Liver procurement from a brain-dead kidney transplant recipient — a case report

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ABSTRACT

The shortage of organ donors has led to new strategies to increase the availability of allografts for transplantation, such as organ procurement from brain-dead organ transplant recipients.

We present the case of a 26 year-old male brain-dead liver donor who had been a kidney transplant recipient six years previously. This is also the first case described in the medical literature of liver recovery from a brain-dead kidney transplant recipient on an immunosuppressive regimen with three immunosuppressive agents.

Although transplant recipients represent an uncommon group of deceased organ donors, it is probable that situations when they may be considered as potential organ donors will occur more often. Therefore, although specific criteria for organ donors exist, each reported potential donor should be considered individually, and brain-dead solid organ recipients should not be excluded a priori as organ donors; both their native and allografted organs may be recovered and successfully transplanted. In this study, we also review the current state of knowledge on the reuse of organs.

Key words: liver transplantation, brain-dead, renal transplant recipient, organ shortage

The goal of transplantation is to provide every patient on the waiting list with an opportunity to obtain an organ transplant. According to ‘Poltransplant’, the Polish Transplant Coordinating Centre, there were 2,284 patients waiting for an organ in Poland on 31 July 2012 [1]. The shortage of organ donors has led to new strategies to increase the availability of allografts for transplantation, such as organ procurement from brain-dead organ transplant recipients.

According to the United Network for Organ Sharing (UNOS) data as of 8 August, 2012: between 1 January, 2000 and 31 March, 2012, 762 organs (264 kidneys, 368 livers, 79 lungs, 36 hearts, 13 pancreases and two intestines) were donated by 718 deceased donors who had been transplanted (Table 1) [2].

We present the case of a 26 year-old male brain-dead liver donor who had been a kidney transplant recipient six years previously.

CASE REPORT

A 26 year-old male was admitted to the Emergency Department with a strong headache and aphasia. Six years before, due to chronic renal failure, he had undergone renal transplantation. The postoperative period was uneventful and the patient was discharged on an immunosuppressive regimen with cyclosporin, rapamycin and prednisone. His creatinine level varied between 1.8 and 2.5 mg dL−1. Over the following years, he developed arterial hypertension, for which he had received antihypertensive therapy.
A computerised tomography study showed a subarachnoid haemorrhage, and angiography showed an anterior communicating artery (ACoA) aneurysm; therefore coil embolisation of the aneurysm was performed. In spite of aggressive treatment, the patient’s intracranial pressure continued to increase and his neurological status worsened. The patient required a catecholamine infusion (fig. 1).

Echocardiographic heart examination showed a lesion typical for hypertonic cardiomyopathy. The creatinine level reached 5.4 mg dL⁻¹, and the patient needed renal replacement therapy. An additional problem was the hypernatremia that continued to increase in spite of adequate fluid therapy. The hepatic function tests were normal, with a prothrombin index of 82.4%, and liver enzymes activity was within normal values. Ultrasonographic liver examination revealed no abnormalities. Hepatitis B virus (HBV) and hepatitis C virus (HCV) infections were excluded.

On the seventh day, neurologic examination showed no brain-stem reflexes. Brain death was confirmed by cerebral angiography and two clinical examinations registered at six hour intervals according to the Polish medico-legal protocol. Non-objection to organ donation was verified by the transplant coordinator and the family was approached for acceptance for organ donation.

Because no similar case had previously been reported in Poland, and after numerous consultations with the liver transplant team, the decision was made to harvest only the liver.

The liver was transplanted to a 45 year-old male recipient, with post-HCV infection cirrhosis. The transplanted patient had been waiting for a liver transplant on the non-urgent waiting list for ten months. Despite such factors as the use of norepinephrine, hypernatremia, an eight-day stay in the intensive care unit (ICU), and three potentially hepatotoxic (immunosuppressive) drugs regimen, the liver’s function was still normal 29 months after transplantation.

This is the first case described in the medical literature of liver recovery from a brain-dead kidney transplant recipient treated with an immunosuppressive regimen with three immunosuppressive agents (cyclosporine, rapamycin and prednisone).

**IMPLICATIONS FOR INTENSIVE CARE TEAMS**

**DISCUSSION**

Solid organ transplantation is limited by constant problems regarding organ availability. Therefore, over the last few...
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sone, with an ACoA aneurysm and a massive subarachnoid
immunosuppressed with cyclosporin, sirolimus and predni-
donor described in our case report was a 26 year-old male
cerebral haemorrhage in the left hemisphere; whereas the
emergency department due to a nonoperable large
urine as the only immunosuppressive agent, admitted to
female on an immunosuppressive regimen with cyclospo-
toxic factors such as hypernatremia and norepinephrine
suppressive agents is relatively rare. Of the agents
liver failure after kidney transplantation due to immuno-
ECD rules must not result in a decrease in graft or patient survival [3].

Efforts to address organ shortage have also focused on
the use of donors who had previously been transplanted. Although transplant recipients represent an uncommon
group of deceased organ donors, it is probable that situa-
tions where transplant recipients may be considered as
potential organ donors will occur more often. Intracranial
haemorrhage, the commonest reason for brain death, has
been found in 7–24% of autopsied liver transplant recipients
[5, 6]. Thus it is feasible to encounter such a situation in the
ICU among admitted liver transplant recipients.

Although the immunosuppressive regimen remains
potentially hepatotoxic, no severe complications including
liver failure after kidney transplantation due to immuno-
suppression were observed. Hepatotoxicity from transplant
immunosuppressive agents is relatively rare. Of the agents
administered to this patient, cyclosporin may result in cho-
lestatosis, whereas steroids may cause steatosis. None of these
were observed in this case [7].

A case of a successful liver procurement from a kidney
transplant recipient 11 years after transplantation was re-
ported in 2000 [8]; however, there were differences between
these two cases regarding donor gender, age and immuno-
suppressive regimen, as well as numerous potentially hepato-
toxic factors such as hypernatremia and norepinephrine
infusion. The donor described in this report was a 61 year-old
female on an immunosuppressive regimen with cyclosporin, sirolimus and predni-
sone, with an ACoA aneurysm and a massive subarachnoid
haemorrhage leading to cerebral hypertension.

Organ procurements from transplanted, and thus im-
munosuppressed, donors have already been reported in
the literature. The first reuse of a liver allograft from a brain-
death donor recipient was described in Spain in 1991 [9].
From 1991 to 2007, 22 other transplantations were reported
the first two cases of orthotopic reuse of hypertrophied
partial liver grafts for recipients with chronic liver disease
by surviving recipients of partial auxiliary liver transplantation because of acute liver failure whose nati-
ve liver regenerated. In 1993, a report about the reuse of a transplanted kidney was published [12] as well as an extra-
ordinary case regarding the reuse of a transplanted heart
[13]. In 2004, the first case of heart and lung procurement
together with the reuse of a recently transplanted liver
from a brain-dead donor following liver transplantation was
reported [14]. Reprocurements from brain-dead recipients
were performed in the majority of cases within one week;
however, in 2006 a case of successful reuse of a liver graft
13 years after initial transplantation was published [15].
It is worth noting that organ reuse is a unique situation in
which one organ, including the heart, functions consecu-
tively in three people: the donor, the recipient-donor and the
recipient [13].

Although other cases concerning organ reuse have been
published previously, this is the first case in the medical lit-

erature of liver recovery from a brain-dead kidney transplant
recipient on an immunosuppressive regimen with three
immunosuppressive agents. It is also the first documented
case report concerning organ procurement from a brain-
death organ transplant recipient in Poland.

In conclusion, this report confirms that although speci-
cific criteria for organ donors exist, each reported potential
donor should be considered individually, and brain dead
solid organ recipients should not be excluded a priori as
organ donors. Unfortunately, only some of the possible
donors have been reported to ‘Poltransplant’, the Polish
Transplant Coordinating Centre. This has led to a shortage
of organ donors, and therefore sometimes difficult, but not
risky, decisions have to be made in the field of organ reco-
very and transplantation.

The liver donor described in this report, as the first in
Poland, has paved a new, although as yet narrow, way in
the field of organ donation. To give every patient on the
waiting list an opportunity to obtain an organ transplant,
every possible donor ought to be considered as a potential
donor, because they may finally become effective donors.

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