

Consensus among Experts on Acute-On-Chronic Liver Failure and Liver Transplantation, Including Postoperative Assessment

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Abstract

Liver transplantation can treat acute-on-chronic liver failure (ACLF), although post-transplant results are significantly impacted by perioperative complications. Recent years have seen a considerable improvement in organ reserve function, surgery tolerance, and postoperative quality of life due to early rehabilitation for critical illness, liver disease, and surgery. They could also be used by ACLF patients undergoing liver transplantation throughout the postoperative period. Because of this, the Organ Transplant Committee of China Association Rehabilitation Medicine, the Transplantation Immunology Committee of Branch of Organ Transplantation Physician of Chinese Medical Doctor Association, and the Guangdong Medical Doctor Association of Organ Transplantation conducted a thorough review of rehabilitation in end-stage liver disease, critical illness, and surgical patients by summarising current evidence and best clinical practises and proposed a solution.

Keywords: Liver transplantation (LT); Acute-on-chronic liver failure (ACLF); The perioperative period; Rehabilitation; Evaluation and intervention

Introduction

Acute-on-chronic liver failure can be cured through liver transplantation (LT) (ACLF). However, in end-stage liver illness, malnutrition and multiple organ dysfunctions appear to lower cardiopulmonary reserve function and physical activity (ESLD). It can be difficult to deal with the adverse postoperative results of the lengthy LT operation. Rehabilitation has been widely used in cases of severe surgery and liver illness. In some populations, it shortens hospital stays or intensive care unit (ICU) stays and lowers the rate of readmission. The perioperative care provided to LT3, 4, and 5 patients could potentially be examined in this setting. Therefore, it is crucial to quickly come to an agreement on how to assess and carry out therapy in LT patients with ACLF [1].

A multidisciplinary team from the Transplantation Immunology Committee of Branch of Organ Transplantation Physician of Chinese Medical Doctor Association, the Organ Transplant Committee of China Association Rehabilitation Medicine, and the Guangdong Medical Doctor Association of Organ Transplantation summarised the most recent research on rehabilitation in critical illness, liver diseases based on the prior consensus for the perioperative management of ACLF patients with LT6. We eventually came to an agreement on cardiopulmonary, physical evaluation and intervention application after three formal rounds of thorough debate and vote. It will be an invaluable resource for professionals from transplant teams so they can enhance the health and standard of living of ACLF patients.

The evidence-based medicine and recommendations in this consensus were graded using the Grading of Recommendations Assessment, Development, and Evaluation (GRADE) system. Each statement's response frequency was calculated. The median GRADE score for each statement was determined and ultimately applied.

Materials and Method

Respiratory system

Reason: One of the key organs most frequently affected by ACLF is the lung. Significant respiratory abnormalities may result from

direct comorbidity damage (such as chronic obstructive pulmonary disease (COPD), interstitial lung disease (ILD), indirect hepatic dysfunction involvement (such as hepatopulmonary syndrome (HPS), portopulmonary hypertension (POPH), and hydrothorax), or extrahepatic complications (such as neurological abnormalities, cardiopulmonary vascular remodelling, and malnutrition). Oxygenation drop, respiratory drive reduction, and airway protective failure are common throughout the perioperative period in advanced ACLF and are significant risk factors for postoperative pulmonary problems. As a result, based on comorbidities and consequences, examination of respiratory function in patients with ACLF, including respiratory drive, airway protective response, and oxygenation, should be carefully done [2].

Regular Inspection

Significant postoperative complications and mortality associated with ACLF are typically accompanied by atelectasis, infection, alveolar damage, or vascular problems. This can lead to extremely low survival after LT, which would unquestionably be a contraindication. Examples include uncontrolled disseminated infection prior to LT, severe ILD, and POPH patients with a mean pulmonary artery pressure (mPAP) higher than 50 mmHg. Regular chest X-rays can be utilised to provide a preliminary infection or comorbidity screening. To screen for hypoxia and its causes, blood gas analysis and pulse oximetry can be utilised. An essential rehabilitation evaluation that can grade the seriousness of ventilation dysfunction and reevaluate the effectiveness of rehabilitation is the pulmonary function test (PFT). To distinguish the origin risk, transthoracic echocardiography (TTE) should be routinely carried out.

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Along with the left heart, the right ventricular dysfunction needs further focus. To determine whether there is intrapulmonary shunting when chronic and increasing hypoxia is present, contrast echocardiography should be carried out. When the right ventricular systolic pressure (RVSP), as determined by normal TTE, is greater than 45 mmHg, right heart catheterization is indicated [3].

Respiratory drive

In ACLF, hepatic encephalopathy (HE) is very common. The risk of mortality and morbidity increases with increasing HE grades. 18 When brain failure is severe, it can lead to respiratory arrest and airway desensitisation, which raises the possibility of aspiration and subsequent infection. Even though routine head computed tomography (CT) scans in HE patients with neurologic deterioration are debatable they may be useful in determining prognosis in cases where respiratory drive is compromised, such as ischemic or hemorrhagic brain stem stroke or hernia after cerebral edema [4].

The PFT is a thorough assessment of ventilation that can identify coexisting lung illnesses including COPD and ILD. Peak expiratory flow, forced expiratory volume in the first second (FEV1), and vital capacity can all be utilised to predict how well a transplant will go and how well a patient will respond to rehabilitation. An important integrated test method for assessing lung function is the submaximal exercise experiment. 30 The 6-minute walk test (6MWT) and the associated modified Borg scale (today, the modified Borg scale, 0-10 score, higher scores indicate more severe dyspnoea or tiredness) are the two extensively used easy procedures for assessing cardiopulmonary function during rehabilitation. Before walking, patients' dyspnoea and nonspecific weariness are indicators of their respiratory motion reserve and endurance [5].

Discussion

For patients whose consciousness is gradually improving, for those who can collaborate, and for those who are only allowed to do in-bed activities, the grip test and muscle strength grading are the most often utilised evaluation techniques. The muscle strength of 58 boys and girls with hand grip strengths (HGS) of less than 28 and less than 18 kg, respectively, has reduced. Six body muscular groups are evaluated using the Oxford muscle grading scale by the Medical Research Council (MRC), and a score of less than 48 points signifies ICU-acquired muscle weakness. The MRC score is used to assess the effectiveness of rehabilitation as well as forecast the prognosis of numerous important conditions [6].

Gait exercises and respiratory therapy are both possible after mobility has advanced beyond standing and walking. To boost the ability to perform aerobic activity, the 6MWT plus respiratory function training should be offered. Training for breathing involves using breathing techniques such as pursed lip breathing, abdominal breathing, balloon blowing exercises, inspiratory and expiratory muscle training, and active circular breathing. Additionally, the anaerobic workout endurance as well as the effort's duration and intensity should be gradually raised [7, 8].

Conclusion

The aerobic exercise endurance test is the most popular method of evaluating physical activity for conscious patients who can cooperate and walk without the aid of any equipment. The 6MWT is a quick instrument to evaluate physical function both before and after LT, in addition to its general usage in the heart and lungs. The postoperative

quality of life and survival during the time preceding surgery are highly connected with the 6MWT. 31,32,50,60 Preoperative 6MWT 250 m is substantially linked with mortality, increasing short-term survival by 50% for every 100 m over baseline. 50 The 6MWT is strongly and favourably connected with postoperative complications or survival quality outcomes both preoperatively and postoperatively. Poor muscle function is indicated by a score of 0-6 points, moderate muscular function is shown by a score of 7-9 points, and good muscle function is indicated by a score of 10-12 points. Many ACLF patients have recently employed the liver frailty index (LFI), which measures balance, grip strength, and ability to rise up from a chair. A 4.5 means that you are feeble. The outcome of liver transplant recipients can be accurately predicted using preoperative and postoperative LFIs, which can also be used to direct rehabilitation care. Additionally, a few integrated evaluation scales, such as the Karnofsky performance scale and the activities of daily life scale, can be used as instruments to merely assess physical function [9, 10].

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Potential Conflicts of Interest

It is stated by the authors that they have no competing interests.

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