

NHS BLOOD AND TRANSPLANT

CTAG HEART ADVISORY GROUP

PILOT REPORT – HEART ISCHAEMIA TIME BY CENTRE

SUMMARY

BACKGROUND

- 1 At the CTAG Clinical Audit Group meeting on 4 February 2015, it was agreed that a pilot audit report summarising the various components of ischaemia time by centre should be presented at the Spring 2015 CTAG meeting.
- 2 It was acknowledged that in many cases, the calculation of ischaemia time using data from the National Transplant Database (NTxD) would not accurately reflect the true ischaemia time as reperfusion strategies (e.g. Ex Vivo Lung Perfusion (EVLP) and Organ Care System(OCS)) are not recorded.
- 3 The Clinical Audit Group agreed that this report should be treated as a pilot in order to illustrate how future ischaemia time audit reports could be presented and to emphasise the need for recording reperfusion strategies.

DATA ANALYSIS

- 4 Data on heart transplants performed in the UK from donors after brain death (DBD) between 1 January 2013 and 31 December 2014 were extracted separately for adult (aged ≥ 16 years) and paediatric (< 16 years) recipients. Heart-lung transplants and multi-organ transplants were excluded along with heart transplants performed from donors after circulatory death (DCD). Paediatric patients transplanted at adult only centres are included in the adult section whilst adults transplanted at Great Ormond Street were included in the paediatric section.
- 5 Results are presented, by centre, for the following time intervals:
 - (a) Total ischaemia time (cross clamp to reperfusion)
 - (b) Cross clamp to organ arrival
 - (c) Transport box to organ arrival
 - (d) Organ arrival to out of ice
 - (e) Organ arrival to reperfusion
 - (f) Out of ice to reperfusion
- 6 The median and interquartile range (IQR) is reported along with the number of observations used in the calculation and proportion of missing values.

RECOMMENDATIONS

- 7 Members are asked to comment on the value of an annual report of this nature.

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April 2015

NHS BLOOD AND TRANSPLANT
CARDIOTHORACIC ADVISORY GROUP

PILOT REPORT – HEART ISCHAEMIA TIME BY CENTRE

BACKGROUND

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- 3 The Clinical Audit Group agreed that this report should be treated as a pilot in order to illustrate how future ischaemia time audit reports could be presented and to emphasise the need for recording reperfusion strategies.

DATA ANALYSIS

- 4 Data on heart transplants performed between 1 January 2013 and 31 December 2014 were extracted separately for adult (aged ≥ 16 years) and paediatric (< 16 years) recipients. Heart-lung transplants and multi-organ transplants were excluded along with heart transplants performed from donors after circulatory death (DCD). Paediatric patients transplanted at adult only centres are included in the adult section whilst adults transplanted at Great Ormond Street Hospital are included in the paediatric section.
- 5 Results are presented, by centre, for the following time intervals:
 - (g) Total ischaemia time (cross clamp to reperfusion)
 - (h) Cross clamp to organ arrival
 - (i) Transport box to organ arrival
 - (j) Organ arrival to out of ice
 - (k) Organ arrival to reperfusion
 - (l) Out of ice to reperfusion
- 6 The median and interquartile range (IQR) is reported along with the number of observations used in the calculation and proportion of missing values.
- 7 The use of OCS, EVLP and other reperfusion systems is not recorded in NTxD. In such cases, the calculated ischaemia time (and other related time periods) may be overestimated.
- 8 To identify and exclude recording errors, negative durations and durations > 17 hours were considered as missing values.

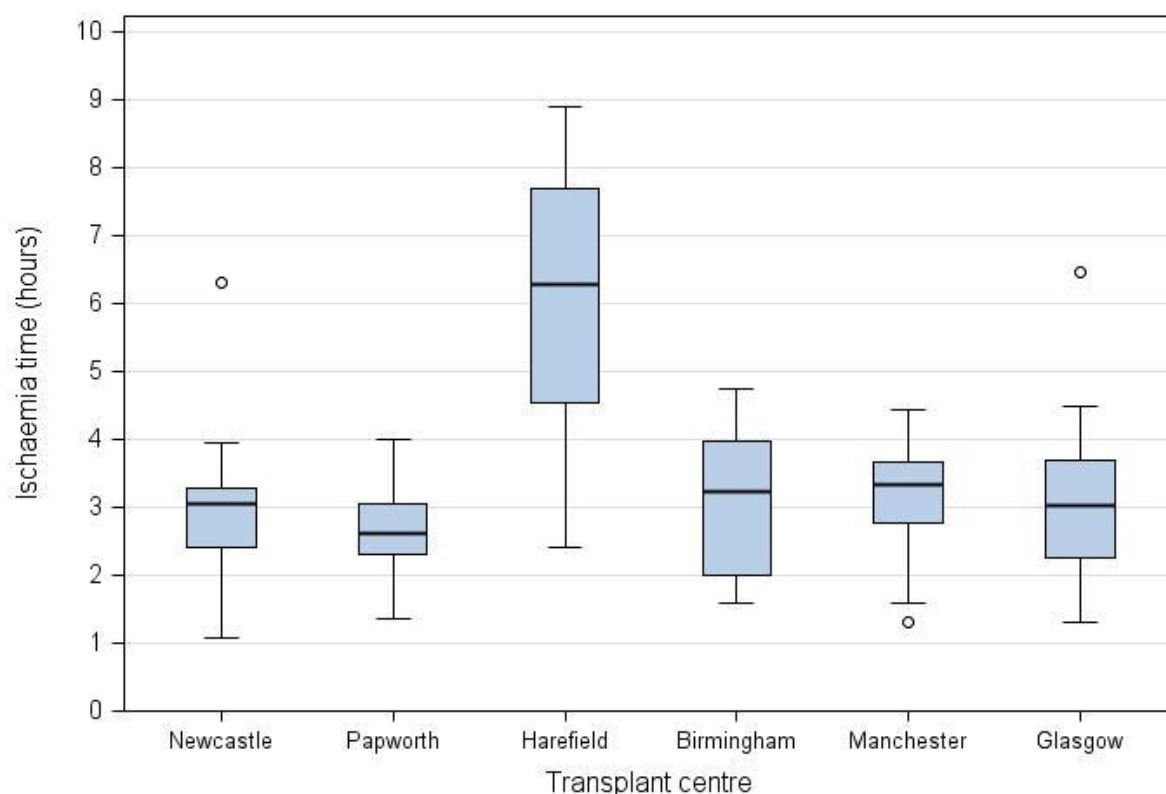
RESULTS

- 9 **Table 1** shows the median and IQR for all six time intervals outlined in paragraph 5 along with a summary of missing data. Results are presented by centre for adult DBD heart only transplants. Total ischaemia time was not calculated for the majority of heart only transplants performed at Birmingham due to the reperfusion date and time not being reported.
- 10 **Figure 1** illustrates the median total ischaemia time by centre. The box plot also shows the IQR and any data outliers for each centre. Total ischaemia times for transplants performed at Harefield were substantially longer than for all other centres. However, this analysis does not take into account the use of donor organ maintenance systems for some transplants. These enable warm blood perfusion to continue ex-vivo during transportation. For such transplants, the definition of total ischaemia time used over-estimates the true ischaemia time because the heart is not subject to ischaemia during transportation.

Table 1 Ischaemia time (hours) for adult heart-only transplants between 1 January 2013 and 31 December 2014

Centre		Total ischaemic time	Cross clamp to organ arrival	Transport box to organ arrival	Organ arrival to out of ice	Organ arrival to reperfusion	Out of ice to reperfusion
Newcastle	Median (IQR)	3.1 (2.4-3.3)	2.2 (1.4-2.6)	1.8 (1.1-2.1)	0 (0-0.1)	0.8 (0.6-1.1)	0.8 (0.6-1.0)
	No. obs	42	42	41	42	43	42
	No. missing (%)	4 (9%)	4 (9%)	5 (11%)	4 (9%)	3 (7%)	4 (9%)
Papworth	Median (IQR)	2.6 (2.3-3.1)	1.7 (1.5-2.2)	1.5 (1.1-1.9)	0 (0-0.2)	0.8 (0.7-1.0)	0.7 (0.6-0.9)
	No. obs	68	70	70	72	68	67
	No. missing (%)	5 (7%)	3 (4%)	3 (4%)	1 (1%)	5 (7%)	6 (8%)
Harefield	Median (IQR)	6.3 (4.5-7.7)	3.6 (2.9-4.8)	3.3 (2.5-4.5)	1 (0.5-2)	1.8 (1.2-3.5)	1 (0.8-1.1)
	No. obs	40	45	44	26	41	24
	No. missing (%)	12 (23%)	7 (13%)	8 (15%)	26 (50%)	11 (21%)	28 (54%)
Birmingham	Median (IQR)	3.2 (2.0-4.0)	1.8 (1.1-2.4)	1.6 (0.9-2.2)	0.1 (0-0.2)	0.9 (0.8-1.2)	0.8 (0.6-1.0)
	No. obs	8	40	39	38	8	8
	No. missing (%)	36 (82%)	4 (9%)	5 (11%)	6 (14%)	36 (82%)	36 (82%)
Manchester	Median (IQR)	3.3 (2.8-3.7)	1.9 (1.3-2.3)	1.6 (0.8-2.0)	0.1 (0-0.3)	1.4 (1.2-1.7)	1.2 (1-1.4)
	No. obs	56	56	54	51	56	52
	No. missing (%)	0 (0%)	0 (0%)	2 (4%)	5 (9%)	0 (0%)	4 (7%)
Glasgow	Median (IQR)	3 (2.3-3.7)	1.9 (1.4-2.7)	1.6 (1.1-2.1)	0.1 (0.1-0.2)	1.1 (0.8-1.2)	0.9 (0.7-1.1)
	No. obs	34	33	33	33	33	33
	No. missing (%)	0 (0%)	1 (3%)	1 (3%)	1 (3%)	1 (3%)	1 (3%)
Total	Median (IQR)	3.1 (2.4-3.8)	2 (1.5-2.6)	1.7 (1.1-2.3)	0.1 (0-0.3)	1.1 (0.8-1.4)	0.9 (0.7-1.1)
	No. obs	248	286	281	262	249	226
	No. missing (%)	57 (19%)	19 (6%)	24 (8%)	43 (14%)	56 (18%)	79 (26%)

**Figure 1 Median Total Ischaemia Time for adult heart transplants,
1 January 2013 to 31 December 2014**

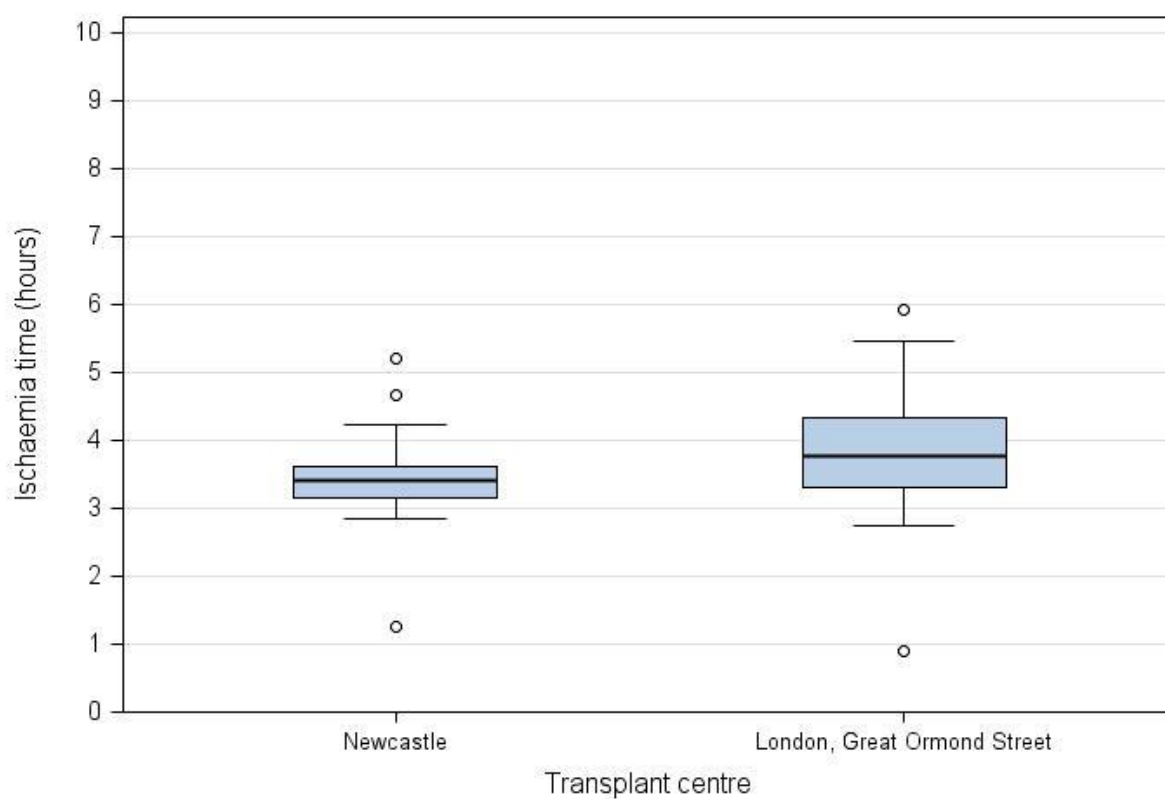


11 **Table 2** and **Figure 2** show the median and IQR for paediatric DBD heart transplants. Total ischaemia time was not calculated for a third of paediatric heart transplants. This is mainly due to the reperfusion date not being reported.

**Table 2 Ischaemia time (hours) for paediatric heart-only transplants between
1 January 2013 and 31 December 2014**

Centre		Total ischaemic time	Cross clamp to organ arrival	Transport box to organ arrival	Organ arrival to out of ice	Organ arrival to reperfusion	Out of ice to reperfusion
Newcastle	Median (IQR)	3.4 (3.2-3.6)	2.5 (2.2-2.8)	2.2 (1.9-2.7)	0 (0-0.1)	0.8 (0.7-1.0)	0.8 (0.6-0.9)
	No. obs	28	29	26	28	28	28
	No. missing (%)	4 (13%)	3 (9%)	6 (19%)	4 (13%)	4 (13%)	4 (13%)
GOSH	Median (IQR)	3.8 (3.3-4.3)	2.7 (2.1-3.3)	2.4 (1.7-2.6)	0.3 (0.1-0.4)	1 (0.9-1.8)	0.9 (0.7-1.4)
	No. obs	14	24	21	24	14	14
	No. missing (%)	17 (55%)	7 (23%)	10 (32%)	7 (23%)	17 (55%)	17 (55%)
Total	Median (IQR)	3.5 (3.2-3.9)	2.6 (2.2-3.0)	2.2 (1.9-2.7)	0.1 (0-0.3)	0.9 (0.7-1.0)	0.8 (0.6-0.9)
	No. obs	42	53	47	52	42	42
	No. missing (%)	21 (33%)	10 (16%)	16 (25%)	11 (17%)	21 (33%)	21 (33%)

**Figure 2 Median Total Ischaemia Time for paediatric heart transplants,
1 January 2013 to 31 December 2014**



RECOMMENDATIONS

- 12 Members are asked to comment on the value of an annual report of this nature.

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