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## How to handle Large for Size

**Donghwan Jung**

*Asan Medical Center, University of Ulsan, Republic of Korea*

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The allocation of a liver graft to a recipient is based on scores that give priority to the severity of liver disease more than to the anthropometrics of the donor and recipient. Discrepancies in appropriate matching between the donor and the recipient can lead to the implantation of an excessively large liver graft into a small recipient cavity. This condition, known as large-for-size (LFS) liver transplantation (LT), has been widely described in pediatric LT and results in poor graft or recipient outcomes. However, in recent years, with the increased prevalence of the obesity epidemic among the donor pool, the incidence of LFS LT tends to increase in adult LTs. A large graft receives relatively low portal blood flow due to the relatively small recipient body size, which impairs hepatic microcirculation. External compression due to a relatively small abdominal cavity for large grafts also attributes to microcirculatory disturbances, especially in pediatric recipients. This microcirculatory hypoperfusion results in sustained warm ischemia and worsening of ischemia-reperfusion, leading to delayed recovery of hepatic function and, massive hepatic necrosis and PNF, the so-called "large for-size syndrome". The release of larger amounts of inflammatory factors from the ischemic and larger graft and sequestration of recipient blood volume into the donor graft may explain the severity of hemodynamic instability or higher incidence of post-reperfusion syndrome. High levels of antigen in large-volume grafts are also associated with a high incidence of rejection. In addition, the discrepancy in the caliber of vessels is also attributed to prolonged warm ischemia time, and sudden change in vascular diameter at anastomosis creates the turbulent flow, leading to thrombosis formation. A higher incidence of biliary complication has been reported in large for-size grafts due to ischemic cholangiopathy (ischemic type biliary lesion) from prolonged ischemia. Respiratory complications were higher in the large-for-size group, which may be associated with the mass effect of large grafts (cranial shift of diaphragm, atelectasis formation, and decreased functional reserve volume). Consequently, graft survival is inferior compared to size-matched transplants. Unlike small-for-size grafts, the treatment strategy for LFS syndrome is less stringent. Most of the proposed therapies are symptomatic treatments. The abdomen may need to be left open or closed by mesh in case a significant elevation of airway pressure is noted or a significant elevation of intra-abdominal pressure associated with the closure of the abdomen leads to abdominal compartment syndrome. Reduced size

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graft is commonly used for pediatric liver transplantation to overcome the large graft size. Large graft size compresses the hepatic outflow tract. In the case of hepatic venous occlusion due to large graft size, graft volume reduction by hepatectomy after completion of vascular anastomosis may be helpful. Post-reperfusion can be severe after reperfusion. A larger amount of flush may be needed to remove hyperkalemic and acidotic preservation solution, and a larger amount of inflammatory mediators. Pre-emptive vasopressors with fluid resuscitation may be helpful to maintain blood pressure immediately after reperfusion but the effect is limited to immediately after reperfusion. Future studies will be expected to investigate indexes to predict post-transplant risk hazards for graft or patient survival in consideration of donor and recipient conditions together with size differences.