

The Results of Liver Transplantation in Turkey

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Summary: *To overcome the problem of the organ shortage, at least partially, in addition to the orthotopic cadaver liver transplantation, we have started performing living donor partial liver transplantations in children and adults, alike. From December 9, 1988 to April 21, 1992 six orthotopic cadaver and twelve living donor partial liver transplantations were performed at our center. Only two of the twelve living donor partial liver transplant patients were children under 10 years of age. Two of the patients were adolescent males (15 and 16 years of age) with cryptogenic cirrhosis. The remaining six patients were adults with ages ranging from 20 to 53 years. The donors were mothers in three cases, fathers in four cases, spouses in three cases, and siblings in two cases. All of the recipient-donor pairs were ABO compatible. Half of the recipients with whole liver grafts showed acute rejection, with two of these being reversible. One recipient overcame three rejection episodes, gave birth to a baby boy, and has been living for 16 months with normal liver function. The reasons for mortality included pulmonary infection and gastrointestinal hemorrhage in one patient; hypovolemic cardiac arrest in one patient sepsis in one patient, hepatic failure in two patients, one due to rejection and the other due to portal vein thrombosis. All of the living related partial liver grafts began vein thrombosis. All of the living related partial liver grafts began producing bile on the operating table. The intra-operative period was uneventful in all cases. The reasons leading to death in this group included, cerebral edema in one patient, marginal graft function with cholestasis*

and coagulopathy associated with cerebral hemorrhage in one, pulmonary infection in one, chronic rejection in one, irreversible acute rejection in one, liver failure due to hepatic vein outflow block in two, sepsis and DIC in one. Four out of 12 patients are alive. One patient has been living for over three months with normal liver functions, one patient (with hepatoma) has been living for over two months and his general condition and liver functions are improving. The two recently (11, 19 April, 1992) operated patients are having very smooth postoperative period with excellent liver functions. None of the 12 living donors showed any serious postoperative complications and they all are alive and in good health with normal liver functions.

Key Words: Liver transplantation, results, Turkey

Over the last decade liver transplantation has become the preferred therapeutic option for chronic liver failure patients (1-4). However, inadequate supply of donor organs is a major issue limiting this life-saving procedure. Potential candidates for liver transplantation still have a significant risk of dying before a donor becomes available. The shortage of cadaver organs harvested from heart-beating donors is magnified in developing countries. Although, experimental liver transplantation began in the early seventies in Türkiye (5,6), cadaver organ harvesting from heartbeating donors was not possible until November 1988. After heart-beating donors became a reality,

liver transplantation was immediately incorporated into the clinical transplantation program. Yet, despite the years gone by since the beginning of the liver transplantation program, the severe shortage of organ donation continues as the waiting list for liver transplants becomes longer. To overcome this problem, at least partially, in addition to the orthotopic cadaver liver transplantation, we have started performing living donor partial liver transplantations in children and adults, alike (7,8).

PATIENT and METHODS

From December 9, 1988 to April 21, 1992 six orthotopic cadaver and twelve living donor partial liver transplantations were performed at our center. Five of the cadaver liver recipients were male and one was female, with ages ranging from 17 to 53 (average 38.6 years). The etiology for liver failure was cirrhosis due to hepatitis B virus in four patients, alcoholic cirrhosis in one patient, and Wilson's cirrhosis in the other. All the cadaver liver transplants were performed orthotopically, with the use of veno-venous bypass in five cases. The intraoperative blood requirement was between 4 to 53 units. Immunosuppressive regimen consisted of triple-drug therapy (cyclosporine A 5-10 mg/kg/day, azathioprine 2 mg/kg/day, prednisolone 1.5-2 mg/kg/day). Rejection episodes were treated with steroids (250-500 mg/day of methyl prednisolone) or OKT3 (5 mg/day).

Only two of the twelve living donor partial liver transplant patients were children under 10 years of age. One was a 10 months old boy with biliary atresia and the other was a three years old boy with Byler's disease and a 10 years old boy with fulminant Wilson's cirrhosis. Two of the patients were adolescent males (15 and 16 years of age) with cryptogenic cirrhosis. The remaining six patients were adults with ages ranging from 20 to 53 years.

Two of these had hepatitis B antigen (HBsAg) positive chronic active hepatitis one of whom was a 20 years old man and the other a 40 years old woman. The predominant diagnosis for adult recipients of partial liver transplants from living donors was HBsAg(+) post-necrotic cirrhosis. One of these post-necrotic cirrhosis patients had also a hepatoma confined to the liver.

The donors were mothers in three cases, fathers in four cases, spouses in three cases, and siblings in two cases. The ages of the donors varied between 18 and 57 years (average 38.6 years). All of the donors varied between 18 and 57 years (average 38.6 years). All of the recipient-donor pairs were ABO compatible. HLA typing showed HLA-A, b and DR fullmatch in two, w HLA-A, B and 1 DR mismatch in two, 2 HLA-A, B and 1 DR mismatch in one, 3 HLA-A, B and O DR mismatch in one, and 4 HLA-A, B and O DR mismatch in one case. The donor partial hepatectomy consisted of removing segments II, III, and the falciform ligament together with a 2 cm strip of liver tissue from segment IV. Recipients had "piggy back" removal of their livers leaving the inferior vena cava intact. After perfusion with cold UW solution, the grafts were transplanted orthotopically. The intraoperative blood requirement was between 2 to 11 units (average: 3.7 units).

RESULTS

Half of the recipients with whole liver grafts showed acute rejection, with two of these being reversible. Five of the recipient overcame three rejection episodes, gave birth to a baby boy, and has been living for 16 months with normal liver function. The reasons for mortality included pulmonary infection and gastrointestinal hemorrhage in one patient, hypovolemic cardiac arrest in one patient, sepsis in one patient, and hepatic failure in two patients, one due to rejection and the other due

Table I: Results of Cadaveric Liver Transplantation

Patient	Age/Sex	Original Liver Disease	Donor Age	Current Status
1	31/male	Postnecrotic cirrhosis	23 years	Died on the 65 day due to pulmonary infection and G.I hemorrhage
2	40/male	Postnecrotic cirrhosis	13 years	Died on the 10th day due to heart failure
3	46/male	Postnecrotic cirrhosis and hepatoma	36 years	Died on the 45 th day due to sepsis
4	48/male	Alchocolic cirrhosis	37 years	Died on the 25 th day due to liver failure
5	53/male	Postnecrotic cirrhosis	9 years	Died on the 15 th day due portal vein thrombosis
6	18/female	Wilson cirrhosis	26 years	Has been living for 17 months with normal liver function

to portal vein thrombosis (Table 1).

All of the living related partial liver grafts began producing bile on the operating table. The intra-operative period was uneventful in all cases. However, cerebral edema developed in the first case on the third postoperative day and this patient died 2 weeks later. Marginal graft function with cholestasis and coagulopathy was associated with cerebral hemorrhage and resulted in the death of the second patient on the 12th postoperative day. The third patient lived for 56 days but succumbed to pulmonary infection. The fourth patient was the longest survivor but he too died at the end of 9 months due to chronic rejection. The fifth patient died from liver failure due to irreversible acute rejection on the 10th post-operative day. The next two patients died due to liver failure caused by hepatic vein outflow block. The 8th patient has been living for over three months with normal liver function. The 9th patient died on postoperative day 13 due to sepsis and DIC. The 10th patient was the one with hepatoma and he has been living for over two months and his liver functions and general condition is improving. The 11th patient was transplanted on April 11, 1992 and is doing well with good liver function. The last patient was operated on April 19, 1992 and is

having a very smooth postoperative period with excellent liver function (Table 2).

None of the 12 living donors showed any severe postoperative complications and they all are alive and in good health with normal liver functions.

DISCUSSION

The first successful orthotopic liver transplantation was performed in 1967 by Starzl et al (2,9). Shortly thereafter, Calne et al. (10) also began performing orthotopic liver transplantations. These two pioneering teams were followed by many other centers. After cyclosporine entered into clinical use, the survival rates in liver transplantation steadily increased from 30% to over 70%. At present, liver transplantation is the most widely accepted radical treatment for end stage liver failure (11,12). Unfortunately, while other countries made great progress in the field of liver transplantation, we could not start doing clinical liver transplantation in our country until December 8, 1988. The main reason for this delay was the problem of extremely limited number of heart-beating donors. The problem still exists and there is an ever increasing number of patients on the waiting list for liver

Table II: Results of The Living Donor Partial Liver Transplantation

Patient	Recipient Age/sex	Cause of Liver Failure	Recipient Blood Group	Donor Relation	Donor Age	Donor Blood Group	Mismatch A,B/DR	Current Status
1	10 months male	Biliary atresia	A	Mother	31	A	O/O	Died on the 14th day due to cerebral edema
2	20 years male	Chronic active hepatitis	A	Father	56	A	O/O	Died on the 12th day due to cerebral hemorrhage
3	11 years female	Byler's disease	O	Mother	47	O	2/1	Died on the 56th day due to pulmonary infection
4	15 years male	Cryptogenic cirrhosis	A	Father	42	O	0/1	Died 10 months after tx. due to chronic rejection
5	31 years male	Postnecrotic cirrhosis	B	Sister	26	B	1/0	Died on the 10th day due to liver failure
6	40 years female	Chronic active hepatitis	A	Spouse	42	A	2/1	Died on the 8th day due to outflow obstruction
7	57 years male	Postnecrotic cirrhosis	A	Spouse	49	O	2/1	Died on the 5th day due to outflow obstruction
8	10 years male	Wilson's cirrhosis	O	Father	34	O	1/1	Living since 28.12.91 with normal liver function
9	32 years male	Cryptogenic cirrhosis	A	Father	55	A	1/1	Died on the 13th day due to intraabdominal bleeding
10	44 years male	Postnecrotic cirrhosis +Hepatoma	A	Spouse	41	O	4/0	Living since 3.2.1992 with near normal liver function
11	16 years male	Postnecrotic cirrhosis	A	Sister	20	A	3/0	Living since 11.4.1992 with normal liver function
12	3 years male	Byler's disease	B	Mother	22	B	2/1	Living since 19.4.1992 with normal liver function

transplantation. This necessity has turned us to another alternative, namely, segmental living liver transplantation since April 15, 1990.

It is known that left lateral lobe of the liver is sufficient for an adult after extended right hepatic lobectomy. Therefore, if immunologic difficulties can be dealt with, left lateral segments transplanted from an adult living donor should have the same clinical outcome as the extended right hepatic lobectomy in an adult. With this reasoning, we started performing living donor partial liver transplantations in adults, as well as in children (7,8).

Although we have encountered some unfortunate complications during the postoperative

period in some patients, the 10 month survival of a 15 yearold boy and the two 10 and 44 year-old recipients who have been living for over 3 and 2 months, respectively, encouraged us as to the applicability of partial living donor hepatic transplantation to recipients over 10 years of age. Also it is worth mentioning that none of the partial liver living donors had any serious postoperative complications.

CONCLUSION

Our experience with cadaver orthotopic and living donor partial liver transplantations shows that these highly sophisticated surgical procedures can also be done in developing countries. However, it may be necessary to

adopt the transplantation programs to the realities of that country. The severe shortage of organs harvested from heart-beating donors has made us try living donor partial liver transplantations in adults as an alternative to cadaver donor orthotopic liver transplantations. Although our initial results were not

very good, our recent results are encouraging. Now that we have mastered the technique, we think that living donor partial liver transplantation in adults is eventually going to be accepted as an alternative to cadaver donor liver transplantation in the treatment of liver failure.

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