Utility of Modeling End-Stage Liver Disease in Children with Chronic Liver Disease

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Abstract

Introduction: Chronic liver diseases consist of wide spectrum disorders that may be complicated by cirrhosis and therefore need to transplantation. The pediatric end-stage liver disease (PELD) score and model of endstage liver disease (MELD) score has been used as predictors of mortality chronic liver diseases listed for liver transplantation. The aim of this study is evaluation of relation between PELD\MELD score and evidence of cirrhosis in children with choronic liver disease.

Materials and Method: This cross-sectional study conducted on 106 patients of chronic liver disease referred to Ghaem hospital, Mashhad university of medical science, Iran during 24 months period (2010-2013). PELD and MELD score were calculated for all patients. Clinical and patholoogical findings of cirrhosis were recorded.

Results: Mean age of patients was 68/3 ± 41.8 months. Mean PELD\MELD score was -1/59± 9/64. There was significant correlation between PELD\MELD score and clinical icter, spelenomegaly, evidence of hepatopulmonary syndrome, esophageal varices, evidence of cirrhosis in tissue specimences.

Conclusion: PELD\MELD score appear to be benefit for detection of cirrhotic children among paient with choronic liver disease.

Keywords: Chronic Liver Disease, Cirrhosis, PELD\MELD Score.

Introduction
Several prognostic parameters have been advocated for children with chronic liver diseases. The pediatric end-stage liver disease (PELD) model and model of endstage liver disease (MELD) are new models for scoring liver disease severity. PELD scores can be calculated using 5 parameters for patients less than 12 years: age, growth retardation, serum bilirubin, serum albumin and INR. MELD scores also can be calculated using 3 parameters.

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for patients younger than 12 years: serum bilirubin, serum creatinine and INR(1-6). In this study we evaluated the validity of the PELD risk scoring system as a severity index for diagnosis of cirrhosis in chronic liver disease, which is a major indication for liver transplantation in children.

Materials and Methods
This cross-sectional study was carried out among all consecutive children younger than 18 years with chronic liver disease referred to Ghaem hospital, Mashhad university of medical science, Iran during 24 months period (2010-2013). Patients with liver malignancy, concurrent hemolytic disease or protein-losing enteropathy were excluded. Demographic data, clinical signs and symptoms of cirrhosis and paraclinical findings were recorded in a checklist for all patients. PELD and MELD score were calculated with PELD\MELD calculator for patients younger and older than 12 years old retrospectively. After entering data into SPSS software version 16.0, association between demographic, clinical, and laboratory data were analyzed by \( \chi^2 \) or Fisher exact test for quantitative data and by \( t \) test or Mann-Whitney U test for qualitative data. \( P \) value <0.05 was considered significant.

Results
Between December 2010 and November 2013, 106 patients with chronic liver disease were evaluated. Mean age of patients was 68.3 ± 41.8 months. Mean PELD\MELD score was -1.59 ± 9.64 with range of -16-26. Demographic, clinical, and PELD\MELD findings of the patients are summarized in Table 1. Five variables had significant correlation with PELD\MELD score including clinical icter, splenomegaly, evidence of hepato-pulmonary syndrome, esophageal varices, evidence of cirrhosis in tissue specimens (Table 1).

### Table 1: Demographic, clinical, and PELD\MELD findings of the patients

<table>
<thead>
<tr>
<th></th>
<th>No (%)</th>
<th>PELD\MELD score (mean ± SD)</th>
<th>( P ) value</th>
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<tbody>
<tr>
<td>Sex(Female)</td>
<td>56(52.8)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Age, mean(range), month</td>
<td>68.3 ± 41.8(12-156)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Failure to trive</td>
<td>55(51.9)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Icter</td>
<td>47(44.3)</td>
<td>3.44 ± 9.21</td>
<td>0.0001</td>
</tr>
<tr>
<td>clubbing</td>
<td>21(19.8)</td>
<td>1.71 ± 7.09</td>
<td>0.07</td>
</tr>
<tr>
<td>hepatomegaly</td>
<td>78(73.6)</td>
<td>-1.19 ± 8.98</td>
<td>0.47</td>
</tr>
<tr>
<td>Splenomegaly</td>
<td>47(44.3)</td>
<td>1.25 ± 9.63</td>
<td>0.06</td>
</tr>
<tr>
<td>Encephalopathy</td>
<td>4(3.8)</td>
<td>-2.0 ± 0.0</td>
<td>0.66</td>
</tr>
<tr>
<td>Ascites</td>
<td>15(14.2)</td>
<td>0.73 ± 8.44</td>
<td>0.27</td>
</tr>
<tr>
<td>HPS*</td>
<td>8(7.5)</td>
<td>10.5 ± 8.84</td>
<td>0.004</td>
</tr>
<tr>
<td>Esophageal varices</td>
<td>13(12.3)</td>
<td>5.38 ± 12.45</td>
<td>0.005</td>
</tr>
<tr>
<td>Cirrhosis**</td>
<td>9(8.5)</td>
<td>10.66 ± 7.9</td>
<td>0.0001</td>
</tr>
</tbody>
</table>

*hepatopulmonary syndrome, **pathological evidence of cirrhosis

Discussion
Prognostic models are useful to estimate disease severity and survival as well as to make decisions regarding specific medical interventions. These models are developed using analytical methods that determine the effects on specific outcomes such as death of variables of interest eg, demographic data and laboratory values. PELD score has been proposed as an objective tool to prioritize children awaiting orthotopic liver transplantation (OLT);
a higher PELD score has been associated with increased pre-OLT mortality (7). Previous studies showed it was also associated with a higher rate of complications and mortality as reported in previous studies (7,8).

Our finding showed there were significant relation between presence of icter, splenomegaly, HPS, encephalopathy, esophageal varices and evidence of cirrhosis in biopsy specie and PELD/MELD score. These parameters are clinical and pathological evidence of cirrhosis in chronic liver disease. Also there was no significant relation between hepatomegaly and PELD/MELD score. It may be due to shirinkage of cirrhotic liver. Also there was no significant relation between clubbing and encephalopathy and PELD/MELD score. It may be due to low incidence of clubbing and encephalopathy in chronic liver disease in camparision to other findings of cirrhosis.

Jagadisan etal evaluated clinical presentation, etiology, outcome, and mortality in children with an acute hepatic insult superimposed on chronic liver disease. Children with acute on chronic liver disease (ACLD) Were divided into two groups: acute on chronic liver failure (ACLF) and non-ACLF. 17 patients with ACLF criteria and 19 with non-ACLF were inrolld. The 3-month mortality of ACLF group was significantly higher than non-ACLF group (59% vs 11%, P<0.001). PELD score of >25.5 predicted death, with sensitivity of 100% and specificity of 83.3% (9). Several studies have shown that PELD/MELD profiling is a useful scoring system that can be utilized for selecting patients with end stage liver disease(2,4,10). On the other hand some studies bring up some limitation for these scoring system, such as the effect of age, gender, and low body mass in chronic liver disease on serum creatinine level that may introduce a bias independent from severity of liver disease. For evaluation PELD/MELD score validity we sugest more studies with larger sample size and evaluation of labratory liver function tests.

**Conclusion**

It seems that evaluation of PELD/MELD score can be a useful method for screening cirrhotic children among paients with choronic liver disease.

**Acknowledgment**

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**References**

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