

# Living-donor liver transplantation

## 1 Guidance

- 1.1 Current evidence on the efficacy of living-donor liver transplantation and its safety profile appears adequate to support the use of this procedure for suitable recipients.
- 1.2 However, current evidence suggests that living-donor liver transplantation carries a significant risk of morbidity and a small risk of death for donors. Therefore clinicians wishing to undertake this procedure should take the following actions.
- Inform the clinical governance leads in their Trusts.
  - Ensure that donors and recipients undergo thorough physical and psychological screening, and receive counselling about the morbidity and risks associated with this procedure. They should also be provided with clear written information. In addition, use of the Institute's information for patients ('Understanding NICE guidance') is recommended (available from [www.nice.org.uk/IPG194publicinfo](http://www.nice.org.uk/IPG194publicinfo)).
  - Audit and review clinical outcomes of all people donating liver tissue for transplantation (see section 3.1).
- 1.3 Living-donor liver transplantation should only be performed on patients selected using UK Transplant Liver Advisory Group standards in specialist centres and in the context of a multidisciplinary team.
- 1.4 Clinicians should enter all donors and recipients into the UK & Ireland Liver Transplant Audit ([www.rcseng.ac.uk/surgical\\_research\\_units/ceu/projects/proj\\_liver.html](http://www.rcseng.ac.uk/surgical_research_units/ceu/projects/proj_liver.html)).

## 2 The procedure

### 2.1 Indications

- 2.1.1 Liver transplantation is a treatment option for patients with end-stage liver failure, which may be acute or chronic, and may also be indicated for patients with some types of primary liver cancer.
- 2.1.2 Living donation is an alternative to cadaveric-organ donation and is an option for

patients whose clinical condition is deteriorating significantly while waiting for a cadaveric donor. Living donation may also be an option for critically ill children. The living donor is usually a blood relative, but can also be a spouse or partner.

### 2.2 Outline of the procedure

- 2.2.1 Living-donor liver transplantation requires two operations: a partial hepatectomy performed on the donor, and a hepatectomy (of the native organ) followed by transplantation of the donated liver lobe for the recipient.
- 2.2.2 The graft size required is determined by the ratio of body size between the donor and recipient. Right-lobe transplants are chosen for many adult recipients, whereas left-lobe transplants are used more commonly for children and adult recipients of small body size. The right lobe provides a larger volume of liver tissue, and the blood and biliary vessels are larger and easier to anastomose. However, right hepatectomy is a more complex procedure than left hepatectomy and may be associated with an increased risk to the donor.

### 2.3 Efficacy

- 2.3.1 Many of the studies on living-donor liver transplantation were reported from countries in which cadaveric liver transplantation is not performed. Patient characteristics may therefore differ from those in the UK, and patient outcomes may not be directly comparable.
- 2.3.2 In a review of primary studies assessing outcomes following adult-to-child liver transplantation, median 5-year survival was generally higher in the living-donor group (92%) than in the cadaveric-graft group (81%) (based on eight studies looking at 1091 living grafts and 4550 whole-organ cadaveric grafts). Graft survival was also higher with living-donor grafts: the median 5-year survival rate was 81% in the living-donor group, compared with 73% in the cadaveric-graft group.
- 2.3.3 The evidence for efficacy in adult-to-adult transplantation was based on a systematic review

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### This guidance is written in the following context

This guidance represents the view of the Institute, which was arrived at after careful consideration of the available evidence. Healthcare professionals are expected to take it fully into account when exercising their clinical judgement. This guidance does not, however, override the individual responsibility of healthcare professionals to make appropriate decisions in the circumstances of the individual patient, in consultation with the patient and/or guardian or carer.

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This guidance is endorsed by NHS QIS for implementation by NHSScotland.

(246 studies, including 9 comparative studies totalling 675 patients) and a large case-control study (n = 2234). No significant differences in recipient survival at 12 months were found in three comparative studies included in the review (80–100% in the living-donor group and 75–90% in the cadaveric-graft group). In 65 non-comparative studies included in the review, recipient survival rates ranged from 43–100% at follow-up of 1–36 months.

- 2.3.4 Graft survival was also reported in three comparative studies. At follow-up of at least 12 months, graft survival was 75–89% in the living-donor groups, compared with 73–89% in the cadaveric-graft groups.
- 2.3.5 In a systematic review of donor outcomes it was reported that nearly all donors returned to normal activity by 6 months (based on 18 studies). By 6 months, donors' livers had regenerated to a median of 89% of their original size (based on 16 studies). The authors of the systematic review noted that relatively few studies have assessed quality of life and psychological outcomes in donors. For more details, refer to the 'Sources of evidence' section.
- 2.3.6 The majority of Specialist Advisers noted that living-donor liver transplantation is an established procedure in end-stage liver disease, particularly in children. However, there are still some uncertainties about long-term survival and graft function in comparison with cadaveric-liver grafts.

## 2.4 Safety

- 2.4.1 Biliary complications (leaks and strictures) were the most commonly reported complications for both child and adult recipients. In a review of literature assessing outcomes following adult-to-child liver transplantation, the incidence of biliary complications ranged from 5% to 14% (based on four studies). Other complications reported included portal vein and hepatic artery thrombosis.
- 2.4.2 In a systematic review of outcomes in adult recipients, the median reported biliary complication rate was 22% (based on 75 studies). Other common complications included infection and hepatic and vascular complications, with median reported rates of 19%, 21% and 7%, respectively.
- 2.4.3 In a systematic review of outcomes in donors, mortality was estimated to be about 0.2% (12/6000). At least seven of these deaths involved adult-to-adult donation, and the risk of mortality appeared to be higher for right-lobe donation (0.23–0.5%) than for left-lobe donation (0.05–0.21%).

### Ordering information

Copies of this guidance can be obtained from the NHS Response Line by telephoning 0870 1555 455 and quoting reference number N1138. 'Understanding NICE guidance' can be obtained by quoting reference number N1139.

The distribution list for this guidance is available at [www.nice.org.uk/IPG194distributionlist](http://www.nice.org.uk/IPG194distributionlist)

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Interventional procedures guidance makes recommendations on the safety and efficacy of a procedure. The guidance does not cover whether or not the NHS should fund a procedure. Decisions about funding are taken by local NHS bodies (primary care trusts and hospital trusts) after considering the clinical effectiveness of the procedure and whether it represents value for money for the NHS.

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- 2.4.4 Donor morbidity ranged from 0–100%, with a median of 16% (based on 131 studies). Complications included biliary leaks and strictures, pulmonary embolism, small bowel obstruction, pleural effusion and bleeding. Similar results were reported in two large case series, with overall morbidity of 13% (52/386) and 16% (238/1508). In both studies, the frequency of postoperative complications was significantly higher in right-lobe donors than in left-lobe donors. One study also reported that more serious complications occurred in those who had donated right-lobe grafts. For more details, refer to the 'Sources of evidence' section.

- 2.4.5 The Specialist Advisers considered the main complications for the recipient following living-donor liver transplantation to be biliary and vascular complications. With respect to donors, the Specialist Advisers expressed concerns that a number of donors may develop acute liver insufficiency, and become recipients. It was noted that donor mortality varied depending on the size of the liver donated, with right hepatectomy possibly associated with increased risk.

## 3 Further information

- 3.1 This guidance requires that clinicians undertaking the procedure make special arrangements for audit. The Institute has identified relevant audit criteria and developed an audit tool (which is for use at local discretion), available from [www.nice.org.uk/194](http://www.nice.org.uk/194)

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### Information for patients

The Institute has produced information describing its guidance on this procedure for parents ('Understanding NICE guidance'). It explains the nature of the procedure and the decision made, and has been written with consent in mind. This information is available from [www.nice.org.uk/IPG194publicinfo](http://www.nice.org.uk/IPG194publicinfo)

### Sources of evidence

The evidence considered by the Interventional Procedures Advisory Committee is described in the following document.

'Interventional procedure overview of living-donor liver transplantation', April 2006.

Available from: [www.nice.org.uk/IP253overview](http://www.nice.org.uk/IP253overview)