Although the living donor liver transplantation remains relatively rare, life insurance applications of living liver donors may appear (and have!) on the desks of underwriters and medical directors. What information is available to guide the consideration of these applicants?

Living donor liver transplants were first performed for child recipients. Liver segments from adult donors are used in urgent situations where there is little chance of finding a suitable donor organ in a narrow window of time. In living donor transplants to children, a small segment of adult liver, usually the left lobe, constituting 20%–25% of the donor’s liver mass, can be safely removed with little consequence to the donor. With growing waiting lists (11,136 in 2001) and waiting times (median wait time 770 days for individuals registered in 1997), the potential for adult donor to adult recipient transplants as a way to reduce this gap has received considerable attention. However, adult-to-adult liver transplantation introduces major donor risk and ethical issues into transplant medicine.

Instead of a small segment of an adult’s liver, successful donation to an adult recipient requires removal of the donor’s right liver lobe. This can be up to 65% of the donor’s liver mass. Success is predicated on the inherent ability of the liver to respond to injury and regenerate itself. This has been illustrated to be true in practice. After successful living donor transplantation, the volume of the graft may increase by 87%, and the donor’s liver remnant may double in mass in 7 days after the operation.

Initial experience with adult-to-adult liver transplantation developed in Asia (primarily Hong Kong and Japan) where cultural issues concerning cadaveric organ transplantation, and high incidence of hepatocellular carcinoma were driving factors. Successful outcomes in Asia, lead to dissemination of the procedure to the United States. Continuing concerns are the ability of the donor to recover and have normal liver general health and functional status following donation surgery.
Figure 1. Transection plane for left and right liver lobe donors. From Miller et al, Annals of Surgery 2001. Reproduced with permission. © 2001 Lippincott Williams & Wilkins.

Figure 2. Illustrates need for venous reconstruction of short hepatic and hepatic segment 5 and 8 tributary veins. From Miller et al, Annals of Surgery 2001. Reproduced with permission. © 2001 Lippincott Williams & Wilkins.

Figure 1 illustrates liver transection required for either left or right lobe donation. Figure 2 illustrates the complex hepatic venous reconstructions of the right lobe graft to allow successful engraftment in the recipient. The primary messages of the figures are the extent of the resection and the high level of complexity of the procedure for the donor, as well as the recipient. Operative time for the donor is in the range of 7 to 10 hours in experienced centers, and median hospital confinement ranges from 6 to 12 days dependent on the series and country.

With any medical treatment that is new and related to a relatively rare condition, outcomes data are “thin.” Although there is a great deal of interest, there is no single registry for the collection of living organ donor related data. Several reviews, and large single center case series give a reasonable picture of morbidity outcomes of donors. However, other than accounting of short-term, transplant surgery related deaths, long-term mortality data related to liver donation has not been developed. Relatively few transplant surgery related deaths have been reported, 0.28% in one review, however there are concerns that the full short-term surgical risk of death has not been accounted for by published series.

Morbidity outcomes studies have focused on surgery complications, quality of life, and return to usual life activities. Reported surgical complication rates in donors range from 15% to 30% dependent on the series, experience of the center, and the definition of complications. Among significant complications, bile leaks from the cut surface of the liver occur in about 5% of patients, and between 9% and 19% of donors have other complications related to major abdominal surgery, such as wound infection, small bowel obstruction, and incisional hernia. Less severe complications include dysphagia and abdominal pain. A high percentage (up to 96%) of donors report return to usual activities including employment (same or similar jobs) within the year following surgery. Based on donor self-report, 84% returned to work within 6 months of surgery. Only 4% required more than 12 months recovery before returning to work.

An interesting question that may surface during underwriting is the duration required for recovery of liver function tests postoperatively. Chisuwa et al in their series of 160 living donors noted that peak serum bilirubin exceeded 2.0 mg/dL in only 11 donors, 7 of whom were diagnosed as having Gilbert’s syndrome preoperatively. The highest levels
of AST (234 U/L ± 118), ALT (245 U/L ± 137) were noted on the first postoperative day, falling to near normal levels, AST (44 U/L ± 29), ALT (85 U/L ± 61), by the 14th postoperative day. Similar improvement in the prothrombin time to near-normal percentage of control was seen by the 14th day also. Comparison of donors with a steatotic liver with those who did not revealed a higher peak ALT level in those with steatosis than in those who did not (303 U/L vs 227 U/L, p <0.05). At least 1 center excludes donors whose BMI is more than 28 because of the substantial prevalence of steatosis in individuals above this level.6

Though direct mortality data is not available, one can reasonably infer that a donor who did not have hepatic steatosis preoperatively, has been free of significant postoperative complications, has returned to a preoperative functional and activity level, and has evidence of normal liver function based on all usual biochemical assessments should have an excellent long-term prognosis.

REFERENCES