

## PROGNOSTICATORS OF BILIARY ATRESIA OUTCOMES IN THE NORDIC COUNTRIES - A MULTICENTER SURVEY OF 158 PATIENTS

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**Aim of the study:** To analyze predictors of biliary atresia (BA) outcomes in the Nordic countries.

**Methods:** All children with BA born in the Nordic countries (Denmark, Finland, Iceland, Norway and Sweden) between 1.1.2005 and 31.6.2016 were included. Prognosticators of normalization of serum bilirubin (<20µmol/l) and 5-year native liver and overall survival were analyzed using Chi square and t-test, Kaplan-Meier curves, log-rank test and Cox regression.

**Main results:** Of the 158 patients 4 died after withdrawal of active treatment due to severe associated anomalies. BA was type 1 in 6%, type 2 in 9% and type 3 in 82% of the patients. Any associated and splenic malformations were recorded in 28% and 11% of the patients, respectively. Six patients were primarily transplanted and 148 underwent portoenterostomy (PE) at mean age of 60±30 days. Over 92% of the patients received postoperative steroids, ursodeoxycholic acid and antibiotics. After PE serum bilirubin normalized in 64%. Patients, who normalized bilirubin were younger at PE (55±29 vs 67±31 days, p=0.027) than those who did not. After PE, 5-year native liver survival was 55% (95%CI 47-64). In addition to normalization of serum bilirubin, yearly center case load >3 and PE-age <65 days were significant predictors of 5-year native liver survival, whereas BA type or associated malformations were not (**Table**). In multivariate Cox regression normalization of serum bilirubin (HR 26, 95%CI 13-53, p<0.0001) and yearly case load >3 (HR 2.5, 95%CI 1.4-4.6, p=0.003) remained significant. 5-year overall survival was 88% (95%CI 83-94). Failure to normalize bilirubin after PE (HR 13, 95%CI 2.9-58, p=0.0007) and presence of splenic malformation (3.6, 1.2-11, p=0.026) and were predictive for mortality.

**Conclusion:** Outcomes of BA in the Nordic countries are encouraging. Increasing center experience and decreasing PE age improved native liver survival, while unsuccessful PE and splenic malformations decreased overall survival.

| Variable                   |     | 5-year native liver survival |         | univariate Cox regression |         |         |
|----------------------------|-----|------------------------------|---------|---------------------------|---------|---------|
|                            |     | (95%CI)                      | P-value | HR                        | 95%CI   | P-value |
| Normalization of bilirubin | Yes | 86 (78-94)                   | <0.0001 | 22                        | 11-43   | <0.0001 |
|                            | No  | 4.0 (0-10)                   |         |                           |         |         |
| >3 cases/year              | Yes | 66 (54-77)                   | 0.004   | 2.1                       | 1.3-3.6 | 0.004   |
|                            | No  | 44 (32-56)                   |         |                           |         |         |
| PE age <65 days            | Yes | 66 (55-78)                   | 0.005   | 2.1                       | 1.3-3.5 | 0.006   |
|                            | No  | 44 (32-56)                   |         |                           |         |         |
| BA types 1 or 2            | Yes | 66 (44-87)                   | 0.187   | 1.7                       | 0.8-3.7 | 0.193   |
|                            | No  | 53 (43-62)                   |         |                           |         |         |
| Associated malformation    | Yes | 63 (46-79)                   | 0.624   | 1.2                       | 0.6-2.2 | 0.625   |
|                            | No  | 53 (43-63)                   |         |                           |         |         |
| Splenic malformation       | Yes | 45 (18-73)                   | 0.311   | 0.7                       | 0.3-1.5 | 0.314   |
|                            | No  | 56 (47-65)                   |         |                           |         |         |

**Table.** Prognosticators of 5-year native liver survival after portoenterostomy