Acute Renal Failure in the First 100 Orthotopic Liver Transplant Patients in Southern Iran

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Postoperative acute renal failure is a frequent and serious medical complication following orthotopic liver transplant. Here, we report our experiences with liver transplant recipients who developed acute renal failure in the early period following orthotopic liver transplant.

Among 100 liver transplants performed between April 1993 and January 2004, we retrospectively analyzed 91 patients (mean age, 29.9 ± 14.0 years) who had undergone orthotopic liver transplant. The underlying causes of liver failure were cryptogenic liver cirrhosis (n=27), viral hepatitis (n= 21) (hepatitis-B–related liver cirrhosis [n=13], hepatitis-C–related liver cirrhosis [n=7], and hepatitis-B– and C–related liver cirrhosis [n=1]), autoimmune hepatitis (n=18), Wilson's disease (n=10), primary sclerosing cholangitis (n=8), biliary atresia (n=3), Budd-Chiari syndrome (n=2), and primary biliary cirrhosis (n=2). The immunosuppressive regimen included mycophenolate mofetil (azathioprine for 10 patients), cyclosporine, and steroids. Six patients received a combination of tacrolimus and steroids. Ten patients (10.9%) experienced acute renal failure, 7 (70%) were men, and none of them required renal replacement therapy and/or died. Four patients were diagnosed as having cryptogenic liver cirrhosis; 2 with hepatitis-C–related liver cirrhosis, 2 with autoimmune liver cirrhosis; 1 with primary biliary cirrhosis; and 1 hepatitis-B–related liver cirrhosis. Six patients were Child-Pugh's classification C, and the others were B. The rate of postoperative acute renal failure in our patients was relatively low when compared with other series, and our outcomes were good.

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Postoperative acute renal failure is a common and serious medical complication following orthotopic liver transplant. The incidence of acute renal failure is reported to range from 12% to 70% of all orthotopic liver transplant patients (1-7); between 8% and 17% of all patients need renal replacement therapy (8-9). Here, we report our experiences with liver transplant recipients who developed acute renal failure in the early period following orthotopic liver transplant.

Materials and Methods

Among 100 liver transplants performed between April 1993 and January 2004, 91 patients with complete data were entered in the study. Data regarding age; sex; weight; blood group; duration of liver disease; Child-Pugh's score classification; and serum creatinine levels before, 2 weeks after, and 1 month after surgery were collected. Acute renal failure was defined as a 50% rise in the serum creatinine level within the first month after orthotopic liver transplant. Patients with a partial liver transplant or those with incomplete data were excluded from the study. The recipients' mean age at the time of transplant was 29.9 ± 14.0 years, and 63.7% of the recipients (n=58) were male. The underlying causes of liver failure were cryptogenic liver cirrhosis (n=27), viral hepatitis (n=21) (hepatitis-B–related liver cirrhosis [n=13], hepatitis-C–related liver cirrhosis [n=7], and hepatitis-B– and C–related liver cirrhosis [n=1]), autoimmune hepatitis (n=18), Wilson's disease (n=10), primary sclerosing cholangitis (n=8), biliary atresia (n=3), Budd-Chiari syndrome (n=2), and primary biliary cirrhosis (n=2). All operations were performed by the same surgical team that used a simple duct-to-duct anastomosis in 74% of the patients and a Roux-en-Y choledochojejunostomy in the remaining ones. A venovenous bypass was used in 6 patients; the

piggyback technique was performed in the remainder (94%). The immunosuppressive regimen included mycophenolate mofetil (azathioprine for 10 patients), cyclosporine, and steroids. Six patients received a combination of tacrolimus and steroids.

Results

Ten patients (10.9%) experienced acute renal failure, 7 (70%) were male, and none required renal replacement therapy. The patients' clinical data are presented in Table 1. The mean age of the patients was 37.30 ± 11.20 years. The mean baseline serum creatinine level was 70.72 ± 26.22 μmol/L (range, 70.72-158.12 μmol/L). The mean peak serum creatinine level was 198.01 ± 103.42 μmol/L (range, 185.64-282.88 μmol/L). Four patients were diagnosed as having cryptogenic liver cirrhosis; 2 as having hepatitis-C–related liver cirrhosis, 2 as having autoimmune liver cirrhosis; 1 as having primary biliary cirrhosis; and 1 as having hepatitis-B–related liver cirrhosis. Six patients were Child-Pugh's classification C and the others were B. All patients received steroids for induction therapy and cyclosporine and mycophenolate mofetil thereafter. The cause of renal failure was multifactorial in most of the patients. Renal failure was treated with fluid replacement, avoiding nephrotoxic medication, decreasing cyclosporine dosages, and adjusting antibiotic dosages. All patients have recovered and survived during 6 months of follow-up.

Discussion

The prevalence of postoperative acute renal failure in our patients (10.9%) was lower than that observed in other series (12%-70%) (1-7). In our study, no patients received renal replacement therapy, and no patients died of acute renal failure. The etiology of acute renal failure is multifactorial and includes ischemic acute tubular necrosis, prerenal acute renal failure, use of potentially nephrotoxic drugs, and sepsis-associated acute renal failure (8,9,10,11). In our study, the etiology of acute renal failure was multifactorial including intraoperative blood loss, cyclosporine nephrotoxicity, massive ascites loss, use of antibiotic and antifungal medications, and gastrointestinal bleeding. Beginning cyclosporine treatment after surgery and using a lower dosage of cyclosporine, avoiding amino glycoside antibiotics, the young ages of the patients, and using the piggyback technique in 97% of the patients might have helped reduce the rate of acute renal failure and improve the outcomes in our recipients of renal transplants for acute renal failure (12).

Table 1. Clinical and paraclinical findings of postoperative acute renal failure patients.

Patients' No./age/sex	Weight	Blood group, Rh	Underlying liver disease	Duration of liver disease (years)	Child-Pugh score /MELD	Preoperative serum creatinine (μmol/L)	Serum creatinine 2 weeks after surgery (μmol/L)	Serum creatinine 1 month after surgery (μmol/L)	Outcome
1/28/f	62	A+	Cryptogenic	6	C/22	106.08	185.64	97.24	Recovery /survival
2/24/f	50	O+	Autoimmune hepatitis	5	B/15	61.88	282.88	79.56	Recovery /survival
3/26/f	72	B-	Autoimmune hepatitis	2	C/26	70.72	221	132.6	Recovery /survival
4/39/m	70	A-	Hepatitis C	1	B/17	88.4	194.48	141.44	Recovery /survival
5/42/m	49	A+	Primary biliary cirrhosis	6	C/21	106.08	212.16	141.44	Recovery /survival
6/54/m	76	A+	Hepatitis B	4	C/25	114.92	256.36	114.92	Recovery /survival
7/48/m	59	A+	Cryptogenic	6	B/14	141.44	194.48	106.08	Recovery /survival
8/47/m	74	O+	Hepatitis C	8	B/16	97.24	185.64	106.08	Recovery /survival
9/42/m	76	B+	Cryptogenic	3	B/15	106.08	203.32	106.08	Recovery /survival
10/23/m	62	A-	Cryptogenic	18	C/23	70.72	185.64	159.12	Recovery /survival

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