

NHS BLOOD AND TRANSPLANT

BOWEL ADVISORY GROUP

PATIENT SURVIVAL AFTER INTESTINAL TRANSPLANT

SUMMARY

INTRODUCTION

- 1 This paper reports on patient survival following intestinal transplantation, for transplants performed in the UK over a 16 year period. The results should be regarded as guidance only due to the limited amount of data available.

DATA ANALYSIS

- 2 154 elective intestinal transplants were carried out in first time recipients in the UK between 1 January 1998 and 31 December 2013. Follow-up data were recorded on the UK Transplant Registry (UKTR) as at 24 March 2014 for 127 (82%) of these transplants.
- 3 Unadjusted survival analysis on 65 paediatric patients (aged \leq 16 years) and 62 adult patients suggests the following patient survival estimates at 90 days, one year and five years post-elective intestinal transplant: paediatric: 88%, 72% and 51%, respectively, adult: 84%, 76% and 62%, respectively.
- 4 As the total number of transplants is small it is difficult to make comparisons between transplant eras and transplant types. However, there is some evidence that the outcomes of transplants carried out in the latter part of the 16 year period are better than the outcomes of transplants carried out in the earlier years. In particular, adult patient survival at one year has improved significantly from an estimated survival of 60% between 1998 and 2009 inclusive to 85% post 2010 (log-rank test, $p = 0.05$).
- 5 There have been five super-urgent intestinal transplants performed in the UK to date. Two transplants were performed in the same patient as their first super-urgent transplant resulted in primary non-function. Two of the four patients are surviving at three months post-transplant and one is surviving at 15 months. Outcome data are not reported on the UKTR for the fourth super-urgent patient.

ACTION

- 6 Follow-up data for intestinal transplant patients can now be reported to NBSBT via ODT Online. Timely provision of three-month and annual follow-up data will aid more accurate estimation of outcomes following intestinal transplantation in the UK.

Sally Rushton
March 2014

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INTRODUCTION

- 1 This paper reports on patient survival following intestinal transplantation, for transplants performed in the UK over a 16 year period. The results should be regarded as guidance only due to the limited amount of data available.

DATA AND METHODS

- 2 154 elective intestinal transplants were carried out in first time recipients in the UK between 1 January 1998 and 31 December 2013. Follow-up data were recorded on the UKTR as at 24 March 2014 for 127 (82%) of these transplants. This analysis cohort included 65 paediatric patients (aged ≤ 16 years) and 62 adult patients.
- 3 The Kaplan-Meier estimation method was used to produce survival curves and estimates of 90 day, one year and 5 year patient survival, where the outcome event was patient death. Analyses were broken down by age group, transplant era or transplant type. The number of deaths in each group was often very small so the results should be interpreted with caution.
- 4 The log-rank test was used to make comparisons between the survival experiences of different groups of patients. The p-values from these tests are presented within the plots, however, they should be treated with caution since the small number of events means that a slight change in the number could affect the p-value considerably.
- 5 The types of intestinal transplant are categorised as:
BO Bowel Only (all those not including a liver or pancreas)
BP Bowel and Pancreas
LBP Liver, Bowel and Pancreas
MV Multivisceral (liver, bowel, pancreas and stomach/spleen/kidney/abdominal wall/colon)
MMV Modified Multivisceral (bowel, pancreas and stomach/spleen/kidney/abdominal wall/colon)
- 6 Five super-urgent intestinal transplants have been carried out in the UK to date. The outcomes of these transplants are also presented in this paper.

RESULTS

- 7 **Figure 1** shows 90 day and one year survival of paediatric and adult patients who received an elective intestinal transplant over the 16-year time period. Patient survival following intestinal transplantation was 88% and 84% at 90 days and 72% and 76% at one year post-transplant for paediatric and adult patients, respectively, although these differences were not statistically significant.

- 8 **Figure 2** shows long-term patient survival by age group. Five year survival estimates for paediatric and adult elective intestinal transplant recipients are 51% and 62%, respectively.
- 9 **Figures 3 and 4** show elective paediatric patient survival only. **Figure 3** suggests that paediatric patient survival to 90 days has improved from 83% (for transplants between 1998 and 2002 inclusive), to 92% (for transplants between 2008 and 2013 inclusive), however this result is not statistically significant.
- 10 **Figure 4** compares 90 day and one year paediatric patient survival for bowel only recipients and recipients of a liver and bowel (note that BP and MMV recipients were excluded from this analysis due to missing follow-up data). The results suggest that 90 day survival is more favourable for bowel only recipients but one year survival is more favourable for liver and bowel recipients. Again, this result is just a guide due to the small number of events and none of these differences is statistically significant.
- 11 **Figures 5 and 6** show elective adult patient survival only. **Figure 5** suggests that adult patient survival to 90 days and one year has improved for transplants performed in the latter four years of the time period. In particular, there was a borderline statistically significant improvement in one year outcomes, from 60% for transplants between 1998 and 2009 inclusive, to 85% for transplants between 2010 and 2013 inclusive (log-rank test, $p = 0.05$).
- 12 **Figure 6** suggests that adult recipients of liver and bowel transplants have a poorer, albeit non-statistically significant, survival experience to 90 days compared with recipients of non-liver containing intestinal grafts. These survival curves also suggest that for bowel only and bowel and liver recipients, death events tend to occur in the first 90 days with few or no deaths between 90 days and 1 year.
- 13 **Table 1** presents the outcomes of the five super-urgent intestinal transplants that have been carried out in the UK to date. These transplants were all carried out between November 2012 and November 2013. Two transplants were performed in the same patient, as the first transplant resulted in primary non-function.

Table 1 Outcome of super-urgent intestinal transplants, all carried out between November 2012 and November 2013 at Cambridge transplant unit

Patient number	Graft number	Month of transplant	Transplant type	Outcome
1	2	Nov-12	MV	Previous elective MV transplant failed within one month (acute vascular occlusion). Patient is alive at 15 months after super-urgent MV transplant
2	1	May-13	MV	No follow-up reported on the UKTR as at 24 March 2014
3	1	Aug-13	MV	Transplant experienced primary non-function so patient was re-registered on the super-urgent list
3	2	Aug-13	MV	Patient is alive at 3 months after second super-urgent MV transplant
4	1	Nov-13	MV	Patient is alive at 3 months after super-urgent MV transplant

SUMMARY

- 14 Outcome data recorded on the UKTR for paediatric and adult patients who received an elective intestinal transplant over a 16 year period suggest the following patient survival estimates at 90 days, one year and five years post-transplant: paediatric: 88%, 72% and 51%, respectively, adult: 84%, 76% and 62%, respectively.
- 15 The total number of transplants performed in adult patients and paediatric patients is small, making comparisons between transplant eras and transplant types difficult. However, there is some evidence that the outcomes of transplants carried out in the latter part of the 16 year period are better than the outcomes of transplants carried out in the earlier years. In particular, adult patient survival at one year has improved significantly from 60% to 85% (log-rank test, $p = 0.05$).
- 16 Outcome data were missing for 18% of the transplants carried out between 1 January 1998 and 31 December 2013.
- 17 There have been five super-urgent intestinal transplants performed in the UK to date. Two transplants were performed in the same patient, as the first transplant resulted in primary non-function. Two of the four patients are surviving at three months post-transplant and one is surviving at 15 months. Outcome data are not reported on the UKTR for the fourth super-urgent patient.

ACTION

- 18 Follow-up data for intestinal transplant patients can now be reported to NHSBT via ODT Online. Timely provision of three-month and annual follow-up data will aid more accurate estimation of outcomes following intestinal transplantation in the UK.

**Sally Rushton
Statistics and Clinical Studies**

March 2014

Figure 1 90 day and 1 year patient survival following intestinal transplantation, by age group

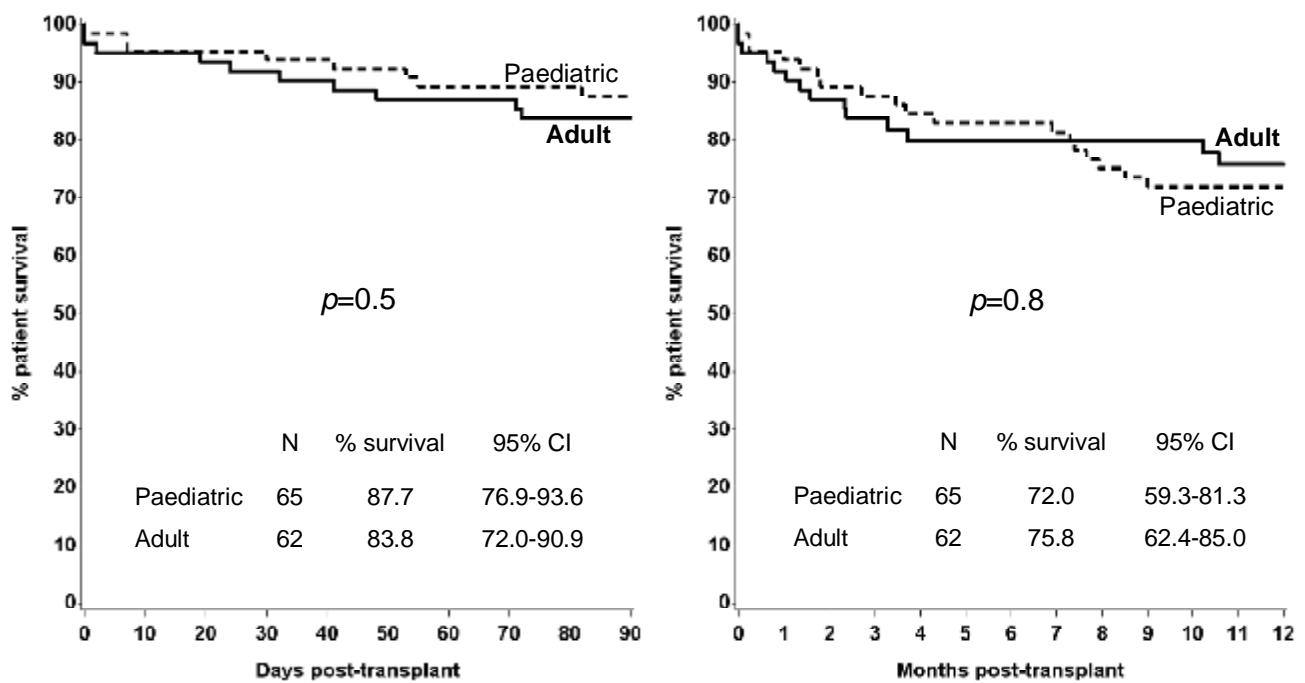
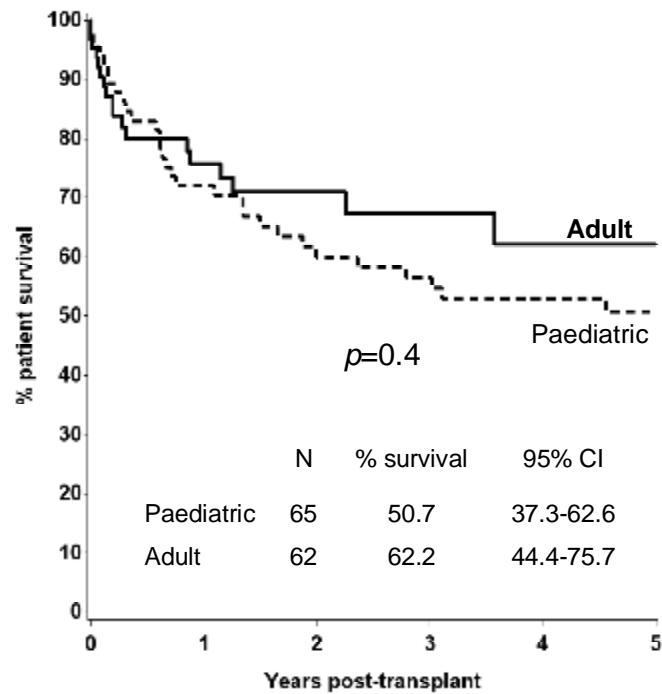
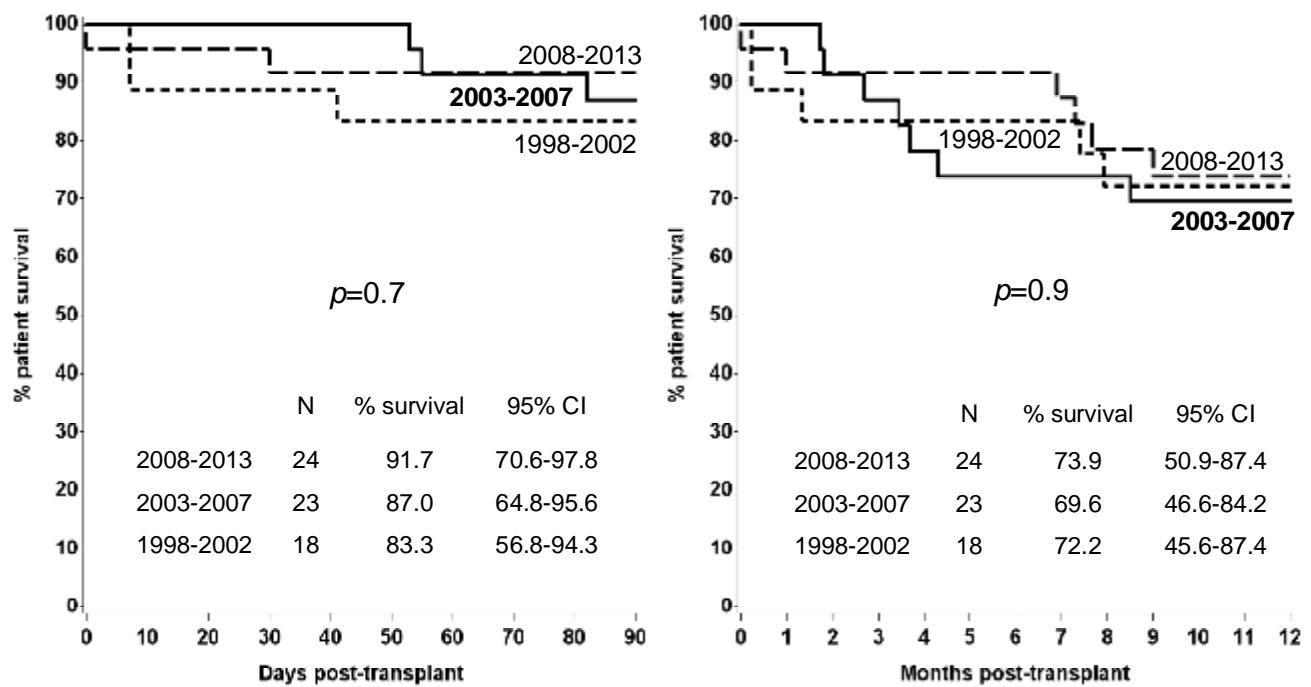
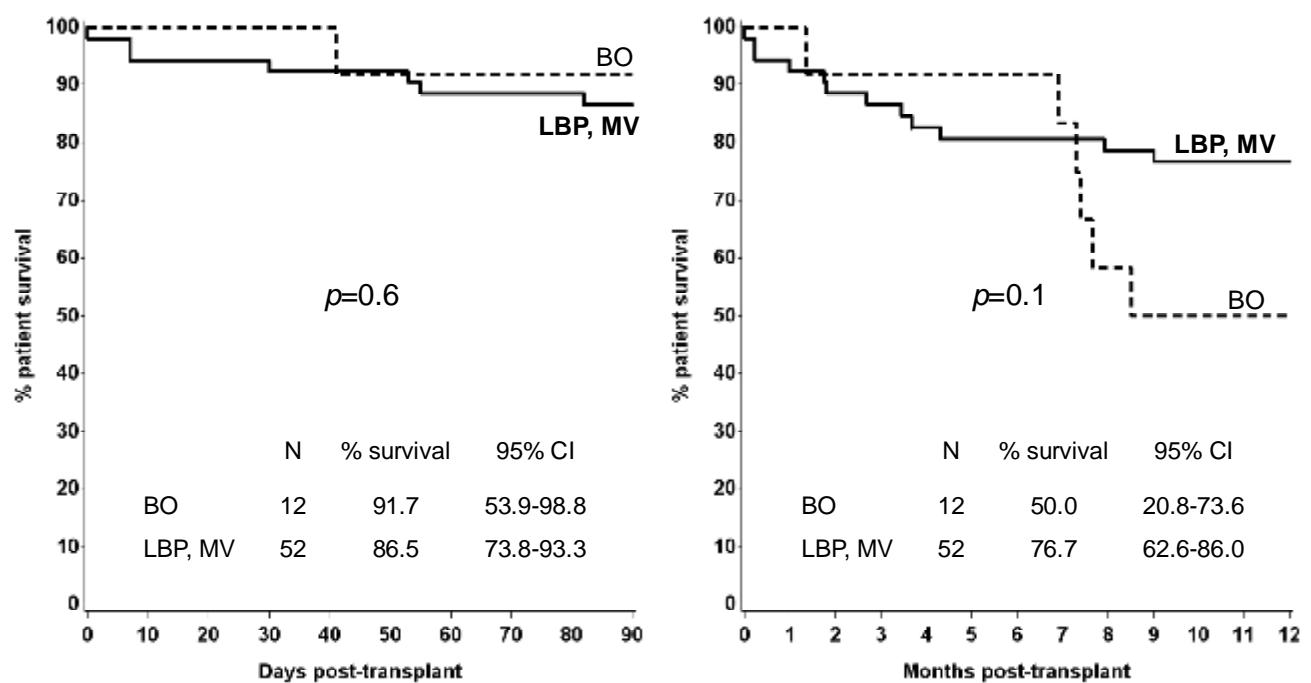


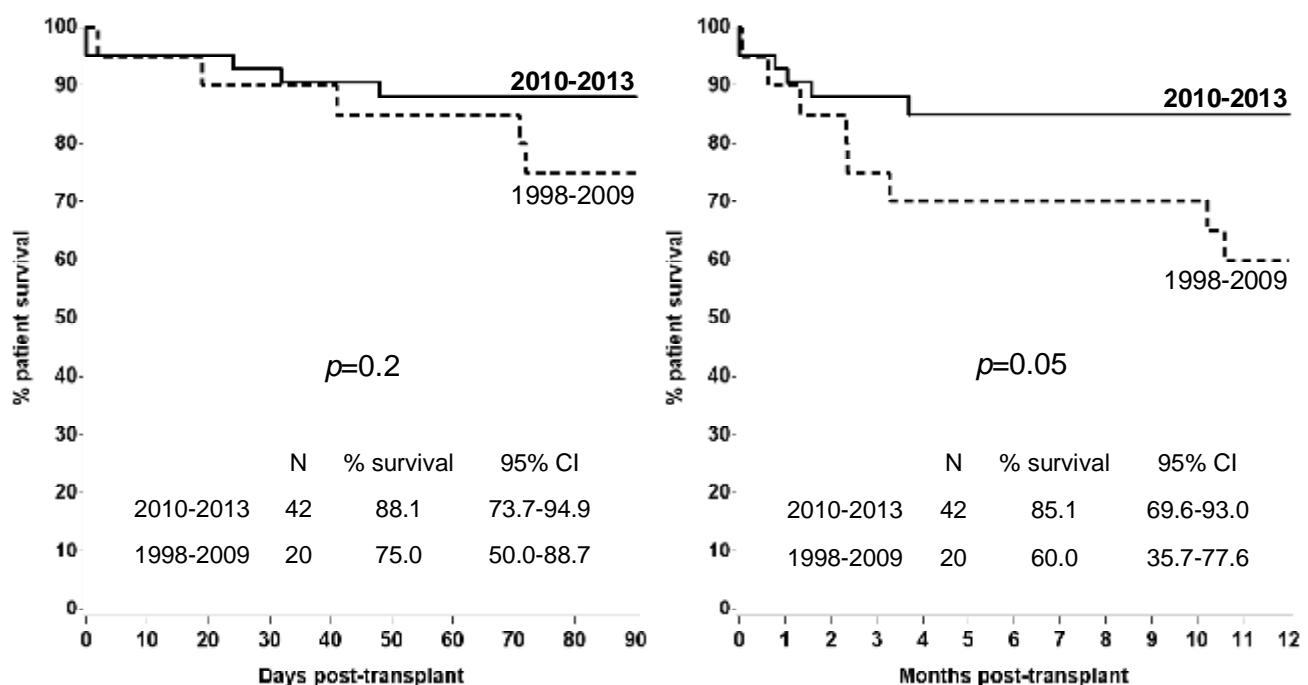
Figure 2 5 year patient survival following intestinal transplantation, by age group



PAEDIATRIC PATIENTS

Figure 3 90 day and 1 year paediatric patient survival following intestinal transplantation, by transplant era**Figure 4 90 day and 1 year paediatric patient survival following intestinal transplantation, by transplant type**

ADULT PATIENTS

Figure 5 90 day and 1 year adult patient survival following intestinal transplantation, by transplant era**Figure 6 90 day and 1 year adult patient survival following intestinal transplantation, by transplant type**