

## Determinants of Effectiveness of Thoracic Duct Drainage for Primary Cadaver Kidney Transplantation

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**I**N PREVIOUS publications,<sup>1,2</sup> it was suggested that thoracic duct drainage (TDD) should be used for at least 28 days before renal transplantation in order to achieve the maximum benefit of this lymphoid-depleting procedure. Further experience has reinforced this conclusion. The lines of evidence are as follows.

### KIDNEY AND PATIENT SURVIVAL

In Fig. 1 are shown the kidney survival curves in primary cadaveric recipients who were treated with: (1) azathioprine and prednisone to which an ineffective ALG was often added; (2) the same, but with TDD starting on the day of transplantation; (3) the same, with TDD treatment prior to transplantation for 17–27 days; and (4) the same, with TDD pretreatment 28 days or more.

Kidney survival was better in all TDD groups than in patients treated with conventional immunosuppression alone. The best results were achieved with pretreatment of  $\geq 28$  days (Fig. 1). The 22 patients who were pretreated  $\geq 28$  days had only a single rejection (4.5%) in the first 3 months.

The actual as well as actuarial patient

mortality was not greater in the TDD series than in the retrospective controls, and indeed it was slightly less (Fig. 2).

### HUMORAL ANTIBODIES AFTER TRANSPLANTATION

Warm anti-T and/or anti-B-lymphocyte antibodies<sup>3</sup> in response to transplantation were measured in 19 patients who were pretreated for 16–27 days and in the 22

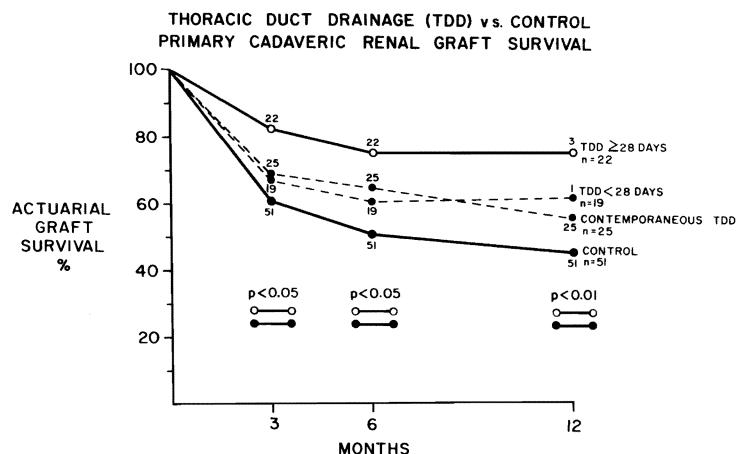
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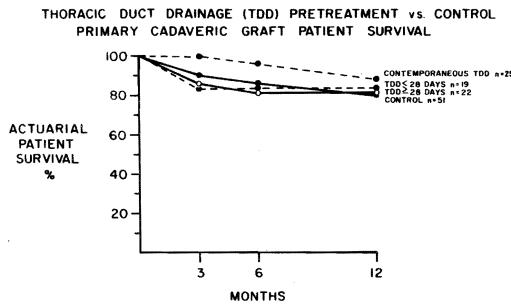
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**Fig. 1.** One-year actuarial graft survival. TDD pretreatment for 28 days or more significantly differs from controls at 3, 6, and 12 months. TDD pretreatment of less than 28 days and contemporaneous TDD do not differ from controls. The control group consists of 51 consecutive retrospective controls.



**Fig. 2.** Side effects from TDD include occasional bacteremia, chylothorax, and rarely wound infection. However, TDD does not affect the mortality.

patients who had TDD for 28 days or more before transplantation. Compared to recipients with TDD pretreatment  $\geq 28$  days, patients with shorter periods of preparation were still draining large numbers of lymphocytes in the last 5 days preceding transplantation, retained a strong capability to produce

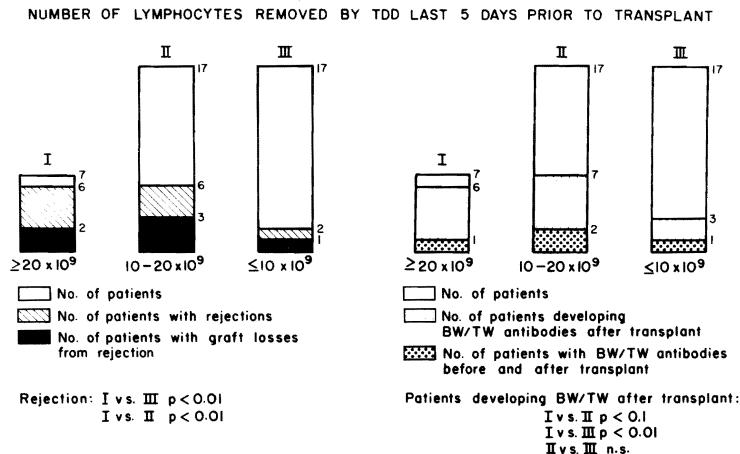
warm antibodies, and had a high incidence of rejection (Fig. 3).

### CONCLUSION

The foregoing results explained why the primary cadaveric kidneys survived at such a high rate in patients conditioned by TDD for 4 weeks or longer. The immunodepressive effect of TDD was not fully established until the full 4 weeks. The same conclusion about the time curves of TDD effectiveness has been reached by Machleider and Paulus<sup>4</sup> by immunologic tests in patients being treated for autoimmune diseases.

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**Fig. 3.** The incidence of rejection and graft losses from rejection within 3 months after transplantation in group I, characterized by the largest number of lymphocytes still being present in the last 5 days before transplantation; 6/7 patients experienced rejection and 2 grafts were lost. In group II, characterized by removal of intermediate numbers of lymphocytes in this pretransplantation period, 6/17 patients had rejections and 3 grafts were lost. In group III, characterized by the least number of residual lymphocytes, only 2/17 patients experienced rejections and only 1 graft was lost. The incidence of rejection within 3 months between groups I and III and between groups I and II differs significantly ( $p < 0.01$ ). In group I, one patient had antibodies before and 6 developed antibodies after transplantation. In group II, 2 patients had antibodies before and 7 developed antibodies after transplantation. In group III, one patient had antibodies before and 3 developed antibodies after transplantation. The ability to form B-warm and/or T-warm antibodies between groups I and II is not quite significant ( $p < 0.1$ ); but between groups I and III a significance exists ( $p < 0.01$ ). There is no statistically significant difference between groups II and III. BW, warm anti-B-lymphocyte antibodies; TW, warm anti-T-lymphocyte antibodies.