NHS BLOOD AND TRANSPLANT

LIVER ADVISORY GROUP

WINTON CENTRE - LIVER TRANSPLANT TOOL

INTRODUCTION

1. NHSBT have been collaborating with the Winton Centre for Risk and Evidence Communication, at the University of Cambridge, to design an online risk communication tool to aid clinicians and patients in decision-making at different points in the transplantation process, using data from the UK Transplant Registry (see Appendix for other tools that the Winton Centre have developed).
   Specifically:
     - To communicate clinically relevant and statistically significant factors which influence patient and graft outcomes following listing for transplantation.
     - To help develop patients' understanding of the risks and benefits associated with transplantation and convey possible outcomes in an understandable way to a wide variety of patients via a user-friendly interface.
     - To provide useful information to clinicians when consenting patients, using NHSBT data to ascertain modelled outcomes.

2. The tools will be organ specific, incorporating data relevant to that specific organ. Lung and kidney transplant tools are being developed initially, with the aim to be used in a clinical setting by the end of 2021. This work will then be extended to the other organs.

3. This paper summarises the analysis that is required to develop a communication tool for liver patients. The tool will require statistical models for outcomes on the liver transplant waiting list and outcomes post-transplant. For the latter, this will be based on the risk model used in the Annual Report on Liver Transplantation. For the former, work is required to develop the model, using data from the transplant registry and importantly, using data that is contemporaneous with the National Liver Offering Scheme.

COHORT AND ANALYSIS

4. The cohort will be adult and large paediatric NHS Group 1 elective patients registered on the UK deceased donor liver only transplant waiting list from 20 March 2018 to 19 March 2020. Paediatric patients not dual-listed will be excluded along with super-urgent patients, living donor liver transplants and multi-organ patients.

5. The cohort will be split into three groups based on whether the patient had cancer or variant syndrome reported at registration and analysis will initially be non-cancer patients only. The outcome will be one year following registration.

6. Cox proportional hazards regression modelling will be used to determine the factors that affect survival from listing (time to transplant, death (including removal due to condition deterioration) or removals due to other reasons). **Table 1** shows the factors that will be considered in the analysis that are either currently included in the Transplant Benefit Score or the survival on the list model in the Annual report for liver transplantation.

7. Seventy percent of the cohort will be used to develop the risk-adjusted models while the remaining 30% will be used to validate the models. In addition, factors will be checked for proportionality, and residuals assessed and the 'predictive ability' of the models will also be ascertained using various statistical methods.

ACTIONS

8. Members are asked to note this analysis and an update will be provided at the next meeting in November 2021.

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Statistics and Clinical Research

Table 1 Candidate variables for predicting outcomes on the liver waiting list
Age
Age squared
Gender
HCV
Aetiology (using Roberts grouping)
Creatinine
Bilirubin
INR
Sodium
Renal support
Inpatient status
Registration year
Ethnic group
Blood group
Graft number
Potassium
Albumin
Previous abdominal surgery
Encephalopathy grade
Diabetes
Ascites
Maximum AFP level (cancer only)
Tumour size (cancer only)
Number of tumours (cancer only)
BMI
Interactions between bilirubin and sodium
Interactions between disease group and bilirubin
Interaction between disease group and age
Interaction between age and creatinine

APPENDIX

Previous tools that the Winton centre have been involved in developing:

https://breast.predict.nhs.uk/

https://prostate.predict.nhs.uk/