

**NHS BLOOD AND TRANSPLANT
CARDIOTHORACIC ADVISORY GROUP**

PILOT REPORT – LUNG 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 lung transplants performed between 1 January 2013 and 31 December 2014 were extracted separately for DBD and DCD donors and for adult (aged ≥ 16 years) and paediatric (< 16 years) recipients. Heart-lung transplants and multi-organ transplants were excluded. Paediatric patients transplanted at adult only centres are included in the adult section whilst adults transplanted at Great Ormond Street are 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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Statistics and Clinical Studies

April 2015

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DATA ANALYSIS

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 - (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.
- 9 For bilateral lung transplants, reperfusion has been taken to be reperfusion of the second lung.

RESULTS

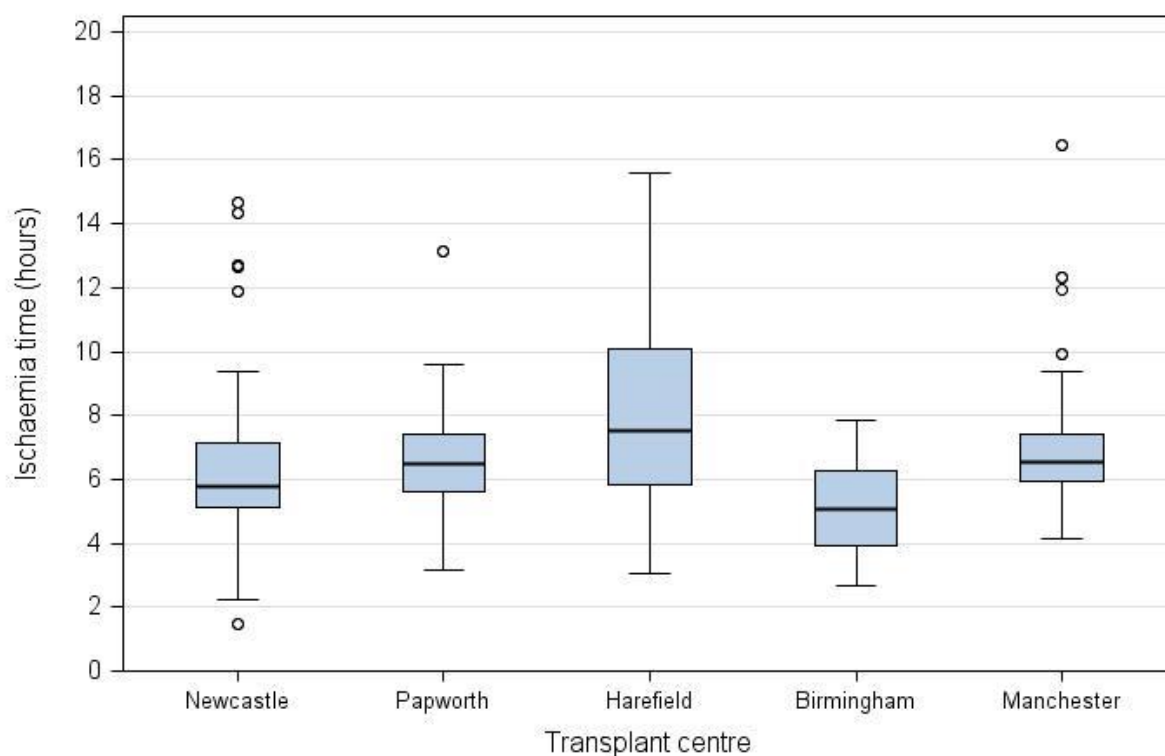
A. ADULT LUNG ONLY TRANSPLANTS

- 10 **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 lung-only transplants.
- 11 Total ischaemia time was not calculated for over 10% of the transplants performed at Harefield and Birmingham. This is mainly due to the non-reporting of reperfusion date and times.
- 12 **Figure 1** illustrates the median total ischaemia time by centre. The box plot also shows the IQR and any data outliers for each centre. The median total ischaemia times were similar across all centres. Total ischaemia times for transplants at Birmingham were, however, lower than other centres but there were fewer transplants and hence a smaller sample size.

Table 1 Ischaemia time (hours) for adult DBD lung 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) | 5.8 (5.1-7.2) | 3 (2-3.4) | 2.4 (1.5-2.8) | 0.5 (0.1-1.1) | 2.9 (2.3-3.8) | 2.2 (1.8-2.7) |
| | No. obs | 155 | 150 | 144 | 148 | 150 | 153 |
| | No. missing (%) | 10 (6%) | 15 (9%) | 21 (13%) | 17 (10%) | 15 (9%) | 12 (7%) |
| Papworth | Median (IQR) | 6.5 (5.6-7.4) | 2.5 (2-2.7) | 1.8 (1.3-2.1) | 0.2 (0-0.7) | 4 (3.3-4.9) | 3.6 (2.9-4.4) |
| | No. obs | 101 | 103 | 99 | 101 | 103 | 101 |
| | No. missing (%) | 4 (4%) | 2 (2%) | 6 (6%) | 4 (4%) | 2 (2%) | 4 (4%) |
| Harefield | Median (IQR) | 7.5 (5.8-10.1) | 2.6 (2.1-3.2) | 1.9 (1.4-2.6) | 1.6 (0.6-3.2) | 4.8 (2.9-6.9) | 2.7 (2-3.4) |
| | No. obs | 122 | 151 | 149 | 119 | 122 | 112 |
| | No. missing (%) | 35 (22%) | 6 (4%) | 8 (5%) | 38 (24%) | 35 (22%) | 45 (29%) |
| Birmingham | Median (IQR) | 5.1 (4-6.3) | 2.5 (1.9-3) | 1.9 (1.3-2.4) | 0.2 (0.1-0.5) | 2.4 (2-3.5) | 2.2 (1.9-2.9) |
| | No. obs | 54 | 60 | 58 | 61 | 55 | 55 |
| | No. missing (%) | 9 (14%) | 3 (5%) | 5 (8%) | 2 (3%) | 8 (13%) | 8 (13%) |
| Manchester | Median (IQR) | 6.5 (5.9-7.4) | 2.3 (2-2.8) | 1.6 (1.1-2.1) | 0.5 (0.3-1.3) | 4.2 (3.4-4.9) | 3.3 (2.8-3.9) |
| | No. obs | 84 | 83 | 83 | 82 | 83 | 83 |
| | No. missing (%) | 2 (2%) | 3 (3%) | 3 (3%) | 4 (5%) | 3 (3%) | 3 (3%) |
| Total | Median (IQR) | 6.3 (5.3-7.6) | 2.6 (2-3.2) | 1.9 (1.3-2.5) | 0.5 (0.1-1.4) | 3.6 (2.7-4.8) | 2.7 (2-3.5) |
| | No. obs | 516 | 547 | 533 | 511 | 513 | 504 |
| | No. missing (%) | 60 (10%) | 29 (5%) | 43 (7%) | 65 (11%) | 63 (11%) | 72 (13%) |

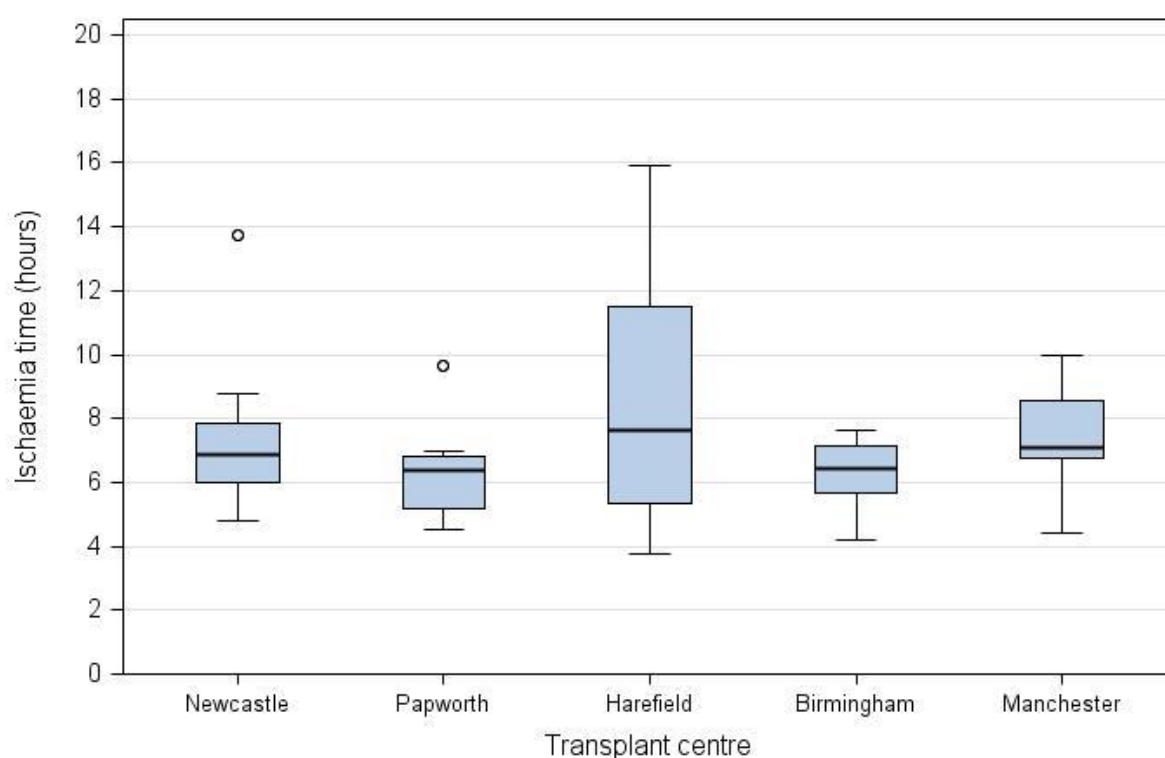
**Figure 1 Median Total Ischaemia Time for adult DBD lung transplants,
1 January 2013 to 31 December 2014**



- 13 **Table 2** and **Figure 2** show similar information for adult DCD lung transplants. Total ischaemia time was not calculated for over 15% of the transplants performed at Harefield and Birmingham. Again, this is mainly due to the non-reporting of reperfusion dates and times. The interquartile range for transplants performed at Harefield is wider than the inter quartile range for all other centres.

Table 2 Ischaemia time (hours) for adult DCD lung 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) | 6.9 (6-7.9) | 3.1 (1.7-3.4) | 2.4 (1-2.7) | 1.3 (0.4-2.6) | 4 (3.4-5.3) | 2.2 (2.1-2.5) |
| | No. obs | 31 | 31 | 31 | 33 | 29 | 29 |
| | No. missing (%) | 2 (6%) | 2 (6%) | 2 (6%) | 0 (0%) | 4 (12%) | 4 (12%) |
| Papworth | Median (IQR) | 6.4 (5.2-6.8) | 2.3 (1.7-2.4) | 1.4 (1-1.7) | 0.8 (0.4-1.7) | 4.3 (3.2-4.7) | 3.5 (2-3.9) |
| | No. obs | 20 | 20 | 20 | 20 | 20 | 20 |
| | No. missing (%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) |
| Harefield | Median (IQR) | 7.7 (5.4-11.5) | 3.1 (2.2-3.8) | 2.5 (1.7-2.9) | 0.8 (0.2-2.4) | 5.1 (2.9-8.5) | 2.9 (2.1-3.7) |
| | No. obs | 41 | 43 | 43 | 31 | 41 | 29 |
| | No. missing (%) | 8 (16%) | 6 (12%) | 6 (12%) | 18 (37%) | 8 (16%) | 20 (41%) |
| Birmingham | Median (IQR) | 6.5 (5.7-7.1) | 2.9 (2.6-4) | 2.3 (2-3.5) | 1.2 (0-1.4) | 3.6 (3.2-4.3) | 2.6 (2-2.8) |
| | No. obs | 10 | 14 | 12 | 12 | 8 | 10 |
| | No. missing (%) | 4 (29%) | 0 (0%) | 2 (14%) | 2 (14%) | 6 (43%) | 4 (29%) |
| Manchester | Median (IQR) | 7.1 (6.7-8.6) | 2.8 (2.4-3.2) | 1.6 (1.3-2.6) | 1.6 (0.6-1.9) | 4.8 (4.7-5.4) | 3.8 (2.6-4.1) |
| | No. obs | 9 | 9 | 9 | 9 | 9 | 9 |
| | No. missing (%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) |
| Total | Median (IQR) | 6.7 (5.7-8.6) | 2.9 (2.2-3.4) | 2.2 (1.4-2.8) | 1.2 (0.4-1.9) | 4.4 (3.2-5.9) | 2.6 (2-3.7) |
| | No. obs | 111 | 117 | 115 | 105 | 107 | 97 |
| | No. missing (%) | 14 (11%) | 8 (6%) | 10 (8%) | 20 (16%) | 18 (14%) | 28 (22%) |

Figure 2 Median Total Ischaemia Time for adult DCD lung transplants between 1 January 2013 to 31 December 2014

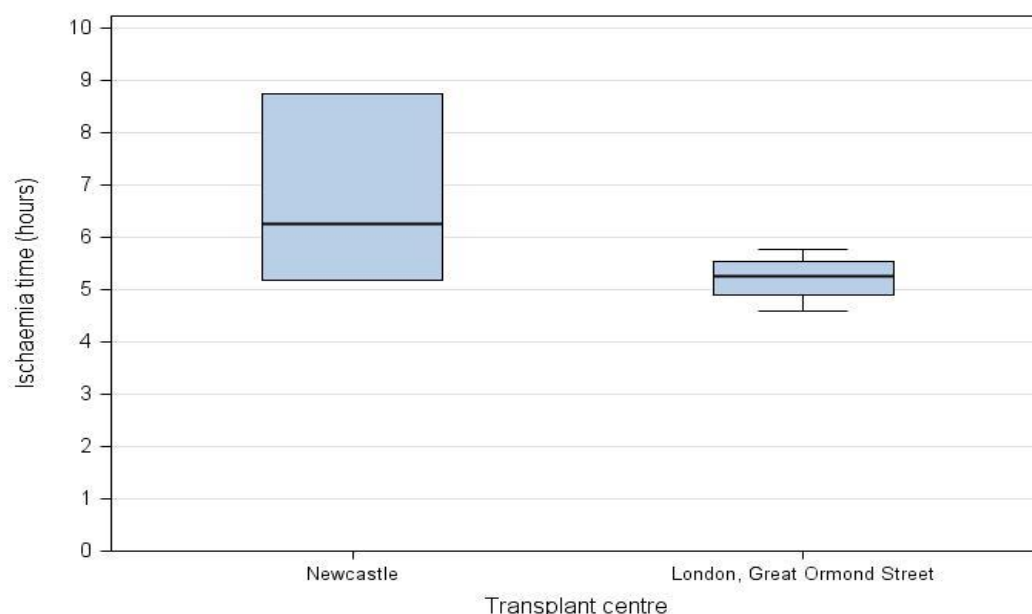
B. PAEDIATRIC LUNG ONLY TRANSPLANTS

- 14 **Table 3** and **Figure 3** show similar information for paediatric DBD lung transplants. Total ischaemia time was not calculated for 50% of the transplants performed at GOSH due to the non-reporting of all variables.

Table 3 Ischaemia time (hours) for paediatric DBD lung 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) | 6.3 (5.2-8.8) | 2.8 (2.3-2.8) | 2.3 (1.9-2.3) | 2.7 (0.4-2.9) | 4 (2.4-6) | 2 (1.3-3.1) |
| | No. obs | 6 | 6 | 6 | 6 | 6 | 6 |
| | No. missing (%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) |
| GOSH | Median (IQR) | 5.3 (4.9-5.5) | 3.3 (3.2-3.6) | 3 (2.8-3.2) | 0.2 (0-0.4) | 2 (1.4-2.3) | 1.8 (0.8-2.2) |
| | No. obs | 8 | 8 | 6 | 6 | 8 | 6 |
| | No. missing (%) | 8 (50%) | 8 (50%) | 10 (63%) | 10 (63%) | 8 (50%) | 10 (63%) |
| Total | Median (IQR) | 5.3 (5.2-6.3) | 3.2 (2.8-3.4) | 2.6 (2.3-3) | 0.4 (0.2-2.7) | 2.4 (2-4) | 1.9 (1.3-2.2) |
| | No. obs | 14 | 14 | 12 | 12 | 14 | 12 |
| | No. missing (%) | 8 (36%) | 8 (36%) | 10 (45%) | 10 (45%) | 8 (36%) | 10 (45%) |

Figure 3 Median Total Ischaemia Time for paediatric DBD lung transplants, 1 January 2013 to 31 December 2014



- 15 Information for paediatric DCD transplants are not presented due to small numbers.

RECOMMENDATIONS

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

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