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# Flow cytometric crossmatching and outcome one year after renal transplantation

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Previous studies have shown that flow cytometric crossmatch assays can identify an at risk population in renal transplantation [1–5]. We used the assay for recipient selection for 1 year. Recipients with donor T cell directed IgG were excluded from transplantation and those with B cell directed IgG were treated with increased immunosuppression. The transplants performed over this period ($n = 126$) were compared with an earlier series ($n = 118$) in which flow cytometric crossmatch results did not influence patient management. The results were evaluated for mortality and graft outcome at 3 months and 1 year. In addition, postoperative complications and duration of hospital stay were also assessed.

**Key words:** Flow cytometric crossmatching – Renal transplantation – Recipient selection

## Method

This has been described previously [6] and consisted essentially of incubating aliquots of $10^5$ donor lymphocytes with recipient sera. After 15 min at 37 °C the cells were washed and then incubated with a combination of anti-IgG conjugated with fluorescein (Seratec) and either antileu 4 (T) or antileu 16 (B) conjugated with phycoerythrin (Becton Dickinson). After 15 min at 4 °C the cells were washed and analysed in a Facscan (Becton Dickinson). The intensity of 530 nm fluorescence of the 575 nm positive cells was compared with the fluorescence of standard ABO sera as control. When the fluorescence of the test serum was greater than 2 standard deviations of the control it was considered positive.

## Results

The current group was compared with the previous series for risk factors. Both groups were found to be identical for A/B match, ischaemic times, previous transplant history, panel reactivity, age, sex, and immunosuppressive regimes. The current series was found to have an improved DR match in comparison to the retrospective series. The results at 3 months are summarised in Table 1. They showed a reduced complication rate with shorter primary non-function, fewer clinical rejection episodes and a shorter hospital stay. The mortality rate was similar between the groups but the graft success at 3 months was significantly higher in the current group using chi-square (94% versus 84.7%).

The effect of DR matching on the results at 1 year are shown in Fig. 1. The notable feature of this graph is that for each DR type, the graft success rate was better in the current series. This only reaches significant proportions in the DR 1 group using the Mantel Haenszel test ($P < 0.001$). The results at 1 year revealed a graft survival of 91.4% in the current group as opposed to 82.9% in the previous series, mortality excluded. This difference was significant if the graft survival curves were evaluated using the Mantel Haenszel test ($P < 0.001$) and was not lost if recipient mortality was also included.

## Discussion

The different emphasis of DR match in the two groups illustrates the shortcomings of a retrospective control series as opposed to a prospective one. Both improved DR

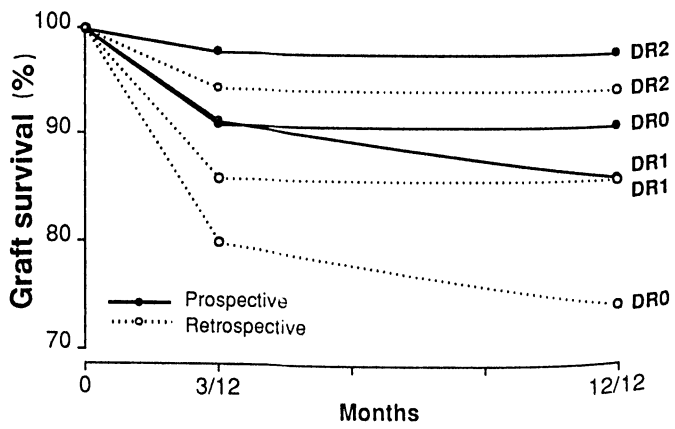


**Fig. 1.** Graft survival up to 1 year

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**Table 1.** Results from retrospective and current series

| Variable | Retrospective $n = 118$ | Prospective $n = 126$ | Probability |
|---|---|---|---|
| DR locus match | 0.83 (1sd = 0.73) | 1.32 (1sd = 0.63) | $P < 0.0001$ Mann Whitney U |
| FACS antibody (total)/% | 22.0 | 13.4 | NS |
| FACS antibody (T)/% | 17.8 | 1.6 | $P < 0.00001$ Fisher |
| Primary non function/days | 12.6 (1sd = 20.6) | 5.0 (1sd = 12.7) | $P < 0.0001$ Mann Whitney U |
| Rejection episodes | 1.78 (1sd = 0.81) | 1.05 (1sd = 0.99) | $P < 0.0001$ Mann Whitney U |
| Immunosuppression (types) | 2.85 (1sd = 0.85) | 2.91 (1sd = 0.98) | NS |
| ATG/OKT3/% | 13.6 | 22.2 | NS |
| Hospital stay/days | 31.7 (1sd = 18.8) | 17.6 (1sd = 7.6) | $P < 0.0001$ Student $t$ test |
| 3/12 Creatinine/μmol/l | 154.8 (1sd = 57.6) | 163.7 (1sd = 73.8) | NS |
| Death/% | 5.1 | 5.6 | NS |
| Failure/% (3 months) | 15.3 | 6.0 | $P = 0.037$ chi-square |
| Failure/% (1 year) | 17.1 | 8.6 | $P = 0.08$ chi-square |

NS = Not significant

matching [7] and flow cytometric crossmatching are known to influence outcome and therefore both should be considered responsible for the excellent results.

In summary the current series of renal transplants had fewer complications and improved graft survival. Consequently the policy of improved DR matching and avoidance of positive T cell flow cytometric combinations is to be continued. In addition the use of increased immunosuppression for B cell flow cytometric combinations may also be advisable and will be evaluated further.

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## References

1. Garavoy MR, Rheinschmidt MA, Bigos M, et al. (1983) Transplant Proc 15: 1939
2. Thistlethwaite JR, Buckingham BS, Stuart JK, et al. (1986) Transplant Proc 18: 676
3. Cook DJ, Terasaki PI, Iwaki Y, et al. (1987) Clin Transplant 1: 253
4. Talbot D, Givan AL, Shenton BK, et al. (1989) Transplantation 47: 552
5. Talbot D, Givan AL, Shenton BK, et al. (1990) Transplantation 49: 809
6. Talbot D, Givan AL, Shenton B, et al. (1988) J Immunol Methods 112: 279
7. Thorogood J, van Houwelingen JC, van Rood JJ, et al. (1989) Transplantation 48: 231