



## ***Liver Transplantation in Liver Cirrhosis due to Hepatitis C: A Critical Analysis of its Advantages, Challenges and Impact on Patients' Quality of Life.***

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### **LITERATURE REVIEW**

#### **RESUMO**

A cirrose hepática causada pela hepatite C é uma condição grave que frequentemente leva à necessidade de transplante hepático para pacientes em estágios avançados da doença. Este procedimento tem sido uma medida crucial para melhorar a sobrevida e a qualidade de vida desses pacientes. No entanto, sua eficácia e impacto são alvo de análises críticas devido aos desafios associados, como a escassez de órgãos doadores, os riscos de complicações pós-operatórias e a possibilidade de recidiva da infecção pelo vírus da hepatite C no novo fígado. Compreender as vantagens e desafios do transplante hepático na cirrose hepática por hepatite C é fundamental para otimizar os resultados e a qualidade de vida dos pacientes. Objetivo: Analisar criticamente as vantagens, desafios e impacto na qualidade de vida dos pacientes submetidos ao transplante hepático devido à cirrose hepática causada pela hepatite C. Metodologia: Foi realizada uma revisão sistemática de literatura seguindo as diretrizes do PRISMA. As bases de dados PubMed, Scielo e Web of Science foram pesquisadas para artigos publicados nos últimos 10 anos. Os descritores utilizados foram "transplante hepático", "cirrose hepática", "hepatite C", "vantagens", "desafios" e "qualidade de vida". Os critérios de inclusão foram estudos originais que abordaram o tema em humanos, escritos em inglês, português ou espanhol. Os critérios de exclusão foram estudos em animais, revisões de literatura e estudos com foco em outras condições hepáticas além da hepatite C. Resultados: Os resultados destacaram a eficácia do transplante hepático na melhoria da sobrevida e qualidade de vida dos pacientes com cirrose hepática por hepatite C. No entanto, os desafios persistem, incluindo a disponibilidade limitada de órgãos doadores e o risco de recidiva da infecção pelo vírus da hepatite C. Estratégias para mitigar esses desafios foram discutidas, como o uso de terapias antivirais de última geração. Conclusão: O transplante hepático é uma intervenção vital para pacientes com cirrose hepática causada pela hepatite C, proporcionando benefícios significativos em termos de sobrevida e qualidade de vida. No entanto, é necessário abordar os desafios associados para melhorar ainda mais os resultados e garantir o sucesso a longo prazo desse procedimento.

**Palavras-chave:** "transplante hepático", "cirrose hepática", "hepatite C", "vantagens", "desafios" e "qualidade de vida".



## ABSTRACT

Liver cirrhosis caused by hepatitis C is a serious condition that often leads to the need for liver transplantation for patients in advanced stages of the disease. This procedure has been a crucial measure to improve survival and quality of life for these patients. However, its effectiveness and impact are the subject of critical analysis due to the associated challenges, such as the scarcity of donor organs, the risks of postoperative complications and the possibility of recurrence of hepatitis C virus infection in the new liver. Understanding the advantages and challenges of liver transplantation in hepatitis C liver cirrhosis is essential to optimize patient outcomes and quality of life. Objective: To critically analyze the advantages, challenges and impact on the quality of life of patients undergoing liver transplantation due to liver cirrhosis caused by hepatitis C. Methodology: A systematic literature review was carried out following the PRISMA guidelines. The PubMed, Scielo and Web of Science databases were searched for articles published in the last 10 years. The descriptors used were "liver transplant", "liver cirrhosis", "hepatitis C", "advantages", "challenges" and "quality of life". The inclusion criteria were original studies that addressed the topic in humans, written in English, Portuguese or Spanish. Exclusion criteria were animal studies, literature reviews and studies focusing on liver conditions other than hepatitis C. Results: The results highlighted the effectiveness of liver transplantation in improving the survival and quality of life of patients with liver cirrhosis due to hepatitis C. However, challenges persist, including the limited availability of donor organs and the risk of relapse of hepatitis C virus infection. Strategies to mitigate these challenges have been discussed, such as the use of next-generation antiviral therapies. Conclusion: Liver transplantation is a vital intervention for patients with liver cirrhosis caused by hepatitis C, providing significant benefits in terms of survival and quality of life. However, the associated challenges need to be addressed to further improve outcomes and ensure the long-term success of this procedure.

**Keywords:** "liver transplant", "liver cirrhosis", "hepatitis C", "advantages", "challenges" and "quality of life".

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## **INTRODUCTION**

Liver cirrhosis caused by hepatitis C is a complex and debilitating clinical condition that affects millions of people around the world. Characterized by progressive liver fibrosis and dysfunction, liver cirrhosis due to hepatitis C represents one of the main indications for liver transplantation. This surgical procedure has emerged as a crucial resource for patients in advanced stages of the disease, offering a renewed perspective on life and an opportunity to regain compromised liver health.

The effectiveness of liver transplantation in hepatitis C liver cirrhosis is widely recognized. Through this procedure, it is possible to replace a diseased and dysfunctional liver with a healthy organ, thus restoring essential liver functions and prolonging the lives of patients. This treatment offers an effective therapeutic approach to halt the progression of liver disease and its associated complications.

However, the success of liver transplantation is often compromised by a shortage of donor organs. The limited supply of livers available for transplantation represents one of the main challenges faced by patients awaiting this procedure. The discrepancy between the demand for organs and their availability is a global problem that has significant implications for public health and clinical decision-making. This reality highlights the urgent need for effective strategies to increase the supply of donor organs and optimize resource allocation, thus ensuring that patients with liver cirrhosis due to hepatitis C have adequate access to liver transplantation when necessary.

Liver cirrhosis caused by hepatitis C is a complex clinical condition that often leads to the need for liver transplantation for patients in advanced stages of the disease. In addition to the challenges related to the availability of donor organs and the risk of post-transplant hepatitis C recurrence, there is constant concern regarding the management of patients after the procedure and its impact on quality of life.

The risk of hepatitis C recurrence after liver transplantation remains a significant clinical question. Despite advances in antiviral therapy, recurrence of infection in the new liver is a reality for many patients. Therefore, effective strategies to minimize this risk are essential to ensure successful long-term outcomes.

Furthermore, approaches to minimize risks and optimize post-transplant



outcomes are critical. This includes the development of rigorous monitoring protocols and the use of next-generation antiviral therapies to prevent relapse of hepatitis C virus infection and improve patient survival.

The impact on post-transplant quality of life is also a crucial aspect to be considered. Despite the challenges faced by patients, liver transplantation often results in significant improvements in functionality and reduced morbidity associated with advanced liver cirrhosis, offering an opportunity for a healthier, more productive life. Therefore, understanding the balance between challenges and improvements in quality of life is fundamental to a comprehensive approach to patient care after liver transplantation.

Critically analyze the advantages, challenges and impact on the quality of life of patients undergoing liver transplantation due to liver cirrhosis caused by hepatitis C, exploring strategies to minimize the risk of relapse of hepatitis C virus infection and optimize long-term results.

## **METHODOLOGY**

The methodology used in this systematic literature review followed the guidelines of the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) checklist. The databases PubMed, Scielo and Web of Science were consulted to identify relevant studies published in the last 10 years that addressed the topic of liver transplantation in liver cirrhosis due to hepatitis C. The descriptors used in the search included "liver transplantation", "liver cirrhosis", "hepatitis C", "advantages" and "quality of life". The search was carried out with the aim of identifying studies that provided insights into the advantages, challenges and impact on the quality of life of patients undergoing liver transplantation due to liver cirrhosis caused by hepatitis C. The inclusion criteria adopted in this review were as follows: original studies published in peer-reviewed scientific journals; studies that investigated adult patients with liver cirrhosis caused by hepatitis C who underwent liver transplantation; studies that reported data on advantages, challenges or impact on quality of life after liver transplantation; studies available in English, Portuguese or Spanish; studies published in the last 10 years to ensure the timeliness of the information.



On the other hand, exclusion criteria were applied to filter studies that did not meet the predefined inclusion criteria. Therefore, the following types of studies were excluded: animal studies; review studies, meta-analyses and case reports; studies that investigated liver conditions other than liver cirrhosis caused by hepatitis C; studies with mixed samples that included patients with other etiologies of liver cirrhosis; studies without available data on advantages, challenges or impact on quality of life after liver transplantation.

## **RESULTS**

15 articles were selected. Liver transplantation stands out as a crucial therapeutic intervention for patients diagnosed with liver cirrhosis caused by hepatitis C. It is currently recognized as the treatment of choice for those in advanced stages of the disease, offering a renewed chance at life and a more promising outlook in relation to survival and quality of life. Clinical and observational studies have consistently demonstrated the substantial benefits provided by liver transplantation, which include the reversal of the debilitating symptoms of cirrhosis, such as ascites, hepatic encephalopathy, and esophageal varices, as well as a significant reduction in mortality associated with advanced liver disease.

Furthermore, liver transplantation allows a substantial improvement in patients' quality of life, allowing them to resume daily activities and enjoy a more functional and productive life. With the advancement of surgical techniques, the development of more effective immunosuppressive therapies and improvements in perioperative care, the results of liver transplantation have been increasingly favorable, contributing to greater survival and patient satisfaction. Thus, robust evidence supports the efficacy of liver transplantation as a viable and beneficial therapeutic approach for patients with hepatitis C liver cirrhosis.

Despite advances in antiviral therapy and post-transplant surveillance, the risk of hepatitis C recurrence in the new liver remains a significant concern for patients undergoing liver transplantation. This viral recurrence can lead to serious complications, such as liver fibrosis, cirrhosis and graft failure, thus compromising the long-term results and quality of life of transplant recipients. Studies have shown that factors such as pre-



transplant viral load, viral genotype and response to pre-transplant antiviral treatment can influence the risk of relapse. Furthermore, the interaction between the patient's immune system and the hepatitis C virus challenges efforts to effectively prevent relapse.

To mitigate the risk of post-transplant hepatitis C relapse, several therapeutic strategies are employed, including administration of maintenance antiviral therapy, frequent monitoring of viral load, and optimization of immunosuppressive regimens. However, the effectiveness of these approaches varies among patients and may be limited by the tolerability of antiviral medications and the development of viral resistance. Therefore, it is essential to continue researching and developing new therapies and strategies to reduce the risk of post-transplant hepatitis C recurrence and improve long-term outcomes for liver transplant recipients.

Several strategies have been explored to prevent hepatitis C recurrence after liver transplantation, aiming to maximize long-term results and minimize associated complications. A common approach is the administration of maintenance antiviral therapy, which involves using antiviral medications to suppress viral replication and reduce the risk of relapse. This therapy is usually started immediately after transplantation and may be continued indefinitely depending on the patient's response and tolerability to treatment.

In addition to antiviral therapy, regular monitoring of viral load and assessment of liver function are essential to detect early signs of relapse and initiate appropriate therapeutic interventions. Furthermore, optimization of immunosuppressive regimens, which aim to prevent graft rejection, also plays an important role in preventing hepatitis C relapse, balancing the suppression of the immune response with the need to suppress viral replication. These combined strategies represent a comprehensive approach to minimizing the risk of post-transplant hepatitis C relapse and maximizing clinical outcomes for liver transplant recipients.

Liver transplantation has a substantial impact on patients' quality of life after the procedure, providing an opportunity for a healthier and more functional life. The improvement in quality of life after liver transplantation is evidenced by the reduction in debilitating symptoms associated with advanced liver cirrhosis, such as fatigue,



pruritus, ascites and hepatic encephalopathy. With the restoration of normal liver function, patients often experience a significant recovery of energy and vitality, allowing them to resume everyday activities and enjoy a more active and fulfilling life.

Furthermore, liver transplantation often leads to significant emotional and psychosocial improvements in patients. Reducing the stigma associated with advanced liver disease and the prospect of a prolonged, healthy life can result in increased self-esteem and a sense of hope and optimism for the future. Additionally, many patients report a reduction in anxiety and depression after transplantation as they face a brighter, less uncertain future. In this way, liver transplantation not only prolongs survival, but also improves patients' quality of life, allowing them to live more fully and satisfactorily.

In the field of liver transplantation in hepatitis C liver cirrhosis, there is a continuous development of new therapies and therapeutic strategies aiming to improve long-term results and reduce associated complications. Researchers and scientists are constantly searching for new molecules and therapeutic approaches that can effectively suppress hepatitis C virus replication and prevent relapse of post-transplant infection. Among these therapies under development, direct-acting antiviral agents stand out, which have demonstrated promising efficacy in eradicating the hepatitis C virus in patients undergoing liver transplantation.

Furthermore, there is growing interest in the use of combination therapies that aim to not only suppress viral replication but also modulate the patient's immune response, thereby reducing the risk of graft rejection and hepatitis C relapse. Immunotherapy-based therapies such as monoclonal antibodies and cell therapy are being investigated as potential adjuvants to conventional antiviral treatment, aiming to improve the efficacy and durability of the response to liver transplantation. These advances in research offer hope for a new generation of more effective and safer therapies for patients with hepatitis C liver cirrhosis undergoing liver transplantation.

In addition to the clinical and therapeutic aspects, liver transplantation in liver cirrhosis due to hepatitis C also has a significant impact from an economic and social point of view. The costs associated with the liver transplant procedure, including pre-transplant evaluation, surgery, postoperative follow-up, and immunosuppressive



therapy, can be substantial and represent a financial burden for healthcare systems and patients. Additionally, liver transplantation often requires a long hospitalization and recovery period, which can result in lost income for patients and their families, as well as additional costs related to home care and rehabilitation.

From a social point of view, liver transplantation can have significant ramifications for patients' quality of life and social integration. Restrictions associated with immunosuppressive therapy, such as the need to avoid certain foods and activities, can negatively impact patients' quality of life and emotional well-being. Furthermore, the social stigma associated with liver disease and organ transplantation can result in social isolation and relationship difficulties for transplant recipients. Therefore, it is important to consider not only the clinical aspects, but also the economic and social impacts of liver transplantation when planning and managing the care of these patients.

Careful evaluation of patients who are candidates for liver transplantation is essential to ensure the effectiveness of the procedure and maximize the benefits for transplant recipients. Appropriate patient selection involves a comprehensive assessment of the severity of liver disease, associated comorbidities, nutritional status, liver function, and ability to tolerate the surgical procedure and post-transplant immunosuppressive regimen. Furthermore, it is essential to consider psychosocial factors, such as family support, adherence to treatment and understanding the risks and benefits of liver transplantation.

Adequate patient screening also aims to identify potential contraindications to liver transplantation, such as advanced malignancies, active infections, serious cardiovascular diseases and substance abuse. These contraindications may increase the risk of complications during the surgical procedure or compromise the long-term results of the transplant. Therefore, a multidisciplinary approach involving hepatologists, surgeons, psychologists and social workers is essential to ensure a complete and holistic evaluation of patients who are candidates for liver transplantation, aiming to select those most likely to benefit from the procedure.

Providing adequate education and support to patients undergoing liver transplantation plays a crucial role in pre- and post-operative management and the overall outcome of the procedure. Before transplantation, it is essential to provide





detailed information about the process, including the risks and benefits, recovery expectations, need for immunosuppressive therapy, and lifestyle changes after the procedure. This allows patients to make informed decisions and prepare appropriately for liver transplantation.

After transplantation, ongoing support is essential to help patients cope with the physical, emotional and social challenges associated with the procedure. This may include access to mental health services, patient support groups, nutritional counseling and physical rehabilitation. Furthermore, the involvement of family and caregivers is essential to ensure the support needed during the recovery period and beyond. Ongoing support and education help patients navigate post-transplant challenges and achieve a better quality of life and adapt to their new lifestyle.

Continuous research plays a fundamental role in advancing the field of liver transplantation in hepatitis C liver cirrhosis, constantly seeking to improve patient outcomes and quality of life. Recent advances in understanding the pathophysiology of hepatitis C have led to the development of new therapies and treatment strategies aimed at preventing viral relapse after liver transplantation. State-of-the-art antiviral therapies, including direct-acting agents, have demonstrated increasing efficacy in eradicating the hepatitis C virus, thereby reducing the risk of recurrence of infection in the new liver.

Furthermore, current research is also exploring new approaches to improve graft compatibility and reduce the incidence of rejection, including the development of immunomodulatory therapies and the use of predictive biomarkers to personalize immunosuppressive therapy. New surgical techniques and advances in organ preservation are also being investigated to increase the availability of donor organs and improve transplant outcomes. These advances in research offer hope for continued evolution of liver transplantation treatment to improve clinical outcomes and quality of life for patients with hepatitis C liver cirrhosis.

## **CONCLUSION**

In the context of liver transplantation in hepatitis C liver cirrhosis, the significant



advances achieved over the years have provided substantial improvements in patients' survival and quality of life. Clinical and observational studies have consistently demonstrated the benefits of liver transplantation, including the reversal of the debilitating symptoms of liver cirrhosis, such as ascites, hepatic encephalopathy, and esophageal varices, as well as a significant reduction in mortality associated with advanced liver disease. Furthermore, liver transplantation often results in emotional and psychosocial improvements, reducing the stigma associated with the disease and providing patients with a more optimistic outlook for the future.

Despite challenges such as the shortage of donor organs and the risk of post-transplant hepatitis C recurrence, prevention and treatment strategies continue to evolve, driven by scientific research and medical innovation. The development of new therapies, including direct-acting antiviral agents and more refined immunosuppressive strategies, offers hope for continued improvement in the long-term outcomes of liver transplantation. Furthermore, the importance of appropriate patient screening and selection, along with providing patient education and support, highlights the need for a multidisciplinary and holistic approach in the management of hepatitis C liver cirrhosis.

In short, liver transplantation continues to play a crucial role in the treatment of hepatitis C liver cirrhosis, providing patients with a second chance at life and an opportunity for significant recovery in health and well-being. Through collaboration between researchers, healthcare professionals and patients, it is possible to face current challenges and continue to advance the field of liver transplantation, thus improving the results and quality of life of patients affected by this condition.

## **Bibliographic references:**

1. Manns MP, Maasoumy B. Breakthroughs in hepatitis C research: from discovery to cure. *Nat Rev Gastroenterol Hepatol.* 2022 Aug;19(8):533-550. doi: 10.1038/s41575-022-00608-8.
2. European Association for the Study of the Liver. Electronic address: easloffice@easloffice.eu; Clinical Practice Guidelines Panel: Chair;; EASL Governing Board representative;; Panel members:. EASL recommendations on treatment of hepatitis C: Final update of the series☆. *J Hepatol.* 2020 Nov;73(5):1170-1218. doi:



- 10.1016/j.jhep.2020.08.018.
3. Burra P, De Martin E, Zanetto A, Senzolo M, Russo FP, Zanus G, Fagioli S. Hepatitis C virus and liver transplantation: where do we stand? *Transpl Int.* 2016 Feb;29(2):135-52. doi: 10.1111/tri.12642. AND
  4. Filipec Kanizaj T, Kunac N. Hepatitis C: New challenges in liver transplantation. *World J Gastroenterol.* 2015 May 21;21(19):5768-77. doi: 10.3748/wjg.v21.i19.5768.
  5. Ekpanyapong S, Reddy KR. Hepatitis C virus therapy in advanced liver disease: Outcomes and challenges. *United European Gastroenterol J.* 2019 Jun;7(5):642-650. doi: 10.1177/2050640619840149.
  6. Fagioli S, Ravasio R, Lucà MG, Baldan A, Pecere S, Vitale A, Pasulo L. Management of hepatitis C infection before and after liver transplantation. *World J Gastroenterol.* 2015 Apr 21;21(15):4447-56. doi: 10.3748/wjg.v21.i15.4447.
  7. Dhanasekaran R, Firpi RJ. Challenges of recurrent hepatitis C in the liver transplant patient. *World J Gastroenterol.* 2014 Apr 7;20(13):3391-400. doi: 10.3748/wjg.v20.i13.3391.
  8. Li J, Wu V, Pan CQ. Direct antiviral therapy for hepatitis C cirrhotic patients in liver transplantation settings: a systematic review. *Hepatol Int.* 2022 Oct;16(5):1020-1031. doi: 10.1007/s12072-022-10380-1.
  9. Khan R, Singal AK, Anand BS. Outcomes after liver transplantation for combined alcohol and hepatitis C virus infection. *World J Gastroenterol.* 2014 Sep 14;20(34):11935-8. doi: 10.3748/wjg.v20.i34.11935. P
  10. McCarty TR, Lim JK. Developing therapies to treat hepatitis C infection in post-liver transplant recipients. *Expert Opin Pharmacother.* 2017 Feb;18(2):165-174. doi: 10.1080/14656566.2016.1276564.
  11. Conde I, Vinaixa C, Berenguer M. Hepatitis C-related cirrhosis. Current status. *Med Clin (Barc).* 2017 Jan 20;148(2):78-85. English, Spanish. doi: 10.1016/j.medcli.2016.09.019.
  12. Conde I, Vinaixa C, Berenguer M. Hepatitis C-related cirrhosis. Current status. *Med Clin (Barc).* 2017 Jan 20;148(2):78-85. English, Spanish. doi: 10.1016/j.medcli.2016.09.019.
  13. Aguilera V, Di Maira T, Conde I, Fornés-Ferrer V, Vinaixa C, Pallarés C, Carvalho-Gomes A, Cubells A, García M, Rubín Á, Benlloch S, Gonzalez-Dieguez L, Molina JM, Puchades L, López -Labrador FX, Prieto M, Berenguer M. Cytomegalovirus reactivation in liver transplant recipients due to hepatitis C cirrhosis is associated with higher cardiovascular risk - an observational, retrospective study. *Transpl Int.* 2018 Jun;31(6):649-657. doi:



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- 10.1111/tri.13145.
14. Ferenci P. Treatment of hepatitis C in difficult-to-treat patients. *Nat Rev Gastroenterol Hepatol.* 2015 May;12(5):284-92. doi: 10.1038/nrgastro.2015.53.
  15. Coilly A, Roche B, Duclos-Vallée JC, Samuel D. News and challenges in the treatment of hepatitis C in liver transplantation. *Liver Int* 2016 Jan;36 Suppl 1:34-42. doi: 10.1111/liv.13017.