Short Communication

Life expectancy after liver transplantation for metabolic disease: Alpha-1-antitrypsin deficiency, Wilson’s disease, or hemochromatosis

ARTICLE INFO

Article history:
Received 18 November 2021
Accepted 5 December 2021
Available online 7 December 2021

Keywords:
Survival
OPTN
Epidemiology
Life table
Mortality

Metabolic disease is an uncommon etiology for liver transplantation, representing less than 1% of all such transplants worldwide [1]. The most frequent in this rare group are three genetic conditions: Alpha-1-Antitrypsin (AAT) Deficiency (inability to produce the AAT protein), Wilson’s Disease (a rare disorder characterized by excess copper storage), and Hemochromatosis (genetic iron overload).

Several studies have reported on life expectancy after liver transplantation for some of the more common etiologies such as HCC [2], and also for some unusual ones including primary biliary cirrhosis, primary sclerosing cholangitis, or Hepatitis B cirrhosis [3]. We here examine survival after transplant for the aforementioned three metabolic causes, and investigate whether survival in these groups has improved since 2002.

The data and methods used here are the same as those in the prior studies [2,3]. Briefly, we analyzed de-identified data from the OPTN database, which contains information on 130,665 first time, single organ liver transplants. We restricted attention to patients meeting three criteria: (1) reason for transplant as AAT (etiopathy code 4300), Wilson’s (4301), or Hemochromatosis (4302), (2) age 35 to 74 years, and (3) transplanted during the MELD era, calendar years 2002 to 2018.

Demographic and medical characteristics of the patients are given in Supplemental Table 1, and the multivariate Cox (proportional hazards regression) survival models in Supplemental Table 2. Long-term survival was similar comparing the AAT and Wilson’s cohorts (hazard ratio [HR] 0.97, \(P = 0.88\)), but was much worse in Hemochromatosis (HR = 1.67, \(P < 0.001\)). Over the 17-year study period, there was evidence of improvement in survival during the first year post transplant (HR = 0.96 per calendar year; \(P = 0.013\)). Amongst those who had already survived one year post transplant, however, and as shown in the prior studies, there was no evidence of improvement (HR = 1.03, \(P = 0.26\)).

The resulting life expectancies by age, sex, and group are shown in Table 1 below. Overall, life expectancy was much reduced from that of the general population (GP), and varied according to age, medical

<table>
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<tr>
<th>Starting Time</th>
<th>Male</th>
<th>AAT/Wilson’s</th>
<th>Hemo-chromatosis</th>
<th>GP</th>
<th>Female</th>
<th>AAT/Wilson’s</th>
<th>Hemo-chromatosis</th>
<th>GP</th>
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<td>5-yrs post</td>
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https://doi.org/10.1016/j.liver.2021.100062
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risk factors, and health status. Such information may prove helpful in medical decision-making regarding treatment for both liver disease and other medical conditions.

**Conflicts of Interest**

None.

**Supplementary materials**

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.liver.2021.100062.

**References**


## Supplemental Table 1. Patient demographics and medical risk factors (figures are column percentages)

<table>
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<tr>
<th>Variable</th>
<th>Categories</th>
<th>AAT N=1,112</th>
<th>Wilson’s N= 163</th>
<th>Hemo N= 387</th>
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<td>1</td>
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<td>80% - Normal activity with effort</td>
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<td>70% - Cares for self, but unable to carry on normal activity</td>
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<td>60% - Requires occasional assistance</td>
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<td>20 and up</td>
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<td>Portal Vein Thrombosis</td>
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<td>1.18 (0.37)</td>
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<td>Dialysis within 1 wk of tx</td>
<td>Yes</td>
<td>1.54 (0.01)</td>
<td>1.63 (0.003)</td>
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§ The univariate results are based on models with only the one stated variable. The multivariate results are based on multiple models, each of which includes terms for age, sex, race and transplant year. For example, the hazard ratios for MELD scores are based on a model with five factors. Of course the multivariate hazard ratios for age, sex, race, and transplant year each vary by model. For simplicity, the values shown here are the ones for the model with MELD score.