

Case report

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Nursing cooperation in orthotopic heart and liver transplantation-A case report



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Abstract

Nursing cooperation in orthotopic heart and liver transplantation Patients with ischemic cardiomyopathy and decompensation of alcoholic liver cirrhosis. To summarize the main points of nursing cooperation for a case of alcoholic liver cirrhosis with decompensated liver function and severe ischemic cardiomyopathy undergoing orthotopic heart-liver transplantation. It is proposed that the nurses in the operating room should have a detailed understanding of the patient's relevant conditions and special requirements before the operation, and participate in the multidisciplinary professional team to formulate possible emergency plans; improve the preparation of preoperative items, strengthen the observation points during the operation, and focus on achieving good surgical treatment, which can enable heart-liver transplantation To achieve the desired effect and promote the quality of life and health of patients.

Keywords

combined heart-liver transplantation, multidisciplinary, nursing cooperation; decompensation of alcoholic liver cirrhosis; ischemic cardiomyopathy; preoperative diagnosis; median sternotomy; proximal circumflex; coronary atherosclerosis; esophageal varices; the skeletonization; heparinization; Hemostasis; anesthesia; hypothermia; extracorporeal membrane oxygenation; cryogenic gravity perfusion; cardiopulmonary bypass; skeletonization; anesthesiologists; human prothrombin complex, human fibrinogen, platelets, cryoprecipitates, erythrocyte suspensions

Clinical liver transplantation and heart transplantation have become common clinical treatment methods, the main objective is to replace the damaged organs to promote the quality of the patient's life; however, heart-liver transplantation (CHLT) is mainly applied to patients with end-stage heart-liver disease. Different from heart transplantation or liver transplantation alone, the operation is complicated, the workload is heavy, and the requirements for medical staff are higher, so adequate preparations, diagnosis and treatment plans are needed.[1-3] CHLT requires a detailed and thorough preoperative diagnosis and treatment plan, adequate preoperative preparation, skilled surgical cooperation, timely and accurate use of various drugs and appropriate transfusion and transfusion, maintaining good body temperature and circulation stability is the key to improve efficiency and ensure the smooth operation [4]. On May 8, 2020, a patient with alcoholic cirrhosis with decompensated liver function and severe ischemic cardiomyopathy received combined heart-liver transplantation in our hospital. The total operation time was about 10 hours, it took only 14 minutes to complete the orthotopic allograft heart transplantation. The operative nursing cooperation is reported as follows.

Clinic Date

General Information

The patient is a 63-year-old male, vulnerable to chest tightness, shortness of breath, and heartache in daily life for more than one year. After being admitted to our hospital, ECG monitoring showed that the heart rate was 80 beats/min, the left ventricle was enlarged, and the contraction of multi-wall segment was abnormal. LVEF was 27%, the proximal circumflex artery faces subtotal occlusion and the right coronary artery total occlusion. Having been consulted and analyzed extensively, the patient was diagnosed as coronary atherosclerosis, alcoholic cirrhosis with esophageal varices. Heart-lung transplant was performed under general anesthesia on May 8, 2020.

Surgical Method

The patient was placed in a hundred-level laminar-flow operating room and was operated on under general anesthesia, supine position and endotracheal intubation and ventilator-assisted ventilation. The median sternotomy was performed, the sternum was sawed and the incision was extended to get an inverted L-incision in the right upper abdomen layer by layer into abdomen. Liver extractor was used to carefully separate and free expose the portal vessels, and the right and left hepatic arties and proper hepatic arties were isolated. The common bile duct was separated, the cystic duct was transected, the main portal vein was carefully free to the skeletonization, and the free superior and

inferior vena cava were dissected. After systematic heparinization, ascending aorta and superior vena cava was cannulated, and the right superior pulmonary vein was retained in left atrium suction. The ascending aorta, superior and inferior vena cava were blocked, the aorta and pulmonary artery were sequentially transected, the superior vena cava and inferior vena cava were transected through the right atrium; and the left atrial sleeve was transected horizontally along interatrial sulcus and atrioventricular sulcus to get the diseased heart.

After the donor heart was examined and pruned, 3-0 Prolene was used to suture and anastomose continuously the left atrium starting at the opening of the left superior pulmonary vein, and 4-0 Prolene aortic incision. When the left heart finished its suction, aorta occlusion clamp was released, and the heart was automatically reactivated. Then the inferior vena cava, pulmonary artery and superior vena cava were sutured continuously with 4-0 Prolene.

The donor liver was pruned, and the heart transplant was confirmed. The proper hepatic artery, the common hepatic duct, the main portal vein, the inferior hepatic vein and the superior and inferior vena cava were clamped, and the diseased liver was removed. Sodium lactate Ringer's solution containing albumin (10g/500ml) was administered via portal vein. The donor liver and recipient liver were anastomosed to superior hepatic vena cava and intrahepatic vena cava respectively with 4-0 Prolene, and the portal vein was anastomosed with 5-0 Prolene to open the portal vein and fill the liver, the superior hepatic and intrahepatic vena cava were opened successively, and the anastomoses were examined to ensure unobstructed. The common hepatic artery of the donor and the proper hepatic artery of the recipient were anastomosed with 7-0 Prolene. The hepatic artery pulsated well after opening, and the anterior and posterior walls of the recipient bile duct were sutured with 6-0 II PDS, without bile leakage.

After the liver was implanted, the heart rate and circulation were stable, the patient's blood-gas circulation then was measured. In addition, the extracorporeal circulation was closed according to the patient's physical conditions. At the same time, blood products were provided to the patients through intravenous delivery. Hemostasis, cleaning instruments and gauze were carried out step by step. Finally, the chest and abdomen were closed.

Nursing Cooperation

Preoperative Nursing

Preoperative Visit

On the day before the operation, the specialist nurses actively communicated with the patient and his family to confirm that within 14 days in the period of disease, the patient hadn't traveled or lived in Hubei or other areas where the local cases were

continuously transmitted, hadn't contacted patients with fever or respiratory symptoms from Hubei and other areas where the local cases were continuously transmitted, no clustered cases or epidemiological association with COVID-19 infected people. Nurses should fully understand the psychological state of patients, and meanwhile assist them to improve various preoperative examinations, do a good job in preoperative health education, and establish an effective family support system [5].

Risk Assessment

a) Intraoperative Assessment

According to the SBAR evaluation sheet of pressure sore in the operating room of our hospital, the risk of this patient is assessed as high. The form should be filled based on the general conditions of the patient and corresponding protective measures should be taken. The specific measures are as follows: (1) The skin under pressure should be kept dry and healthy to prevent damp problems. Meanwhile, the skin needs to be ensured intact and wrinkle-free. (2) The heated memory mattress and foam posture mat can be used to expand the compression supporting surface of the patient. (3) When placing the decubitus, foam dressing (pressure sore patch) can be used for local re-protection of the vulnerable parts, and posture pad or soft pillow is employed to support the knees and distal feet, which can stay in suspension. (4) If the position of the patient must be adjusted during the operation, a foam dressing patch (pressure sore patch) can be used at the corresponding position to reduce local pressure and shear force. (5) It is advisable to use the appropriate type of medical equipment for instrument-related pressure sore to avoid direct contact between the patient's skin and the instrument. (6) The skin color, condition and temperature of the patient should be carefully checked after the operation. Comprehensive records and communication with ICU nurse should be made. (7) Once the inevitable pressure sore is caused, the adverse accident reporting management system should be adopted. The detailed nursing records should be done, and all kinds of abnormal situations should be reported to the nursing department.

b) VTE Prevention and Assessment

VTE is a general term for deep vein thrombosis and pulmonary thromboembolism [6]. 1) Carry out the work according to the doctor's instructions and ensure that the medicine and nursing methods are qualified. 2) Attach importance to the preoperative and postoperative evaluation of both lower limbs, measure leg circumference with tape, observe the skin condition of lower limbs and record them timely. 3) The posture should be placed following the standard of supine position. Elevation of lower extremities after anesthesia is beneficial to venous reflux. Pay attention to the proper tightness of the restraint belt. 4) Comprehensive body temperature protection measures should be taken to reduce the changes of blood circulation caused by hypothermia. 5) Keep

abreast with changes in the patient's physical conditions and the amount of bleeding, a high risk of VTE may appear if possible. Antagonism can be used during the circulatory arrest of the patient to keep track of the changes in blood pressure at any time. Under the condition of administering protamine antagonist to the patient, no adverse changes in blood pressure were observed and various body indicators were relatively normal.

Environment and Staffing

The head nurse of operating room and anesthesiologist before operation should attend the pre-operation symposium of heart-liver transplantation organized by the hospital. According to the post-operation nursing requirements, there should be 4 specialized nurses and 2 circuit specialized nurses, who were respectively responsible for the prune and transplant of heart and liver donors. Heart-liver transplantation is new surgical challenge for cardiac and liver surgeons, anesthesiologists, nurses of operation room and cardiopulmonary bypass surgeons. In order to reduce the influence of personnel entering the operation room on the laminar flow level of the operation, and to avoid the increasing risk of patients after transplantation getting infected, we strictly control the number of personnel that enters the operation room. There will be 7 surgeons (3 cardiac and 4 liver surgeons), 3 anesthesiologists, 4 nurses of operation room, 2 cardiopulmonary bypass surgeons and 1 synchronous recorder of the operation process[7].

Goods Preparation

The specific criteria for heart-liver transplantation should be analyzed comprehensively. Before operation, the following items should be prepared. 1) Specialized surgical instruments: heart transplantation kit, bypass microscopic instruments, liver transplantation instruments, and cardiac extracorporeal instruments; 2) Instruments and equipment: intracardiac and extracardiac defibrillators, high-frequency electrosurgical knives, energy platforms, sternal chainsaws, ice machines, temperature-control blankets, thermometers, fluid warming device, blood recovery machines, extracorporeal circulation machines, platelet separators, cerebral oxygen monitors; 3) Various types of blood products: human prothrombin complex, human fibrinogen, platelets, cryoprecipitates, erythrocyte suspensions, etc. 4) Emergency supplies: temporary cardiac surface pacemaker, intra-aortic balloon counter pulsation (IABP), extracorporeal membrane oxygenation [8] (ECMO), various hemostatic materials; 5) Drug preparation: antibiotics, heparin, atropine sulfate, isoprenaline, dopamine hydrochloride, protamine, methylprednisolone, simulect, midazolam, fentanyl, etc. .

Intra-operation Nursing

Preventive Medication

At the time of 0.5 ~ 1.0 h after anesthesia intubation and before skin incision, add 2g of ceftriaxone sodium (Rocephin) to 100ml of 0.9% sodium chloride solution and slowly drip it from

the central vein. In addition, before transplantation, 20 mg of baliximab (simulect) should be administered intravenously, 40 mg of pantoprazole sodium adding to 100ml of 0.9% sodium chloride solution should be infused intravenously.

Inventory of Surgical Instruments and Supplies

The incision is large, and the operation is time-consuming. The sequence of the operation is median thoracotomy -- heart transplantation -- liver transplantation -- shutdown and hemostasis -- chest closing -- abdomen closing. Note 1) keep the instruments sterile, lay the instrument table for liver transplantation at the end of the heart transplantation, and cover the instrument table for the heart transplantation with a sterile sheet to ensure that the surgical instruments will not be reused. 2) The mobile bypass instrument table is laid to facilitate the overall exchange of the instrument table for heart and liver transplantation. 3) Extensive disinfection is required including the entire periphery of the chest. 4) The instrument nurse should manage the operation instruments well, strengthen the management to prevent the foreign matter from remaining. 5) It is necessary to increase the number of inventorying, focusing on the cross-stitch phase and the management of small instruments.

Reperfusion and Repair of Heart and liver donors

The instrument nurse should take out the donors in accordance with the procedure to strictly prevent the donor from contamination and slipping. Keep the donor aseptic is the principle. Stage 1 (donor arrives in the operation room): three layers of sterile organ bags, the innermost layer is HTK liquid, followed by ice brine, and the outermost layer is ice chips. They should be sealed and placed in the organ transport box; Stage 2 (prune organ to implantation): the heart and liver should be separately repaired, clearly marked, and securely placed on each sterile instrument table. The instrument nurse should closely and dynamically observe the temperature change of the preservation fluid and add ice flakes timely.

The surgeon should examine the organ under direct vision. Rapid, cryogenic gravity perfusion should be performed on the liver, and the height of perfusion frame is about 1 meter, infusing icy 500ml of 0.9% NaCl added with 50g of albumin by blood transfusion apparatus on the operation table. The liver should be placed in an ice basin covered with ice flakes and be stored in a 3-layer sterile bag with 0.9% NaCl solution at 0-4 °C. Numbers of 2-0 to 5-0 Prolene sutures are used to assist the surgeon to repair the leaky blood vessel or bile duct system again. After no leakage is detected, the liver should be stored for later use. The transport box needs to contain basic information about identifying blood type and receptor.

Intra-operation Volume Observation and Nursing

Heart-liver transplantation takes a long time, a large wound surface and a great amount of blood and fluid loss. The

patient's cardiac function is grade 3, and the liver function is in decompensation period. According to the requirements, two peripheral venous channels should be set up, and vasodilator and vasopressor medicine should be infused separately. Meanwhile, red and blue labels need to be applied to mark different artery and vein channels. In this operation, the in vitro regulation was very stable, which provided very good basic conditions for transplantation. However, there was a short-term decrease in blood pressure during liver transplantation, and the stability of blood pressure was maintained through transfusion of blood and blood products.

Intra-operation Monitoring and Adjustment

Hypothermia can lead to the decrease of body function, abnormal metabolism, prolonged clotting time and an increased risk of stress injury. The temperature of the patient should be kept normal, because in the process of heart and liver transplantation, the maintenance and management of multiple organs should be carried out, and oxygen consumption during the operation should be reduced through hypothermia to avoid ischemic problems. In the specific implementation of the operation, the temperature should be lowered gradually when the operation begins, the ambient temperature should be lowered to about 18-20°C, then the temperature should be raised slowly after the anastomosis of left atrium and aorta, and the ambient temperature should be kept between 24-26°C, at the same time, the patient's body temperature should be slowly raised to 36.8-37°C after cardiac reanimation. To prevent the possibility of atrial fibrillation in the stage of a new liver, the patient should be treated with comprehensive heat preservation during liver transplantation. The lowest temperature of this patient during operation was 34.5°C for nasopharynx and 35°C for bladder. No atrial fibrillation occurred during operation and no hypothermia after operation.

Summary

The heart-liver transplantation requires the nursing staff to be familiar with the whole process of preoperative period[9],

to carry out the preparation before operation, and to cooperate with several experts to form a surgical team to avoid accidents, at the same time, they should master the operation sequence of heart-liver transplantation, and make nursing emergency plans and countermeasures for possible problems and potential complications, the success of the operation fully reflects the preciseness, effectiveness and safety of the cooperation among surgical teams.

References

1. Junwu Ch, Jianjun Z, Xiangrong K, et al. (2014) Progress in combined heart-liver transplantation[J]. Practical Journal of Organ Transplantation 6: 375-377.
2. Lebray P, Varnous S (2019) Combined heart and liver transplantation: State of knowledge and outlooks[J]. Clin & Res Hepatol & Gastroenterol 43(2): 123-130.
3. Rosen CB, Barbara DW, Rehfeldt KH, Heimbach JK, Daly RC, et al. (2015) The Perioperative Management of Patients Undergoing Combined Heart-Liver Transplantation[J]. Transplantation: Official Journal of the Transplantation Society 99(1): 139-144.
4. Xinglian G, Jing H, Na X, et al. (2013) Nursing cooperation in combined heart-liver transplantation[J]. Chinese Journal of Nursing, 03: 29-31.
5. Na X, Lei S, Kaiyu X (2019) Nursing cooperation in 2 cases of combined heart-liver transplantation[J]. General Nursing 017(003): 372-373.
6. Murphy PB, Vogt KN, Lau BD, Aboagyeet J, Parry NG, et al. (2018) Venous Thromboembolism Prevention in Emergency General Surgery: A Review[J]. Jama surg 153(5): 479-486.
7. Yanan L (2019) Medical information[J]. Standardized nursing cooperation for heart transplantation 32(z1): 274-275.
8. Braun HJ, Pulcrano ME, Weber DJ, Padilla BE, Ascher NL (2019) The Utility of ECMO After Liver Transplantation: Experience at a High-Volume Transplant Center and Review of the Literature[J]. Transplantation 103(8): 1568-1573.
9. Xiaohui H, Jian Z, Lina Y, et al. (2020) Electronic Journal of Practical Clinical Nursing[J]. Discussion on the application effect of surgical nursing cooperation guidelines in liver transplantation 5(6): 68-69.



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