Severe Liver Fibrosis Predicts Survival After Heart Transplantation

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Abstract

Background: Hepatic dysfunction is common in patients with cardiomyopathy being evaluated for heart transplant (HT). ISHLT guidelines highlight the need for liver evaluation in patients with restrictive cardiomyopathy, congenital heart disease or chronic viral hepatitis, but do not specify a method for evaluation. We sought to examine outcomes of patients at our center undergoing liver evaluation prior to HT.

Methods: The study cohort included adult HT recipients at Cedars-Sinai Medical Center between 2010 and 2016 who underwent liver evaluation by ultrasound and/or computed tomography (n=293). Patients with abnormal imaging underwent transjugular liver biopsy (LB) when clinically indicated. Fibrosis was scored by a liver pathologist as: 0 none, 1 mild, 2 moderate and 3-4 severe. Survival was analyzed for patients undergoing HT alone (n=288) using the Kaplan-Meier method and the Cox model.

Results: Liver parenchyma was abnormal in 86 patients (29%). Imaging revealed heterogeneous parenchyma in 62 (72%) and nodular parenchyma in 24 (28%). Of these, 47 patients had LB pathology available. Pathology revealed mild fibrosis in 19, moderate fibrosis in 11 and severe fibrosis in 9. Nodular regenerative hyperplasia (NRH) was present in 19. Post-HT survival at 3 years did not differ by imaging findings (p=0.90) or by the need for LB (p=0.38). However, increasing fibrosis score predicted an increased mortality (hazard ratio 2.6, p=0.04). There was a trend towards increased mortality in patients with severe fibrosis (hazard ratio 6.3, p=0.07). Post-HT survival was not different in patients NRH.

Conclusion: Although abnormal liver imaging was common in patients being evaluated for HT, severe fibrosis was uncommon. Thus, liver imaging is not sufficient to determine the need for heart-liver transplant. Because patients with severe fibrosis experienced increased mortality, LB is an important part of the pre-HT liver evaluation. A larger study cohort is needed to confirm these findings.

Background

- Hepatic dysfunction is common in patients with cardiomyopathy being evaluated for heart transplant (HT).
- ISHLT guidelines highlight the need for liver evaluation in patients with restrictive cardiomyopathy, congenital heart disease or chronic viral hepatitis, but do not specify a method for evaluation.

Purpose

- To examine outcomes of patients at our center undergoing liver evaluation prior to heart transplant.

Methods

- The study cohort included adult HT recipients at Cedars-Sinai Medical Center between 2010 and 2016 who underwent liver evaluation by ultrasound and/or computed tomography (n=293).
- Patients with abnormal imaging underwent transjugular liver biopsy (LB) when clinically indicated.
- Fibrosis was scored by a liver pathologist as: 0 none, 1 mild, 2 moderate and 3-4 severe. Nodular regenerative hyperplasia (NRH) which is not clinically relevant was also noted.
- Patients were divided into those groups with normal, heterogeneous and nodular findings on non-invasive liver scans.
- Survival was analyzed for patients undergoing HT alone (n=288) using the Kaplan-Meier method and the Cox model.

Demographics

Demographics	Normal (n=207)	Heterogeneous (n=62)	Nodular (n=24)	P-Value
Mean Recipient Age, Years ± SD	56.8 ± 12.2	54.2 ± 13.4	57.1 ± 10.6	0.335
Mean Donor Age, Years ± SD	36.7 ± 12.8	36.4 ± 13.4	34.5 ± 14.2	0.735
Body Mass Index, Mean ± SD	24.7 ± 4.3	25.4 ± 5.0	22.9 ± 4.5	0.071
Female (%)	29.5%	38.7%	33.3%	0.855
Previous Pregnancy in Females (%)	70.7%	78.3%	75.0%	0.780
Ischemic Time, Mean Mins ± SD	160.1 ± 54.6	156.8 ± 55.6	160.5 ± 62.5	0.912
Primary Reason for Transplant, Underlying Diagnosis of Coronary Artery Disease (%)	39.6%	32.8%	33.3%	0.564
Status 1 at Transplant (%)	79.2%	80.6%	100.0%	0.047
Cytomegalovirus Mismatch (%)	27.5%	24.6%	16.7%	0.500
Diabetes Mellitus (%)	32.7%	30.6%	16.7%	0.274
Treated Hypertension (%)	53.4%	41.7%	43.5%	0.291
Insertion of Mechanical Circulatory Support Device (%)	0.0%	0.0%	0.0%	--
Prior Blood Transfusion (%)	37.0%	38.8%	57.9%	0.211
Pre-Transplant PRA ≥ 10% (%)	29.3%	30.6%	37.5%	0.706
Pre-Transplant Creatinine, Mean ± SD	1.5 ± 1.1	1.7 ± 1.6	1.3 ± 0.5	0.245
ATG Induction Therapy (%)	48.8%	62.9%	45.8%	0.125

Liver biopsy and non-invasive scan correlations

	Normal (n=207)	Heterogeneous (n=62)	Nodular (n=24)
Fibrosis score			
0	**4**	**2**	**2**
1	**4**	**9**	**6**
2	**3**	**3**	**5**
3	**1**	**2**	**2**
4	**1**	**1**	**2**
NRH	**4**	**9**	**6**

Results Summary

- Liver parenchyma was abnormal in 86 patients (29%).
- Imaging revealed heterogeneous parenchyma in 62 (72%) and nodular parenchyma in 24 (28%).
- Of these, 47 patients had LB pathology available.
- Pathology revealed mild fibrosis in 19, moderate fibrosis in 11 and severe fibrosis in 9.
- Nodular regenerative hyperplasia (NRH) was present in 19.
- Post-HT survival at 3 years did not differ by imaging findings (p=0.90) or by the need for LB (p=0.38).
- However, increasing fibrosis score predicted an increased mortality (hazard ratio 2.6, p=0.04).
- There was a trend towards increased mortality in patients with severe fibrosis (hazard ratio 6.3, p=0.07).
- Post-HT survival was not different in patients NRH.

Conclusion

- Although abnormal liver imaging was common in patients being evaluated for HT, severe fibrosis was uncommon.
- Thus, liver imaging is not sufficient to determine the need for combined heart-liver transplant.
- Because patients with severe fibrosis experienced increased mortality, LB is an important part of the pre-HT liver evaluation.
- A larger study cohort is needed to confirm these findings.

Author Disclosures

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