < 0.05$  is considered statistically significant. ALT – glutamic-pyruvic transaminase; AST – glutamic-oxalacetic transaminase; ALB – albumin; SCR – serum creatinine; BUN – blood urea nitrogen.

**Table 6.** Comparison of patient satisfaction scale.

Group	Number of cases	Unsatisfied	Neutral	Satisfied	Very satisfied	Total satisfaction (%)
2020 group	24	3	10	8	3	11 (45.8)
2021 group	25	1	2	15	7	22 (88.0)
$\chi^2$				9.9		
P				<0.05		

$P < 0.05$  is considered statistically significant.

5.24±1.72 mmol/L) were not significantly different ( $P > 0.05$ ), as shown in **Table 5**.

### Comparison of Patient Satisfaction

Patient satisfaction of the 2021 group was better than that of the 2020 group, and the difference between the groups was statistically significant ( $\chi^2=9.9$ ,  $P < 0.05$ ), as shown in **Table 6**.

## Discussion

This study has demonstrated that nursing care using a fast-track surgery (FTS) approach with early-stage hepatocellular carcinoma undergoing first-line treatment with radiofrequency ablation is better than conventional nursing, and helps recovery of patients. FTS is an integrated and innovative concept that combines the latest research evidence from perioperative anesthesia, nursing, and surgery. It is a clinical practice process used to shorten the length of hospital stay for patients [10], has been shown to reduce hospital stay, reduce healthcare costs, hasten recovery, and facilitates earlier return to work. Although FTS is usually used for patients undergoing major surgery, its advantages are clearly available for a variety of minimally invasive procedures such as laparoscopic cholecystectomy and laparoscopic hepatectomy, which are already widely used [6,7]. So, we thought it also should be effective in radiofrequency ablation, a kind of minimally invasive surgery, as first-line treatment for early-stage hepatocellular

carcinoma. Implementation of FTS is carried out by multidisciplinary cooperation, in which nurses have an active leading role in information collection, patient observation, and outcome evaluation.

With the continuous improvement of medical service quality, postoperative rehabilitation of patients not only depends on the surgical level of surgeons, but also on effective control of perioperative injury factors and surgical stress.

Hepatocellular carcinoma (HCC) is a type of malignant tumor with a relatively high incidence in clinical practice. It has an insidious onset in the early stage and no obvious clinical symptoms. At the time of diagnosis, many cases are advanced and have secondary spread to multiple organs, which increases the difficulty of clinical treatment and postoperative rehabilitation. Radiofrequency ablation is a new treatment method with the advantages of safety, minimally invasive surgery, and fewer complications, and has been widely accepted in China and abroad [11]. However, in actual clinical practice, because patients may lack understanding of all aspects of radiofrequency ablation, they have a strong sense of uncertainty, negativity, and pessimism, lacking confidence in the treatment, and even sometimes refusing to cooperate with the treatment, which seriously affects outcomes [12].

Due to lack of knowledge about the disease, patients who undergo surgery worry about the effects, and most of them have negative emotions. Nursing staff should understand the

psychological characteristics of patients, pay attention to their psychological and emotional changes, do a good job of preoperative psychological counseling, and try to improve the patients' psychological state, compliance, and cooperation with medical staff throughout the whole process to improve the treatment effect [13]. Patients in the 2021 group received systematic education from the nurses before the operation, and the whole process of disease treatment during the hospitalization of the patients was systematically explained. Nurses can also tell patients about successful past cases and let other patients relate their experiences, so as to relieve the pressure of the patients, enhance their confidence, and achieve the best results. A positive psychological state of patients helps them accept surgical treatment and establish a good nurse-patient relationship to facilitate future work [14]. In addition, patients with insufficient understanding of respiratory function exercise or who have inadequate skills tend to have low exercise compliance. Correct and effective respiratory exercise before surgery can promote recovery of postoperative lung function, prevent atelectasis, and reduce the risk of pulmonary complications.

FTS acknowledges that bowel preparation is stressful for patients, and a large amount of fluid loss induces dehydration and water and electrolyte imbalance before surgery, which increases surgical risk. Studies [15] have shown that intestinal preparation can also lead to ectopic intestinal bacterial infections and abdominal discomfort, increasing the incidence of postoperative abdominal infection and anastomotic fistula, and seriously affecting the recovery of patients.

The double challenges of long-term fasting and surgical trauma synergistically stress the body, which is not conducive to tissue repair and incision healing, and patients are prone to hypothermia [16]. Because FTS shortens the fasting time, insulin resistance and catabolism caused by starvation are relieved, and postoperative intestinal edema is reduced, which is conducive to early resumption of a normal diet. Traditional bowel preparation involves a long fasting time, and discomfort and anxiety are aggravated. Endocrine stress increases, blood glucose levels remain high, and the body is in a state of irritability, which is not conducive to postoperative recovery [17]. The FTS nursing model differs from the traditional preoperative preparation method, and more reasonable gastrointestinal preparations effectively reduce the physical burden of patients, and also avoid increasing their anxiety and fear, which helps patients face treatment with a positive and healthy attitude. At the same time, the stress response caused by surgery and the incidence of postoperative complications is reduced.

Intraoperative hypothermia is mainly affected by room temperature, exposure of the surgical field, and fluid replacement and peritoneal flushing. Hypothermia can easily lead to increased

sympathetic tone, peripheral vasoconstriction, increased blood viscosity, and increased burden on the heart and brain. To maintain body temperature, it increases oxygen consumption, induces hypoxemia, and in severe cases induces the fatal triad of arrhythmia, coagulation disorder, and metabolic acidosis. It has been reported [18] that the decrease in body temperature is closely related to the occurrence of postoperative complications, thus prolonging hospital stay.

Risk assessment is given to patients before surgery based on the basic situation, and measures such as heating blankets, infusion heating devices, and intraoperative irrigation fluid heating can be used to avoid the occurrence of intraoperative and postoperative hypothermia, protect the basic functions of various organs, and promote rehabilitation [19].

Radiofrequency ablation uses the thermal effect of electromagnetic waves to heat the tumor tissue; the local temperature can reach 105°C, and the tumor tissue is destroyed. But at the same time, the thermal effect can lead to the expansion of the liver capsule, causing abdominal distension and pain, which is sometimes severe. Proper analgesia can reduce the stress response such as pain caused by surgical trauma, facilitate the patients' early return to activities and eating, and reduce the occurrence of complications in organs such as the heart, brain, and lungs.

The patients in the 2020 group were dominated by the subjective consciousness of patients after surgery, and they often decided to use analgesics temporarily when they were in pain. In this model, both nurses and patients are passive, and the effect is not good, which delays the early ambulation of patients [20]. In the 2021 group, the concept of preventive analgesia was introduced, and non-steroidal anti-inflammatory drugs were regularly and quantitatively given to patients to achieve preemptive analgesia, so that the analgesic drugs were at steady-state blood levels.

The concept of FTS states that the regular and quantitative administration of non-steroidal analgesics after surgery to maintain a stable blood concentration can improve the analgesic effect, which is beneficial to the recovery of various organs, especially the gastrointestinal tract. It makes it easier for patients to accept early activities such as turning over and sitting up, patting the back and expectorating sputum, thereby reducing the occurrence of complications such as pulmonary infection and lower-extremity deep vein thrombosis [21].

The 2021 group received ropivacaine for local infiltration, and ropivacaine can effectively relieve postoperative pain [22]. In terms of analgesia, this is called nerve management, which refers to the suppression of nerve afferent pain information through local treatment measures such as freezing or local

anesthetic blockade, thereby reducing or even replacing the systemic use of analgesic drugs, reducing gastrointestinal reactions, respiratory depression, and other common analgesic adverse effects, and is beneficial to rapid recovery.

In addition, active and effective psychological intervention can stimulate the body to produce and release endogenous morphine substances, which can inhibit the nerve conduction of pain information and effectively relieve pain [23]. Nursing has a key role in pain control, through providing pain education to patients, reducing their anxiety and fear of pain, helping patients feel happy, thereby increasing the pain threshold and making it easier to tolerate pain.

To increase saliva secretion and promote gastrointestinal peristalsis, patients in the 2021 group were given gum-chewing stimulation when awake after surgery. The attending doctor auscultated the abdomen 6-8 hours later, and the liquid diet could be resumed if there was intestinal sound, without waiting for first flatus. The FTS nursing model encourages patients to eat early after surgery, which can promote recovery of gastrointestinal function, reduce catabolism, and protect the intestinal mucosa. Early activity is beneficial to anabolism, which reduces muscle loss, increases lung capacity, and stimulates gastrointestinal peristalsis, and also promotes venous reflux of the lower limbs, prevents the occurrence of deep vein thrombosis and pressure ulcers, reduces the incidence of postoperative complications, improves the quality of life, and shortens the length of hospital stay [24].

### Postoperative Medication and Monitoring

Excessive fluid replacement increases the burden on the heart, increase the incidence of cardiovascular and cerebrovascular complications, and easily leads to intestinal tissue edema, delaying the recovery of gastrointestinal function, and thus prolonging the hospital stay. In the concept of FTS, individualized and precisely controlled infusion is carried out according to the nutritional status of patients, so as to avoid the occurrence of the above situation and achieve rapid recovery [25].

High-temperature damage to liver tumor tissue by radiofrequency ablation inevitably leads to abnormal liver function, and it is easy to destroy a large number of red blood cells in the blood supply of the tumor, release hemoglobin, cause hemoglobinuria, block renal tubules, and lead to renal failure. Therefore, postoperative monitoring of liver and kidney function is necessary. Sodium bicarbonate can prevent acidosis caused by renal damage, increases the alkali content of patients, and regulates the body's electrolyte balance [26]. In the 2021 group, sodium bicarbonate was routinely used to alkalinize urine after surgery to reduce the damage to renal function caused by surgical stress. However, except for the postoperative albumin index, the statistical data did not indicate significant differences

in liver and kidney function, which may be due to the small sample size, which is related to the size, number, and basic conditions of the patients undergoing radiofrequency ablation. The absorption of tumor necrotic tissue after ablation can easily cause the patient's body temperature to rise. The patient's vital signs should be assessed 24 hours after the operation. Transient abnormalities can be treated symptomatically when the abdominal signs are not obvious, and bedside B-ultrasound should be reviewed. Psychological care is needed to prevent patients from being too anxious and affecting recovery. If the patient has symptoms of hypotension, rapid heart rate, irritability, and peritonitis with tight abdominal muscles, it should be reported to the doctor immediately. If active bleeding is indeed suspected, 2-3 venous channels should be quickly established, hemostasis, blood transfusion, fluid rehydration, and dilatancy treatment should be given according to the doctor's advice, and preparation for surgery or intervention should be made.

The most intuitive advantage of FTS surgical care is that it can shorten the length of hospital stay, so the discharge plan should be discussed with the patient at the time of hospitalization, and prudently formulating discharge standards and follow-up plans is an important measure to reduce the rate of readmission, ensure patient safety, and increase satisfaction. Since patients will still have varying degrees of perioperative discomfort after discharge, it is necessary to have regularly scheduled return visits, promoting the concept of rapid recovery, and guiding postoperative recovery, and these measures will be understood by the patients and actively cooperated with in most cases [27].

Since FTS nursing is a transition from a "disease-centered" to a "patient-centered" nursing model, through multidisciplinary cooperation, the entire treatment process of patients can be accelerated from multiple links, medical expenses can be saved, and patients' confidence in overcoming the disease can be enhanced, so that they can return to the familiar social environment as soon as possible, which is conducive to improvement of quality of life [28].

FTS has been applied in many surgical fields, such as abdominal surgery, cardiothoracic surgery, orthopedics, urology, and gynecology [29], but there are few reports on the application of FTS for radiofrequency ablation of liver cancer. Although radiofrequency ablation is a minimally invasive procedure, there are still many problems plaguing patients in the perioperative period. In this paper, by comparing the relevant data of patients treated with radiofrequency ablation of liver cancer in our hospital in the past, it is concluded that the nursing model based on the concept of FTS is superior to traditional nursing.

Several limitations should be mentioned. The fast-track surgery program is commonly used for patients undergoing major

surgery, and it has been widely used in many minimally invasive surgeries such as laparoscopic cholecystectomy and laparoscopic hepatectomy. Radiofrequency ablation is a kind of minimally invasive surgery, which is why we used the fast-track surgery program in these patients. Furthermore, this was a retrospective study, reporting clinical practice rather than selected trial patients, which might have led to bias. The 2 groups contained limited samples and were not standardized or strictly matched, so it may not be possible to draw reliable conclusions. Future research needs more high-quality, multi-center, and large-sample randomized controlled trials.

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## Conclusions

Nursing care using a fast-track surgery approach with early-stage hepatocellular carcinoma patients undergoing first-line treatment with radiofrequency ablation is better than conventional nursing. It reduces the incidence of complications, relieves pain and economic burden of patients, and improves patient satisfaction. Our results demonstrated that it is worthy of application and promotion.