

NHS BLOOD AND TRANSPLANT

BOWEL ADVISORY GROUP

REVIEW OF PUBLISHED SURVIVAL DATA ON INTESTINAL TRANSPLANT PATIENTS

INTRODUCTION

- 1 NHSBT publish annual organ specific reports containing data on transplant activity and outcomes for all UK transplant centres. These are available online here: <http://www.odt.nhs.uk/uk-transplant-registry/organ-specific-reports/>. The purpose of these reports is to inform commissioners, transplant units and the interested public and it is the aim of NHSBT to make the contents as appropriate and relevant as possible.
- 2 This paper reviews the survival information currently provided in the Annual Report on Intestinal Transplantation and suggests improvements in line with the other organ specific annual reports.

CURRENT PUBLISHED SURVIVAL DATA

- 3 Unadjusted 90 day, 1 year and 5 year patient survival rates are presented in tabular form in the adult and paediatric sections of the report, overall and by centre. **Appendix I** shows the latest results, published in September 2015. Transplants included in the analysis are those performed in the latest 10 years. The survival rates are not adjusted for factors that may affect survival, although there is a further breakdown, where possible, by liver/non-liver containing grafts.

SUGGESTED IMPROVEMENTS

Risk-adjusted survival rates

- 4 Due to higher volumes of transplants and knowledge of relevant risk factors, the other organ specific reports have shown both unadjusted and risk-adjusted centre specific survival rates since their conception. Funnel plots have been used effectively to compare risk-adjusted centre rates. Although funnel plots are not appropriate for intestinal transplantation, due to the small number of centres, evidence is emerging regarding risk factors. Recipient age, transplant type, in-hospital status and year have been shown to affect outcomes in national and international studies. Risk-adjustment for these factors has been tested in the adult cohort and the results are shown in **Table 1** alongside the unadjusted results. Note that it was not possible to do the same in the paediatric cohort since one of the paediatric centres had only one event (death) in the time period.

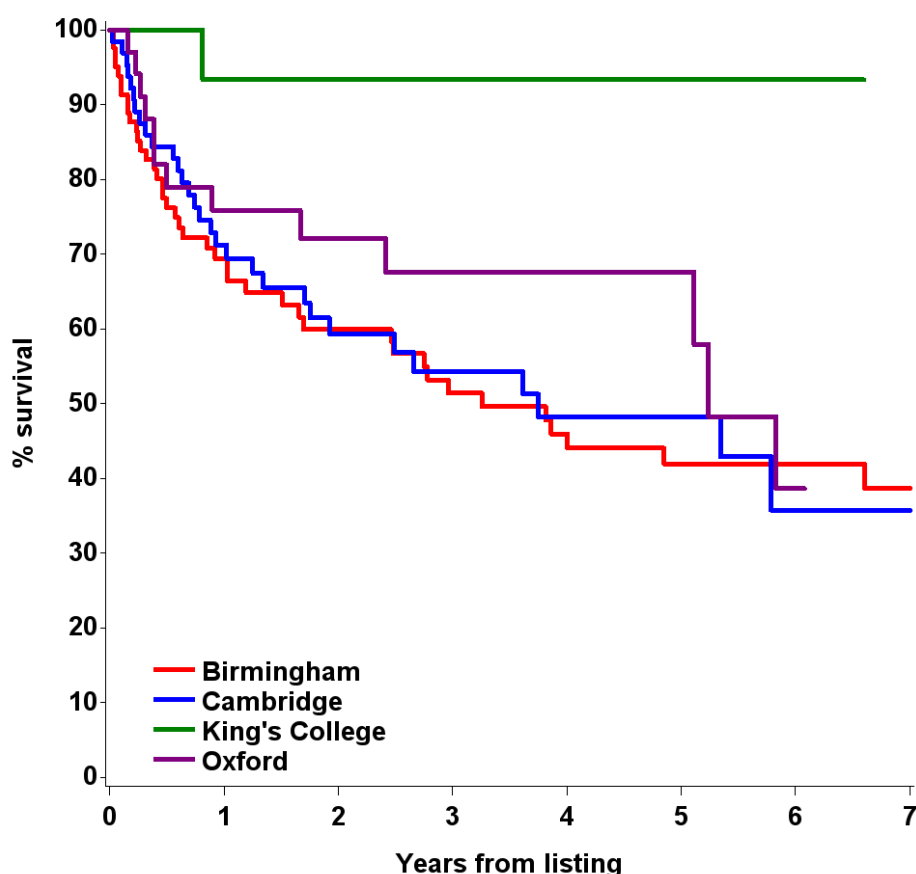
Table 1 Survival from transplant – 1 year patient survival for adult elective first intestinal transplants 1 April 2005 - 31 March 2015				
Centre	Number of transplants	1-year survival % (95% CI)		
		Unadjusted		Risk-adjusted*
Cambridge	49	77.3	(62.8 – 86.8)	81.1 (66.2 – 90.6)
Oxford	28	78.6	(58.4 – 89.8)	67.1 (28.3 – 87.9)
Total	77	77.8	(66.7 – 85.6)	

* Risk-factors: liver containing graft, recipient age, in-hospital status, transplant year

Survival from listing

- 5 As well as survival from the point of transplantation we also publish survival rates from the point of listing in the other organ specific reports. These are adjusted for risk factors recorded at the time of registering the patient with NHSBT. The rationale is that the complete care of the patient from the point of being assessed as needing a transplant is of interest.
- 6 **Figure 1** shows Kaplan-Meier survival functions for time from first intestinal transplant registration to death, regardless of whether the patient was transplanted, for each centre. Survival time was censored at either the date of removal from the list, or at the last known follow up date post-transplant when no death date was recorded, or at 9 February 2016 if the patient was on the transplant list. Note that King's College had the smallest number of registrations and only one death.

Figure 1 Unadjusted survival functions from listing for elective first intestinal transplant registrations 1 April 2005 – 31 March 2015



- 7 **Table 2** shows unadjusted and risk-adjusted survival from listing rates at 1 year for adult patients only. The risk factors used are listed in the footnote.

Table 2 Survival from listing – 1 year patient survival for adult elective first intestinal transplant registrations 1 April 2005 - 31 March 2015				
Centre	Number of registrations	1-year survival % (95% CI)		
		Unadjusted		Risk-adjusted*
Cambridge	64	71.2	(58.3 – 80.8)	77.5 (64.4 – 86.7)
Oxford	34	75.9	(57.5 – 87.2)	50.3 (2.1 – 78.5)
Total	98	72.9	(62.9 – 80.7)	
* Risk-factors: liver required, recipient age, registration year				

ACTION

- 8 In the next NHSBT Annual Report on Intestinal Transplantation members are asked to approve inclusion of:
- Risk-adjusted centre specific post-transplant survival rates where possible, based on a small number of risk factors (as per **Table 1**).
 - Unadjusted and risk-adjusted centre specific survival rates at 1 and 5 years post-listing (as per **Table 2**).
- 9 Members are welcome to suggest alternative/additional risk factors and attempts will be made to include them depending on the quality of the data.
- 10 There may be meaningful outcome measures other than patient survival that members should consider collecting on the NHSBT follow-up form to inform future comparisons.
- 11 Members should consider discontinuing or reducing the regular BAG paper entitled 'Patient survival after intestinal transplantation', which shows various Kaplan-Meier survival functions and detail on super-urgent patients, abdominal wall recipients and causes of death, given that the NHSBT Annual Report on Intestinal Transplantation provides a regular source of survival data.

Sally Rushton
Statistics and Clinical Studies

February 2016

APPENDIX I

ADULT TRANSPLANT SURVIVAL – FIRST TRANSPLANT

Survival by transplant centre

Table 3 shows the 90-day [patient survival rates](#) for adult [elective](#) first intestine transplants between 1 April 2005 and 31 March 2015, overall and by centre. Of the 77 transplants of this kind in the time period, survival information was known for 75 transplants. Of these, 87% of patients were alive at 90 days post-transplant.

Table 3 90-day patient survival (%) for adult elective first intestine transplants between 1 April 2005 and 31 March 2015, by transplant centre			
Centre	Number of transplants	90-day survival (95% CI)	
Cambridge	47	87.2	(73.5-94.5)
Oxford	28	85.7	(67.2-94.5)
TOTAL	75	86.7	(75.6-92.4)

One- and five-year patient survival rates are shown in **Table 4** and **Table 5**, respectively. At 1 year post-transplant, 78% of transplanted patients were alive, while at five years post-transplant, the overall survival rate is 52%. Lower survival rates observed at Cambridge can be accounted for by differences in types of transplants (see next section, Tables 6-8).

Table 4 One-year patient survival (%) for adult elective first intestine transplants between 1 April 2005 and 31 March 2015, by transplant centre			
Centre	Number of transplants	1-year survival (95% CI)	
Cambridge	47	77.3	(60.9-86.1)
Oxford	28	78.0	(56.7-90.3)
TOTAL	75	77.6	(65.1-86.1)

Table 5 Five-year patient survival (%) for adult elective first intestine transplants between 1 April 2005 and 31 March 2015, by transplant centre			
Centre	Number of transplants	5-year survival (95% CI)	
Cambridge	47	49.7	(27.3-67.2)
Oxford	28	62.0	(37.8-79.8)
TOTAL	75	52.0	(33.6-67.2)

Survival by transplant type

Table 6, Table 7 and **Table 8** show the 90-day, one-year and five-year patient survival rates for adult [elective](#) first intestine transplants, by centre and transplant type.

Table 6 90-day patient survival (%) for adult elective first intestine transplants between 1 April 2005 and 31 March 2015, by transplant type			
Transplant type	Number of transplants	90-day survival (95% CI)	
Cambridge			
Including liver	26	76.9	(56.7-88.2)
Not including liver	21	100	-
Oxford			
Not including liver	28	85.7	(67.2-94.5)
TOTAL	75	86.7	(75.6-92.4)

Table 7 One-year patient survival (%) for adult elective first intestine transplants between 1 April 2005 and 31 March 2015, by transplant type			
Transplant type	Number of transplants	1-year survival (95% CI)	
Cambridge			
Including liver	26	67.9	(46.2-81.9)
Not including liver	21	88.9	(63.0-96.6)
Oxford			
Not including liver	28	78.0	(56.7-90.3)
TOTAL	75	77.6	(65.1-86.1)

Table 8 Five-year patient survival (%) for adult elective first intestine transplants between 1 April 2005 and 31 March 2015, by transplant type			
Transplant type	Number of transplants	5-year survival (95% CI)	
Cambridge			
Including liver	26	26.3	(6.3-54.6)
Not including liver	21	77.8	(42.0-92.4)
Oxford			
Not including liver	28	62.0	(37.8-79.8)
TOTAL	75	52.0	(33.6-67.2)

PAEDIATRIC TRANSPLANT SURVIVAL – FIRST TRANSPLANT

Survival by transplant centre

Table 10 shows the 90-day [patient survival rates](#) for paediatric [elective](#) first intestine transplants between 1 April 2005 and 31 March 2015, overall and by centre. There were 64 transplants of this kind in the time period and survival information was known in 61 cases; of these, 93% of patients were alive 90 days post-transplant.

Table 10 90-day patient survival (%) paediatric elective first intestine transplants between 1 April 2005 and 31 March 2015, by transplant centre			
Centre	Number of transplants	90-day survival (95% CI)	
Birmingham	47	91.5	(79.8-96.6)
King's College	14	100.0	-
TOTAL	61	93.4	(84.0-96.6)

One- and five-year patient survival rates are shown in **Table 11** and **Table 12**, respectively. One year post-transplant, 85% of transplanted patients are alive while, five years post-transplant, the survival rate is 66%. Note that the number of transplants at King's College is small and survival rates for this centre must be taken only as a guide.

Table 11 One-year patient survival (%) paediatric elective first intestine transplants between 1 April 2005 and 31 March 2015, by transplant centre			
Centre	Number of transplants	1-year survival (95% CI)	
Birmingham	47	82.8	(69.3-90.3)
King's College	14	90.0	(48.3-98.7)
TOTAL	61	84.5	(71.4-92.4)

Table 12 Five-year patient survival (%) paediatric elective first intestine transplants between 1 April 2005 and 31 March 2015, by transplant centre			
Centre	Number of transplants	5-year survival (95% CI)	
Birmingham	47	60.4	(44.1-73.5)
King's College	14	90.0	(48.3-98.7)
TOTAL	61	65.5	(50.4-77.7)

Survival by transplant type

Table 13, Table 14 and Table 15 show the 90-day, one-year and five-year patient survival rates for paediatric [elective](#) first intestine transplants by transplant type. Due to the small number of transplants for some transplant types, these survival rates must be taken only as a guide.

Table 13 90-day patient survival (%) paediatric elective first intestine transplants between 1 April 2005 and 31 March 2015, by transplant type			
Transplant type	Number of transplants	90-day survival (95% CI)	
Birmingham			
Including liver	28	85.7	(67.2-94.5)
Not including liver	19	100.0	-
King's College			
Including liver	6 ¹	-	-
Not including liver	8 ¹	-	-
TOTAL	61	93.4	(84.0-96.6)

Table 14 One-year patient survival (%) paediatric elective first intestine transplants between 1 April 2005 and 31 March 2015, by transplant type			
Transplant type	Number of transplants	1-year survival (95% CI)	
Birmingham			
Including liver	28	78.3	(58.8-90.3)
Not including liver	19	89.5	(65.1-96.6)
King's College			
Including liver	6 ¹	-	-
Not including liver	8 ¹	-	-
TOTAL	61	84.5	(71.4-92.4)

Table 15 Five-year patient survival (%) paediatric elective first intestine transplants between 1 April 2005 and 31 March 2015, by transplant type			
Transplant type	Number of transplants	5-year survival (95% CI)	
Birmingham			
Including liver	28	51.9	(31.5-69.3)
Not including liver	19	73.1	(39.9-90.3)
King's College			
Including liver	6 ¹	-	-
Not including liver	8 ¹	-	-
TOTAL	61	65.5	(50.4-77.7)

¹ Survival rates for transplant types with less than 10 transplants are not presented due to small numbers.