REVIEW

Abstract: About 15 years have passed since the first liver transplant from a living donor (living donor liver transplantation: LDLT), and the status of the procedure has since been established as a standard cure for end-stage liver disease in Japan where liver transplantation (LTx) from deceased donors has not yet been accepted. However, the following problems are surfacing with the increase in the number of LDLTs between adults: graft size mismatching, an ABO blood-type incompatible transplantation, the expansion of LDLT indication to hepatocellular carcinoma (HCC), the relapse of hepatitis C after LDLT, marginal donors, and the freedom from immunosuppressive treatment. In this article we outline the present conditions of these problems and the future view of the LDLT. J. Med. Invest. 52: 22-32, February, 2005

Keywords: Adult-to-adult living donor liver transplantation, small-for-size graft, large-for-size graft, hepatocellular carcinoma, ABO blood-type incompatible transplantation, marginal donor, hepatitis C, fatty liver, age
1. Graft size mismatching

Graft size mismatching is a significant factor in the outcome of any surgical procedure. The size of the graft should be carefully matched to the recipient site to ensure optimal function and survival. Mismatching can lead to a number of complications, including graft failure, infection, and rejection. The ideal size match is determined by the size of the recipient site, the size of the graft, and the size of the donor site. If the size of the graft is too large, it can lead to a number of complications, including graft failure, infection, and rejection. If the size of the graft is too small, it can lead to a number of complications, including graft failure, infection, and rejection. The size of the graft should be carefully matched to the recipient site to ensure optimal function and survival. Mismatching can lead to a number of complications, including graft failure, infection, and rejection. The ideal size match is determined by the size of the recipient site, the size of the graft, and the size of the donor site. If the size of the graft is too large, it can lead to a number of complications, including graft failure, infection, and rejection. If the size of the graft is too small, it can lead to a number of complications, including graft failure, infection, and rejection. The size of the graft should be carefully matched to the recipient site to ensure optimal function and survival. Mismatching can lead to a number of complications, including graft failure, infection, and rejection. The ideal size match is determined by the size of the recipient site, the size of the graft, and the size of the donor site. If the size of the graft is too large, it can lead to a number of complications, including graft failure, infection, and rejection. If the size of the graft is too small, it can lead to a number of complications, including graft failure, infection, and rejection. The size of the graft should be carefully matched to the recipient site to ensure optimal function and survival. Mismatching can lead to a number of complications, including graft failure, infection, and rejection. The ideal size match is determined by the size of the recipient site, the size of the graft, and the size of the donor site. If the size of the graft is too large, it can lead to a number of complications, including graft failure, infection, and rejection. If the size of the graft is too small, it can lead to a number of complications, including graft failure, infection, and rejection. The size of the graft should be carefully matched to the recipient site to ensure optimal function and survival. Mismatching can lead to a number of complications, including graft failure, infection, and rejection. The ideal size match is determined by the size of the recipient site, the size of the graft, and the size of the donor site. If the size of the graft is too large, it can lead to a number of complications, including graft failure, infection, and rejection. If the size of the graft is too small, it can lead to a number of complications, including graft failure, infection, and rejection. The size of the graft should be carefully matched to the recipient site to ensure optimal function and survival. Mismatching can lead to a number of complications, including graft failure, infection, and rejection. The ideal size match is determined by the size of the recipient site, the size of the graft, and the size of the donor site. If the size of the graft is too large, it can lead to a number of complications, including graft failure, infection, and rejection. If the size of the graft is too small, it can lead to a number of complications, including graft failure, infection, and rejection. The size of the graft should be carefully matched to the recipient site to ensure optimal function and survival. Mismatching can lead to a number of complications, including graft failure, infection, and rejection. The ideal size match is determined by the size of the recipient site, the size of the graft, and the size of the donor site. If the size of the graft is too large, it can lead to a number of complications, including graft failure, infection, and rejection. If the size of the graft is too small, it can lead to a number of complications, including graft failure, infection, and rejection. The size of the graft should be carefully matched to the recipient site to ensure optimal function and survival.
Congestion

Excessive portal flow

Intragraft responses

Shear stress

NO
HSPs (HO-1)
Egr-1
ET-1
vasoconstriction

Cytokines(IL-1, IL-6, TNF, etc.)
Adhesion molecules
Mø infiltration

Left lobe graft with a venoplasty

Before venoplasty

After venoplasty

Right lobe graft with a vein graft

Umbilical vein graft

Umbilical vein graft

Hepatic vein wave

V8 (14 POD)
2. ABO blood-type incompatible transplantation

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2. ABO blood-type incompatible transplantation

Although liver transplantation has been widely used, some patients are unable to undergo this procedure due to either blood-typing or the organ is not from a donor who matches the patient. The ABO blood group system plays an important role in blood compatibility and is also significant in organ transplantation. Patients with ABO incompatible transplantation can develop acute antibody responses against the donor because of the different antigens in the blood between the recipient and the organ donor. This often results in acute rejection and can lead to the death of the patient. ABO incompatible transplantation is considered to be the most frequent type of rejection in the transplant process. The ABO blood group system includes A and B antigens, and thus the incompatible transplantation can lead to a considerable number of patients being excluded from receiving a transplant.

3. LDLT for hepatocellular carcinoma

Liver transplantation remains one of the most effective treatments for end-stage liver diseases and hepatocellular carcinoma (HCC). In recent years, living donor liver transplantation (LDLT) has become a feasible and effective treatment option for patients with HCC. LDLT is performed to provide patients with a better quality of life and improved survival rates. However, LDLT is associated with higher rates of recurrence and immunological issues compared to cadaveric donor liver transplantation (CDLT). Advances in surgical techniques and immunosuppressive therapy have improved the outcomes of LDLT for HCC. In addition, LDLT can be performed more quickly and with less morbidity compared to CDLT, making it a preferred option for patients with HCC.
4) Relapse of hepatitis C

Relapse of hepatitis C can occur after successful treatment. This phenomenon is particularly important in the context of liver transplantation, where patients who have undergone this procedure may experience a recurrence of the disease. The risk of relapse is influenced by various factors, including the patient's immune status, viral genotype, and adherence to post-transplantation treatments.

In the past, the standard of care for preventing hepatitis C relapse after transplantation involved the use of interferon and ribavirin. However, the development of direct-acting antivirals (DAAs) has revolutionized the management of hepatitis C in transplant recipients. DAAs are highly effective and can be used as part of a combination therapy regimen to achieve sustained virological response (SVR).

Despite the progress made with DAAs, relapse remains a challenge, especially in patients with advanced liver disease or those with genotype 1b or 3. Therefore, close monitoring and follow-up are crucial for early detection and intervention. Antiviral therapy may need to be adjusted or continued indefinitely in some cases to prevent or manage relapse.

Understanding the mechanisms behind relapse, improving treatment strategies, and developing new antiviral agents are ongoing areas of research. With advances in medical knowledge and technology, the management of hepatitis C in transplant recipients continues to evolve, offering hope for long-term remission and improved patient outcomes.
5) Marginal donors

While the benefits of marginal donors for clinical purposes have been well documented, little is known about the immunological behavior of these individuals. It is important to note that marginal donors are defined as those who do not meet the standard criteria for blood donation but are found to be eligible for donation after screening. The use of marginal donors is often necessary due to the shortage of volunteer donors. However, the immunological status of these donors is critical to ensure the safety and efficacy of the donated blood.

These donors may have a higher risk of transmitting infectious diseases to recipients. Therefore, it is essential to conduct thorough screening and testing procedures to eliminate potential carriers of diseases such as HIV, hepatitis B and C, and other blood-borne pathogens. Additionally, careful monitoring of the recipient is necessary to detect any potential complications or adverse reactions.

6) Freedom from immunosuppressants

Another critical factor to consider is the use of immunosuppressants. Immunosuppressants are medications that are used to suppress the immune system's ability to reject transplanted organs. These medications can leave the recipient vulnerable to infections and increase the risk of developing certain types of cancers. Therefore, it is important to ensure that the recipient is free from these medications before proceeding with the transplantation.

In conclusion, the use of marginal donors and the freedom from immunosuppressants are crucial considerations in the evaluation of potential donors and recipients. These factors must be carefully assessed to ensure the safety and success of the transplantation process.
et al. (1978) have also shown that the expression of 5-HT4 receptors is...