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Mortality in patients with potential living donor liver waiting liver transplantation

Abstract

Background: Living donor liver transplantation has the advantage of avoiding long waiting times compared to cadaveric liver transplantation with the possibility of decreasing mortality before liver transplantation.

Objective: To identify the mortality in patients with decompensated cirrhosis with potential living donors during the evaluation process for both donors and recipients before liver transplantation.

Methods: We retrospectively reviewed our records for patients with liver cirrhosis requiring liver transplantation that had a potential living donor. Data reviewed included the number of donors evaluated for each candidate and the mortality during the evaluation process related to either complication of liver disease or progression of hepatocellular carcinoma (HCC).

Results: Out of 370 liver cirrhosis patients with potential living donors for liver transplantation, 102 died (27.6%). From the 102 deaths, 79 were related to complications of liver disease and 23 deaths were related to HCC progression. The mortality increased as the number of donors evaluated increased. Mortality was 27.6% for patients with one or two donors evaluated (86 out of4=311), 37% for patients with 3 donors evaluated (13 out of 35), and 50% for patients with five or seven donors evaluated (2 out of 4). We do not have a MELD limit for living donors and patients with MELD >25 are discussed in case to case bases. The donor work up time was anywhere from 2 to 18 days (average 10 days).

Conclusion: The mortality remains high in patients with potential living donor liver transplantation, with an increase in mortality as the number of unsuitable potential donors increased. This may be explained by the time needed for completion of the donor evaluation as well as late referrals.

Keywords: transplant, liver, living donor, hepatitis

Volume 1 Issue 3 - 2014

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Received: June 18, 2014 | **Published:** August 11, 2014

Abbreviations: LDLT, living donor liver transplants; DCD, diseased cadaveric donors; PMP, per million populations; KFSH & RC, King Faisal specialist hospital and research center; UCSF, University of California, San Francisco; HCC, hepatocellular carcinoma; MELD, model for end-stage liver disease

Introduction

Liver transplantation is the best treatment option for patients with decompensated cirrhosis; however, this treatment option is limited by organ shortage leading to high mortality for patients on the liver transplant waiting list. In order to bridge the gap between the growing number of liver transplant candidates and the supply of deceased donor organs, some centers use extended criteria organs and diseased cadaveric donors (DCD), but this provides only a small number of organs. Living donor liver transplants (LDLT) are an attractive solution to providing a large number of organs, although several issues should be considered in LDLTs including donor and recipient outcome, donor safety, and cost of donor operation.

Saudi Arabia has a very low cadaveric donation rate compared to most other countries with an active cadaveric liver transplant rate of 3.1 per million populations (PMP). In 2012, the deceased donation rate ranged from as low as 0.2 PMP in Philippines to as high as 36.5 PMP in Croatia.[1] Only a few countries performed less cadaveric transplants than Saudi Arabia. On the other hand, Saudi Arabia is among the top 5 countries in the world in living donation with a rate of 22 PMP, coming only after Turkey, South Korea, Netherland and Costa Rica. The rate of living donation ranged from 0.55 PMP to as high as 43.3.[1]

The first cadaveric liver transplantation in Saudi Arabia was performed in1990 and the first LDLT was performed in 1998. Since then the number of LDLTs continues to increase and is the main source of liver transplantation.[2-8] In 2012, 146 liver transplants were performed in Saudi Arabia, of which 96 were LDLT (66%). The program at King Faisal Specialist Hospital and Research Center (KFSH&RC) has increased the number of living donor liver transplants from an average of 9 per year (92 total) from 2001-2010 to 76 during 2011-2013 (228 total), representing 75% of all liver transplantations. The advantage of living donor is avoiding the long waiting time on the liver transplant waiting list and potentially decreasing the mortality.

Patients with hepatocellular carcinoma diagnosed within Milan criteria at KFSH&RC receive 22 exceptional MELD points at the cadaveric waiting list without an increase every three months. Patients with available living donors can be transplanted if they exceed Milan criteria but remain within University of San Francisco criteria (UCSF). Patients beyond UCSF without evidence of vascular invasion can undergo a down-staging protocol and receive a liver transplant only if they are successfully down-staged. We looked at the mortality of patients evaluated for liver transplantation that had a potential living donor and evaluated the cause of death during the evaluation process of both the donors and recipients. The donor evaluation process in our center has 5 stages, the first stage (history and physical examination) is interviewing a living related donor with age between 18 to 50 with identical or compatible blood group to the recipients and a Body mass index up to 28, the interview consists of thorough medical, surgical, social, family history, and physical examination, this is followed

by the second stage (psycho-social evaluation) were the donor get evaluated by the social worker and the psychologist. The third stage consists of comprehensive laboratory test, Echocardiogram, and pulmonary function test if indicated. The fourth stage (radiological evaluation) consists of volumetric CT and MRCP for right lobe donor, remaining liver volume of 30% for the donor is acceptable then they get evaluated by the Hepatologist and the transplant surgeon. If all the above is acceptable, the fifth stage is obtaining liver biopsy for all right lobe donor. We accept living donor with Gilbert syndrome or sickle cell trait.

The number of potential donor worked up was 848. Potential living donors were worked up according to the above mentioned step-wise evaluation protocol. Those with BMI>28 were excluded. A total of 548(64.6%) donors were rejected. Most were rejected at the initial stages of evaluation. In 82 donors (9.6%) the rejection was for complicated biliary anatomy. Other anatomical reason includes insufficient liver volume in 132(15.6%) and complicated vessel anatomy in 15(1.7%). Liver biopsy excluded 94 donors (11%). Significant macrovesicular steatosis (fat more than 10%) was detected in 56 donors (60%) and was the main reason for rejection. Other causes include significant fibrotic changes in 15(16%), significant portal lymphocytic infiltrate in 13(14%), active hepatitis 3(3%), shistosomiasis in 3(3%) and other rare disorders in another 4(4%). Even after liver biopsy, few cases were canceled the same day of surgery mainly due to gross abnormality in the liver.[9]

Methods

We retrospectively reviewed our records for patients with liver cirrhosis requiring liver transplantation that had a potential living donor. Data reviewed included the number of donors evaluated for each candidate and the mortality during the evaluation process related to either complication of liver disease or progression of hepatocellular carcinoma (HCC). Patient age, gender, blood group, initial MELD score, as well as MELD score at death were also evaluated.

The patients' ages ranged from 16 to70 (average 48) and male gender comprised 56%. Blood groups were dispersed as follows: O 56%, A 24%, B 15%, AB 5%. The initial MELD scores were 9-43 (average 18), and the last MELD scores were 16-46 (average 31). The average MELD score at the time of death was above 25, most centers do not perform LDLT for recipients with MELD score above 25. We do not have a MELD limit for performing LDLT and we perform LDLT for fulminant hepatic failure.

Results

Out of 370 liver cirrhosis patients with potential living donors for liver transplantation, 102 died (27.6%). From the 102 deaths, 79 were related to hepatic decompensation and 23 deaths were related to HCC progression. Of those patients who died of hepatic decompensation, 5 patients had fulminant hepatic failure and died while waiting for cadaveric liver transplants, 35 patients died of liver failure, 21 patients died of septic shock, and one patient died of massive myocardial infarction. Seventeen patients died at their local hospital and three detailed cause of deaths are not available.

The mortality increased as the number of unsuitable living donors evaluated increased. Mortality was 27.6% for patients with one or two donors evaluated (86 out of4=311), 37% for patients with 3 donors evaluated (13 out of 35), and 50% for patients with five or seven donors evaluated (2 out of 4) but this did not reach a statistical significance (P value 0.703).

Discussion

There is no clear estimate of the number of patients that need liver transplantation annually in Saudi Arabia. In 2012, a total of 146 liver transplants were performed in Saudi Arabia at 4 centers, of which 96 were LDLT and 50 were DDLT.[8] The number of LDLT has increased dramatically since 2011, from an average of 33 LDLT annually to about 100 LDLT per year. There are still a significant number of patient deaths during the evaluation process for potential living donors. The mortality was directly related to hepatic decompensation, fulminant hepatic failure, septic shock or progression of hepatocellular carcinoma. Nearly 5% died of fulminant hepatic failure during the living donor evaluation due to length of evaluation or donor unsuitability. LDLT in fulminant hepatic failure is controversial due to the limited time for donor evaluation and concern about outcome of the recipient with high MELD scores, but it has been performed with success.[10-12] 20% of patients died due to septic shock as a complication of their disease, which is common in patients with decompensated cirrhosis. 34% died with acute on chronic liver failure. Progression of hepatocellular carcinoma included those with HCC within Milan criteria at initial presentation and those beyond Milan criteria undergoing down staging, which was the cause of mortality in 27% of this cohort. The detailed cause of death was not available for 17% of this cohort as they died at their local hospital. We do not have a MELD limit for living donor and patients with MELD >25 are discussed in case to case bases. The donor work up time was anywhere from 2 to 18 days (average 10 days). The limitations of this study consist of being retrospective, including a heterogeneous group of patients with fulminant hepatic failure, liver cirrhosis including patients with MELD score >25, and hepatocellular carcinoma.

Conclusion

In conclusion, the mortality remains high in patients with potential living donor liver transplantation, with an increase in mortality as the number of unsuitable potential donors increased. This may be explained by the time needed for completion of the donor evaluation as well as late referrals.

Acknowledgments

None.

Conflicts of interest

Authors declare that there is no conflict of interest.

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Citation: Elsiesy H, Sebayel MA, Hashim A, et al. Mortality in patients with potential living donor liver waiting liver transplantation. *Gastroenterol Hepatol Open Access.* 2014;1(3):53–55. DOI: 10.15406/ghoa.2014.01.00016