

THE CAUSES AND EFFECTS OF PROLONGED KIDNEY COLD STORAGE TIME – A SINGLE CENTRE PROSPECTIVE AUDIT.

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Problem: Prolonged cold storage (CS) of adult, heart-beating deceased donor kidneys is an established significant risk factor for delayed function, acute rejection and reduced three-month graft survival. Data from UK Transplant [RTSM(04)1] showed a median CS of 19 hours (IQ range 16-23h) for all centres in 2002/03 whilst the median CS in this centre was also 19 hours but the IQ range was 16-25h. The UK T data also showed that three-month survival was reduced by 9% for kidneys transplanted >29h compared with kidneys transplanted after <20h indicating that each month in the UK one kidney transplant fails due to prolonged CS (RR 1.9).

Purpose: A prospective audit of adult, heart-beating deceased donor kidney transplants between Jan 2003 and June 2004 to initiate changes in practice to reduce CS.

Design: Data was collected from 145 consecutive medical notes and from UK T and we established a local database which was interrogated using SPSS. The following events were used to set time cohorts: cross-clamp of donor vessels, offer by UK T, offer accepted, arrival at unit, cross-match report, anaesthesia induction, start of surgery, kidney removed from ice and reperfusion. Free-text “reason codes” recorded causes of delays at each stage. Outcomes were measured by delayed function, serum creatinine and transplant survival at 3/12.

Findings:

Total CS (h)	No. Patients	3 month Creatinine (Mean)	3 month graft loss rate (%)	Delayed Graft Function (%)
<20	85	157	4.5	16.5 ^a
20-24	22	149	4.5	13.6 ^b
>24	38	158	7.9	23.7 ^c
	145	not sig	not sig	p =0.28^{a+b vs c}

Data was split into three six month periods. The third period had a median of 19 hours. There was an increase in the proportion of transplants done within 19 hours over the period of the audit from 21 to 28 transplants ($\uparrow 3\%$). The only time interval which correlated with prolonged CS was the interval of waiting for access to theatre following reporting of the cross match result (linear association, $R=0.69$).

Conclusion: This audit confirms that prolonged CS increases the incidence of delayed graft function and the incidence of 3 month graft loss. The primary cause of prolonged CS is the interval of waiting for access to theatre following reporting of the cross match result. This is a modifiable factor. The number of kidneys transplanted below the median CS increased during the audit.

Relevance: CS is now established as a modifiable and highly influential variable on outcome after kidney transplantation. This prospective audit will influence future practice by supporting the evidence base case for improved access to local operating theatres. Long term outcome will be monitored to establish the effect of prolonged CS.