

Advances in multidisciplinary team-based collaborative care models in the nutritional management of patients with hepatocellular carcinoma

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Abstract: Liver cancer is a common and highly prevalent malignancy in China, and is a high prevalence of malnutrition. With the continuous innovation of medical technology and nursing model, the multidisciplinary teamwork nursing model has become inevitable for the care of liver cancer patients. This study reviews the concept of MDT nursing model, its development status at home and abroad and its application in the postoperative nutritional management of hepatocellular carcinoma patients, aiming to provide a basis for clinical hepatocellular carcinoma nutritional management.

Keywords: multidisciplinary teamwork, hepatocellular carcinoma, care, malnutrition

Liver cancer is one of the most common malignant tumors in China. The latest data of the global cancer burden in 2020 released by the International Agency for Research on Cancer^[1] of the World Health Organization show that the incidence and mortality of liver cancer in the world rank 6th and 3rd respectively. By 2020, the incidence of liver cancer in China has ranked fifth in the cancer spectrum, and the death rate has ranked second^[2]. In addition to the characteristics of the tumor itself, the nutritional status of patients with liver cancer plays a key role in the prevention, treatment and prognosis of cancer. Studies have reported that the incidence of malnutrition in patients with chronic liver disease and liver cancer is 31 ~ 85%^[3], and the incidence of nutritional risk is 39 ~ 68%^[4]. With the rapid development of multidisciplinary team collaborative diagnosis and treatment (MDT)^[5,6], its application in the nutritional management of liver cancer patients has been gradually extensive. This paper expounds the application of MDT nursing model in the nutritional management of patients with liver cancer.

1. Overview of MDT nursing model

MDT nursing model is a new nursing model based on the nursing concept of evidence-based medicine. It takes patients as the center and integrates multidisciplinary teams to develop standardized and individualized systematic nursing plans, so that patients can obtain more professional, effective and comprehensive nursing care^[7,8]. At present, the MDT nursing mode is generally composed of two or more people from different disciplines who jointly form a fixed working group to carry out regular, timed and fixed-point MDT nursing discussion for a specific disease, and a series of nursing work to develop strict and standardized comprehensive nursing plan for improving patients' conditions and promoting patients' rehabilitation^[9]. The discussion on MDT nursing model mainly focuses on diabetes^[10], tumor^[11], surgery^[12], chronic disease^[13], wound care, intravenous infusion therapy and dialysis care^[14] and other aspects.

2. Current status of domestic and international application of MDT care model in liver cancer

2.1 Research Progress Abroad

MDT nursing model of liver cancer was proposed and carried out earlier abroad. Janet Van Cleave^[15] first discussed MDT care for liver cancer in Philadelphia Veterans Affairs Medical Center in

1999. The team was composed of doctors, nurses, pharmacists, volunteers and chaplain, and carried out MDT care for 18 patients with liver cancer. And can improve the quality of life of patients; In 2008, Serper M^[16] discussed the impact of multidisciplinary team collaborative nursing on the treatment and mortality of patients with hepatocellular carcinoma, and the results showed that although multidisciplinary nursing had nothing to do with whether patients could actively cooperate with treatment, it was associated with the reduction of mortality of patients with liver cancer. Chirikov VV^[17] also showed that multidisciplinary nursing was associated with reduced mortality, especially for patients undergoing chemotherapy. In 2011, the multidisciplinary oncology team of Tom Baker Cancer Center in Canada conducted the diagnosis, treatment and nursing activities of MDT based on the Barcelona staging^[18].

2.2 Domestic Research Progress

The MDT nursing model of liver cancer was developed late in China. In 2017, the research group of Xia Hongmei^[19] found that adopting the new model of MDT nursing in the diagnosis and treatment of liver cancer patients could not only improve the quality of life of patients, but also enhance the therapeutic effect of cancer pain. Xu Chunyan^[20] took the "outcome-existing problem-detection model" as the structural framework, based on multidisciplinary team collaborative nursing, combined with the classification of nursing outcomes, developed individualized nursing measures for patients with liver cancer in the perioperative period, and compared the outcome indicators before and after the application of nursing measures. The results showed that this method had better clinical application effect. And the overall nursing level of the department has been greatly improved. Liu Liu^[21] applied the MDT nursing model of liver cancer to the nursing of patients with primary liver cancer recurrence, established a multidisciplinary collaborative team, formulated a nursing plan based on the actual situation of patients, and implemented a multidisciplinary team collaborative diagnosis, treatment and nursing plan. In recent years, discussions about MDT nursing model of liver cancer emerge in endlessly, more based on accelerated rehabilitation surgery implementation of MDT nursing and continuity of care for liver cancer patients after discharge^[22], and there is no systematic nursing plan, which is also the future multidisciplinary team collaborative nursing model can be extended and the direction of research.

3. MDT model of care in the nutritional management of patients with liver cancer

3.1 Nutritional screening

Timely nutritional screening of liver cancer patients is the first step of nutritional treatment. At present, the commonly used nutritional risk screening scales for liver cancer at home and abroad include: nutritional risk Screening 2002 (NRS-2002) Nutritional Risk screening 2002 (NRS-2002), malnutrition universal Screening tool (MUST), The Royal Free Hospitalnutritional prioritizing tool (RFH-NPT), Patient-generated subjective global assessment (PG-SGA) etc. Among them, NRS 2002 is the most widely used nutritional risk screening tool in clinical practice after multi-center large-sample test. NRS 2002 is simple, fast and sensitive, and nurses can also master it after training, which is very suitable for the preliminary screening of patients with malnutrition. Studies have also shown that RFH-NPT has more prominent advantages in nutritional risk screening of inpatients with primary liver cancer^[23,24].

3.2 Nutritional assessment

Few studies have been conducted to implement multidisciplinary care with a focus on nutritional assessment. However, nutritional assessment should be carried out throughout the treatment of patients with hepatocellular carcinoma, including biochemical indicators, physical measurements, and body composition measurements.

3.2.1 Biochemical indicators

Biochemical indicators include albumin (ALB), prealbumin (PA), total lymphocyte count (TLC), creatinine height index (CHI), etc.^[25]. However, albumin and prealbumin are not good indicators of the nutritional status of the organism, especially in patients with severe disease, and are susceptible to the effects of fluid volume and inflammatory factors.

3.2.2 Physical measurements

Traditional physical measurements to assess patients with hepatocellular carcinoma include height, weight, body mass index, upper arm circumference, upper arm muscle circumference and triceps skinfold thickness. Among them, upper arm circumference (AC), triceps skinfold (TSF), and upper arm muscle circumference (AMC) = AC (cm) - 3.14 × TSF (cm) are the easiest and more practical methods in clinical practice^[26]. However, when the patient also has ascites or TSF, it is not possible to determine the circumference. However, when the patient also has ascites or hepatic encephalopathy, the above traditional methods are prone to deviation. Therefore, choosing the best and most reliable nutritional assessment tool is also worth exploring.

3.2.3 Determination of body composition

Current domestic and international methods of body composition measurement include densitometry, bioelectrical impedance analysis (BIA), dual-energy X-ray absorptiometry, computed tomography (CT), magnetic resonance technology, ultrasound technology, and others. Among them, the skeletal muscle index of the third lumbar spine obtained in CT scans is considered to be the gold standard for body composition assessment^[27] BIA can not only assess the nutritional status of liver cancer patients, but also reflect the water composition inside and outside the cells, and can monitor the changes of body muscle and fat^[28] BIA is intuitive, sensitive and accurate in reflecting the nutritional status of liver cancer patients, and it is non-invasive and convenient.

Chen Yingjun et al.^[29] studied patients referred to surgery for liver resection in MDT clinics and jointly applied NRS 2002 and PG-SGA for nutritional assessment, with patients having initial screening completed by outpatient MDT nurses in liver cancer MDT clinics, and patients having nutritional indicators measured and further assessed by clinical pharmacists specialising in nutrition after transfer to the ward. The results showed that patients who were jointly measured as being at nutritional risk were better able to participate in perioperative nutritional therapy and had greater benefit.

3.3 Nutritional interventions

Nutrition intervention in patients with liver cancer must be individualized while considering the level of malnutrition, the existence of complications and the physical strength of patients. In the study^[30], MDT scheme was applied to postoperative nutrition management of gastrointestinal surgery. Nutritional risk was assessed for patients every morning, and individualized nutrition scheme was developed. After that, dietitians calculated the daily energy requirements of patients, and formulated enteral and parenteral nutritional energy intake together with the doctor in charge according to the condition. Based on this, nurses can develop individual recipes for patients, which can maximize the intake of nutrients for patients.

Tang Xiaoli et al.^[31] discussed perioperative nutrition management of patients with liver cancer, and composed a multidisciplinary nutrition support group consisting of department director, head nurse, physicians, nurses, dietitians, pharmacists and psychological counselors. PG-SGA nutritional assessment and physical assessment were performed by trained and qualified nurses on the day of admission. Within 24 hours, the full-time nutrition nurse asked the patients about their daily diet in the 7 days before admission, calculated the actual intake of energy and protein, and analyzed the factors affecting the patients' poor diet. Within 48 hours, doctors make a comprehensive diagnosis of malnutrition based on the patient's lab and exam results. The preoperative target nutrition of the patient was prescribed by the physician for different nutritional energy intake according to PG-SGA score. The operation was determined after the nutritional evaluation was completed again, and the target energy was gradually supplemented after the operation, and the target energy was reached on the fifth day after the operation. The nutritional pattern during the hospitalization was mainly thin, rotten, soft, high-quality protein, and eating less and more meals. After discharge, oral supplementary nutrition was taken for one month, body weight was monitored once a week, home follow-up was conducted after surgery, body composition was monitored on the 14th day after surgery, and the data were reported for nutrition outpatient review. Studies have shown that perioperative nutrition management is safe and effective for patients with hepatocellular carcinoma complicated with cirrhosis, which can promote early recovery of gastrointestinal function, improve nutritional status and protect liver function.

3.4 Exercise prescription

Physical disorder is a common complication of liver cancer patients, so combined with nutritional

therapy, physical exercise should also be given according to the specific conditions of patients. Most liver cancer patients are middle-aged and elderly people, whose gastrointestinal function is gradually weakened and nutrient absorption is slow. Exercise can not only consume calories, but also enhance human metabolism, improve appetite and promote the absorption of nutrients. At present, there is no specific exercise program for patients with liver cancer. Generally speaking, it is recommended to start with balance training for malnourished cancer patients. In order to improve the condition of malnutrition, light resistance exercise can be started. The guidelines of the American College of Sports Medicine^[34] show that both aerobic exercise and resistance exercise can relieve patients' fatigue symptoms, enhance patients' physical fitness, and improve patients' cognition of the disease. Aerobic exercise can also reduce patients' anxiety and depression symptoms. Some scholars^[35] divided the implementation of the multidisciplinary collaboration model into two stages. In the first stage, researchers and full-time nurses in the multidisciplinary collaborative team conducted a comprehensive assessment of patients before discharge, and developed an individualized continuity care plan outside the hospital. The second stage was followed up by a multidisciplinary continuum of care team (telephone and home). The multidisciplinary team developed an individualized family rehabilitation exercise plan for the patient, and let the patient participate in housework, highlighting the needed characteristics of the patient and avoiding the role reduction caused by the disease. Three months after the patient was discharged from the hospital, it was found that the patient's physical condition had significantly improved.

4. Conclusions

In conclusion, MDT nursing model is not widely used in the nutritional management of patients with liver cancer. In particular, nutritional screening and assessment are rarely used. As indications and preconditions for nutritional treatment, early screening and assessment from the perspective of multidisciplinary team cooperation is also a research direction in the future. In addition, exercise, as an important means to enhance patients' physical fitness, should not be ignored, and whether nutrition intervention and exercise therapy can be combined as a way of nutrition treatment is also a question we should discuss.

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