

Occasional viewpoint

Limits to liver transplantation in the UK

In recent years, the number of liver transplants performed in the UK and the Republic of Ireland has been increasing by approximately 10% per year, rising from 509 in 1992 to 687 in 1995. Over the same period, the number of solid organ donors notified to the UK Transplant Support Service Authority (UKTSSA) has remained relatively static (951 in 1992, and 966 in 1995).¹ In 1996, however, there was a fall in the number of liver donors for the first time, with only 691 donors accepted compared with 724 in 1995.^{2,3} In parallel with this decrease in organ availability, there was a 5% decline in the number of liver transplants (from 687 in 1995 down to 652 in 1996) and a corresponding 9% fall in the number of cadaveric kidneys transplanted.³ Although transplant activity has since increased (692 liver transplants in 1997²), such statistics show the fragility of the current balance between solid organ availability and transplantation in the UK. Given that up to 30% of livers from potential donors are unsuitable for organ donation for medical reasons,⁴ the number of patients transplanted each year is unlikely to be maintained, let alone increased, unless organ availability can be improved.

Although the waiting list for liver transplantation in the UK is still relatively short, it has increased by 30% over the past two years, from 138 patients on the active waiting list at the end of 1995, to 180 patients in December 1997.^{2,3} Median times from listing to transplantation for chronic liver disease have also risen, from 30 to 38 days in 1995/96.² These waiting times are still much lower than those of the USA and countries in continental Europe which have a much higher prevalence of liver disease than the UK, where average transplant waiting times for patients with chronic liver disease are often greater than one year.^{1,5} According to data from the Council of Europe,⁶ 15–30% of patients listed for heart, lung, or liver transplants in continental Europe will die while waiting for a donor organ. In this country, some patients are also dying before a donor liver becomes available, particularly young children (who of necessity often receive cutdown adult livers) and adults with acute liver failure who require immediate transplantation. In 1996, a total of 58 patients died in the UK and Ireland while on the active liver transplant waiting list. In 1997, three quarters of the 62 patients less than five years of age who were transplanted, received cutdown livers.^{2,3} The gap between the current organ donation rate and transplantation requirements is even greater for other solid organ categories. At the end of 1997, 4447 UK patients were on the active waiting list for kidney transplants, and a further 553 were listed for heart and/or lung transplants.^{2,3}

Although there is a clear need to ensure that all potential solid organ donors are made available for transplant use, how this is to be achieved in terms of public education and legislative change is far from clear. Currently, there is much interest in the potential role of xenotransplantation—particularly for kidney and heart recipients—but many immunological difficulties are still to be overcome.⁷ Successful cadaveric liver transplantation of children using the left lateral segment initially resulted in the right lobes being discarded, but the relative shortage of good quality grafts has led to the use of the right lobe in adult patients

as part of split liver transplantation. At present, split liver transplantation accounts for just over 1% of liver transplants,² but use of this technique is likely to increase in the future. At King's College Hospital, over 60 split liver transplants have now been performed, with one year patient survival of 85%.⁸ Similarly, although powerful voices are raised in support of living related transplants for kidney recipients, only 10% of kidney grafts transplanted in Britain are from living donors,^{3,9} while living related liver transplants are currently only being performed in a few small infants with biliary atresia and other conditions each year; four such transplants were recorded in 1997.²

The organ donation rate in the UK and Ireland—which has fallen from 15.5 per million population (pmp) in 1992, to 14.6 pmp in 1997^{1,2}—is approximately half that of Spain, which currently has the highest organ donation rate in Europe. In that country, following the institution of a national proactive donor detection programme based within local intensive care units to identify potential organ donors, the annual rate of organ donation increased from 14.3 pmp in 1989, to 21.7 pmp in 1992, and to 26.8 pmp in 1996,^{1,2} with corresponding improvements in the rates of organ retrieval and liver transplantation of 81% and 175%, respectively.¹⁰ In the UK, such a programme would also be expected to reduce regional variations in organ donation. In 1996, for example, solid organ donor retrieval rates ranged from 13.2 pmp in Scotland to 23.9 pmp in Northern Ireland.³ However, even organ donation rates similar to those of Spain may not be sufficient; the Council of Europe has estimated that, to meet current European requirements, as many as 50 donors pmp may be required.⁶

In 1994, on the basis that up to one third of relatives refuse permission for organ donation, and that this refusal rate is decreased if the wishes of the deceased are known,¹¹ the Government launched the NHS Organ Donor Register. The Register, which is coordinated by the UKTSSA, enables people to record their wish to donate organs in the event of their death, although patients' relatives still have the right to overrule the prior wishes of the deceased and refuse such donation. By February 1998, 4.7 million people (8% of the UK population) were registered.^{2,3} Assuming that at most about 1000 patients with brain stem death are identified as potential solid organ donors each year,¹² and that a 30% relatives' refusal rate would be reduced to nil for cases on the Register,¹¹ up to 24 additional solid organ donors might be obtained each year. However, of the 373 registrants who had died up to February 1998, solid organs were donated in only 20% of cases.² Although the number of people registered will undoubtedly increase with time, it is unlikely that the Register, in its present form, will ever include sufficient numbers to influence donor organ availability to any great extent.

The introduction of presumed consent legislation would be expected to increase organ donation rates significantly. In the UK, however, there remains considerable medicopolitical resistance to such an approach, despite recent findings that approximately 80% of the reasons given by relatives who refuse organ donation are unrelated to the prior wishes of the patient.^{11,12} Presumed consent legislation is already in place in many neighbouring countries such as Portugal, Austria, Finland, Belgium, and Sweden.⁶

In Belgium, implementation of such legislation in 1986 resulted in a doubling of the organ donation rate within three years.¹³ In Sweden, new transplant legislation based on the principle of presumed consent was introduced in July 1996, together with a central register for people to record their objection or consent to organ donation in the event of their death. Within the first six months, 1.4 million (15%) of the Swedish population were registered,¹⁴ compared with the figure of 8% of the UK population on the NHS Registry after more than four years.²

It also seems unlikely that legislation will be introduced in the UK, at least in the near future, to allow elective ventilation of a comatose patient who is close to death from severe brain damage, for the purpose of organ donation only. This proposal was strongly recommended in a recent report by the British Transplantation Society.¹⁵ Institution of such a policy in Exeter from 1987 to 1989, resulted in a doubling of the regional donor rate from 19.8 to 37.5 pmp—more than two and a half times the national average.¹⁶ Further support for such a scheme came from a study in Wales of approximately 10 000 hospital deaths.¹⁷ Of 188 patients aged less than 70 who were retrospectively identified as potential organ donors, 57% died without being ventilated at the time of death. Overall, only 14% of potentially eligible patients became organ donors. However, this method—where patients are electively ventilated without their prior consent, not for their own benefit but to harvest their organs—has been judged unlawful since October 1994, on advice from the Department of Health.

In the short term, therefore, the means for increasing organ donation rates in the UK will most likely lie with a coordinated programme of organ donor identification, as recently advocated by the Council of Europe.⁶ An estimated 6–12% of families of ventilated potential donors are never asked for consent.^{4 11 12} Furthermore, many patients in intensive care units or on general medical wards who might satisfy brain stem death criteria, are not considered for organ donation. Based on the results of a two year audit of intensive care units in England and Wales, Gore *et al*¹¹ estimated that 2–3% of all people dying in hospital, and 14% of those dying in intensive care, were likely to fulfil brain stem death criteria. As part of an international initiative to improve organ donation rates, “Donor Action”—a programme designed to help hospitals improve donor detection and referral rates—was developed in 1995 and is currently being piloted in Canada and several European centres, including the UK. Preliminary findings from the medical records review arm of the programme identified 349 potential donors from 529 medical records of patients who had died in the intensive care units of nine hospitals (five European, four Canadian). Organ donation took place in 102 (29%) cases. Among the 247 cases in which organ retrieval did not take place, an objection from the family accounted for only 90. In the remaining 157 potential donors (45% of the total), organ donation did not occur as a result of problems related to donor identification, referral, or the maintenance of the potential donor.¹⁸

The extent of the presently unmet need for liver transplantation and the changing pattern of disease indications also need to be considered. The number of patients transplanted for primary biliary cirrhosis (PBC)—previously the commonest indication for liver transplantation in the UK—fell from 114 in 1994 to 104 in 1995, with a further decline to 81 patients in 1997.² This is likely to represent a true fall in the number of end stage cases referred for transplantation, although Metcalf and colleagues¹⁹ showed recently that liver related deaths in the northeast of England reported to the Office of Population Censuses and Surveys (OPCS), underestimated true PBC

“liver” deaths by nearly 50%. Extrapolated to the UK as a whole, annual transplant requirements for PBC on this basis could be more than 200 per year. The actual fall in the number transplanted is unlikely to represent declining referral rates influenced by donor organ shortage, since other disease categories showed an increase over the same period. For example, the number of patients transplanted for alcoholic liver disease increased from 31 cases in 1992 to 71 in 1995, with a further rise to 80 in 1997²—figures still much lower than the estimate by Davies *et al* of 250 alcoholic patients eligible for transplantation per year.²⁰ One reason for this disparity is that many patients with alcoholic cirrhosis are considered unsuitable for liver transplantation because of medical contraindications or continued alcohol dependence. In those who are considered for transplantation, recent data from France suggest that the five year survival of patients transplanted for severe alcoholic liver disease (Child-Pugh grade C) is improved to roughly double that of non-transplanted disease controls, but that Child’s A or B cirrhotics fare just as well with conservative management.²¹ However, considerations of survival of cirrhotic patients with medical treatment take no account of the improved quality of life afforded by a liver transplant.²²

The prevalence of hepatitis B and C cirrhosis in the UK is much lower than in continental Europe,^{23 24} and the number of patients transplanted for these conditions (35 hepatitis B and 68 hepatitis C cases in 1997) remains small.² These figures include most of the patients currently being referred to the UK under E112 regulations—94 (14%) of the 692 patients transplanted here in 1997 were from other European countries.² Nevertheless, the high prevalence of hepatitis C in certain high risk groups in this country, such as patients with haemophilia,^{25 26} means that the number who will need transplantation for viral induced cirrhosis is likely to increase in coming years. In continental Europe, the proportion of patients transplanted for hepatitis C cirrhosis continues to rise, while in the USA hepatitis C now constitutes one third of the total caseload for liver transplantation.²⁷ While advances in the prevention and treatment of hepatitis B and C recurrence may reduce the risk of graft loss, the need for retransplantation in a number of cases is also likely to continue. Hepatitis C recurs in the graft of almost 100% of transplanted patients, with a risk of cirrhosis of up to 20% at five years.²⁸ Patients transplanted for hepatitis B cirrhosis also have a significant risk of hepatitis B recurrence and graft damage.²⁹

Compared with most other countries in Europe, the overall prevalence of chronic liver disease in the UK is low. For example, for the period 1985–89, Austria, Italy, and Portugal had cirrhosis mortality rates of 42–47 per 1000 000 men and 13–16 per 100 000 women, compared with much lower (but rising) mortality rates in Britain of 6.3 per 100 000 men and 4.3 per 100 000 women, respectively.⁵ These latter values are similar to those of Australia, which has an even lower liver transplant rate (6.8 pmp) than that of the UK (11.3 pmp).¹ Nevertheless, it is likely that not all cases in the UK that might benefit from liver transplantation are currently being referred. According to data for England and Wales from the Office of National Statistics, 2223 patients aged less than 65 years died due to chronic liver disease in 1995³⁰—a year in which 687 liver transplants were performed throughout the UK and the Republic of Ireland.²

In patients with acute liver failure (ALF), the use of emergency transplantation raises a number of difficult ethical issues in relation to the allocation of donor organs. At present, approximately 12% of all liver transplants performed in the UK are for ALF, with one year patient survival rates ranging between 50% and 69%.^{2 31} These

figures are significantly lower than those for patients transplanted for chronic liver disease.² It has been argued that donor organs should therefore be reserved for those with the best outlook post-transplant, so that patients with ALF should not be given priority (as they are currently) over elective cases which may have been on the waiting list for many months. In patients with ALF secondary to paracetamol overdose taken with suicidal intent, there are other difficult issues. Although selection for transplantation is based on standard medical prognostic criteria, the psychiatric condition and background of the patient, in relation to their possible influence on outcome after liver transplantation, also has to be taken into account. In a recent series from King's College Hospital,³² almost half of those who fulfilled medical criteria for transplantation were not placed on the super urgent waiting list at UKTSSA. This was mainly because of rapid clinical deterioration but in a proportion of cases, psychiatric considerations also played a role in the decision taken. Recent studies have clearly shown that those taking an overdose of paracetamol have known of the dangers to life and often take it with true suicidal intent, even when this is an impulsive decision.³³ The assessment of psychiatric suitability is very difficult in such cases and the decision whether or not to list the patient for a transplant is often a harrowing one. Questions have been raised as to whether doctors have a right to make decisions based on a patient's demography or lifestyle, rather than on strict medical grounds—"should those who abuse their bodies pay the price?"³⁴ Such decisions will be made even more difficult by the increasing shortage of organs.

In conclusion, the extent of the currently unrecognised need for liver transplantation in this country remains unclear. Carefully designed epidemiological studies of disease prevalence and severity for the main aetiological categories of chronic liver disease, as attempted in other countries,^{35 36} would provide a more precise estimate of the true need for liver transplantation. The rapidity with which better therapeutic agents are introduced for slowing the progression of liver disease will be another factor affecting the demand for liver grafting in the coming years. With respect to improving donor organ availability, an extension of the NHS Register to include a higher proportion of the population, with the ability to record objection as well as consent, would help to stimulate public debate and the move towards presumed consent. Measures to protect legally a potential donor's registered wish to be a donor should also be possible. The recommendations of the Council of Europe⁶ and the British Transplantation Society,^{15 37} which include designating a trained professional in each hospital to identify potential donors, and counsellors to seek consent from relatives, would also be expected to improve organ donation rates and similarly could be put in place almost immediately. Without implementation of such measures, the shortage of donor organs will continue to worsen and more patients will die while awaiting solid organ transplantation.

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