DEVELOPMENTS IN SURGERY

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edited by
G. M. ABOUNA
M. S. A. KUMAR (*Associate Editor*)
and
A. G. WHITE (*Associate Editor*)

Department of Organ Transplantation
Kuwait University
Kuwait City, Kuwait

and

The Division of Transplantation
Department of Surgery
Hahnemann University
Philadelphia, PA. U.S.A.

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48. Early observation in pancreas transplantation using the bladder drainage procedure

W.D. ILLNER, D. ABENDROTH, H. SCHNEEBERGER, S. SCHLEIBNER, M. STANGL, J. THEODORAKIS, R. LANDGRAF and W. LAND

Improved results in pancreas transplantation using the whole organ and a duodenal segment for diversion of exocrine secretion (1, 2) led to the introduction of this technique at the Munich Transplant Centre, too. This technique permits monitoring of the pancreatic exocrine secretion in the urine. There is accumulating suggestion that reduction in urine amylase activity might be an early marker of pancreatic allograft rejection. As an extension to our experience with the duct-occlusion technique we started a controlled study comparing both surgical techniques.

Patients and methods

So far 91 combined pancreas and kidney transplantation and 7 isolated pancreas transplantations have been performed using prolamine for duct occlusion. The bladder drainage technique was used in 16 diabetics, 11 simultaneously and 5 pancreas alone. Clinical results of our experience with the duct-occlusion technique have been published elsewhere (3).

Donor and recipient operation

The whole pancreas with spleen and a short duodenal segment is removed from the donor after complete *in situ* flushing using UW solution. In 4/16 organ procurements we harvested the whole pancreas together with the liver for grafting. Priority of vascular supply was given to the liver, consisting of the celiac axis plus an aortic patch and the portal vein. The whole pancreas graft includes the splenic artery, divided just distal to its origin on the celiac axis, superior mesenteric artery with an aortic patch and the remaining portal vein plus the superior mesenteric vein. After the Kocher maneuver a short duodenal segment is provided using a GIA stapler. The combined removal of liver and whole pancreas requires an arterial and venous reconstruction for the pancreatico- duodenal graft with the donor iliac vessels (4). The pancreatico-

duodenal graft is placed intraperitoneally along the ascending colon with a transrectal incision. Arterial and venous anastomoses were carried out between the reconstruction pancreatic vessels and the recipient's external iliac vessels. For the bladder-duodenal anastomosis we use the two layer side-to-side technique (inner layer: running: 3/0 Vicryl and outer layer: interrupted 3/0 Vicryl).

Immunosuppressive protocol

Since 1984 a quadruple drug induction therapy is routinely used in pancreatic transplantation. It consists of CsA, Aza 'high' dose of steriods and ATG/ALG for a short period of time. Maintenance treatment consists of steriods, CsA and Aza for a period of 6 months, followed by double drug maintenance treatment with CsA and Aza.

More recently we have used a quadruple drug induction therapy with CsA, Aza, 'high' dose of steriods and ATG or OKT3 in a controlled study. The preliminary results were presented in Barcelona (5).

Problems and complications according to different surgical techniques

Using the duct-occlusion technique we are confronted with two major problems. Firstly, the occurrence of a primary irreversible venous thrombosis. Secondly, the development of a pancreatic fistula with the high risk of a secondary infection. The rate of this complication is shown in Table 1. The need of an anticoagulation therapy is required.

Despite of duct-occlusion with prolamine the residual exocrine secretion remains unsolved at the present time.

According to the new technique our clinical results show a hight incidence of intraparanchymal graft abscesses with subsequent loss of the pancreatic graft

Table 1. Early complications after stimultaneous pancreas and kidney transplantation.

Surgical technique	Venous thrombosis	Local infection		Pancreatic fistula
		Intragraft	Perigraft	
Dust occlusion ($n = 59$)	15% ($n = 9$)	0	20% ($n = 12$)	20% ($n = 12$)
Bladder drainage ($n = 11$)	0	36% ($n = 4$)	18% ($n = 2$)	0

(Table 1). This complication is very common in association with an urinary tract infection.

Results

Patients and graft survival probability rates for 1 year are comparable in both groups (Figures 1 and 2). Long-term results are demonstrable for the duct occlusion technique only (Figure 3).

Summary

Mortality and morbidity rates after pancreas transplantation are low and comparable in both groups talking into account that the number of patients transplanted using the bladder technique is still low and the observation period limited. The 1-year pancreas graft function rate is 60% in both groups. The early phase post-transplant using the duct obliteration in a segmental allograft bears the risk of an irreversible venous thrombosis and the development of a pancreatic fistula with subsequent graft loss. As a consequence of prolamine,

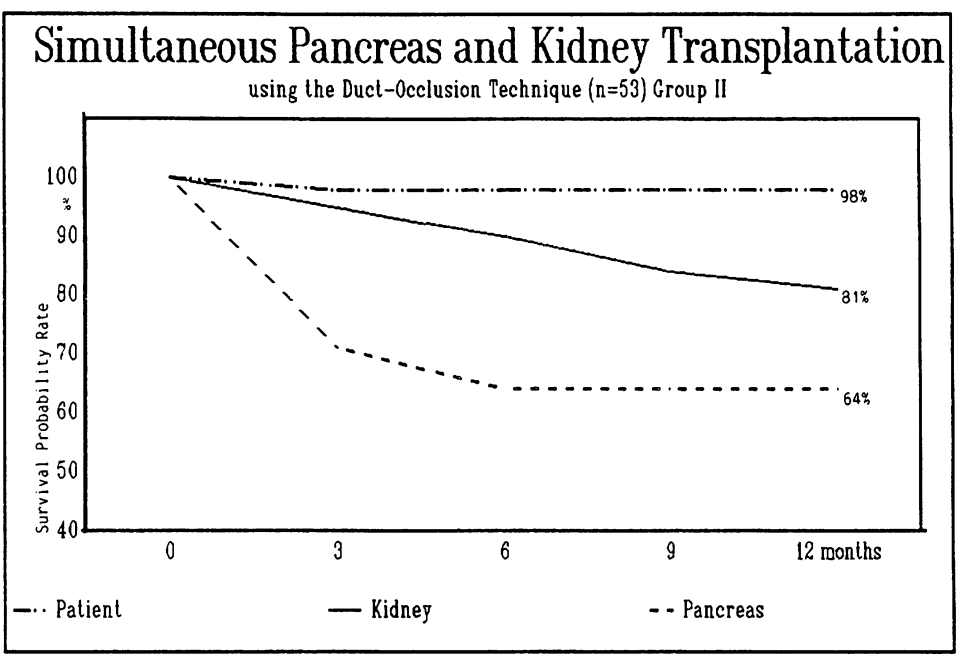

Fig. 1. Patients and graft survival probability in stimultaneous pancreas and kidney transplantation using the duct-occlusion techniques ($n = 53$) (Cutler/Ederer formula).

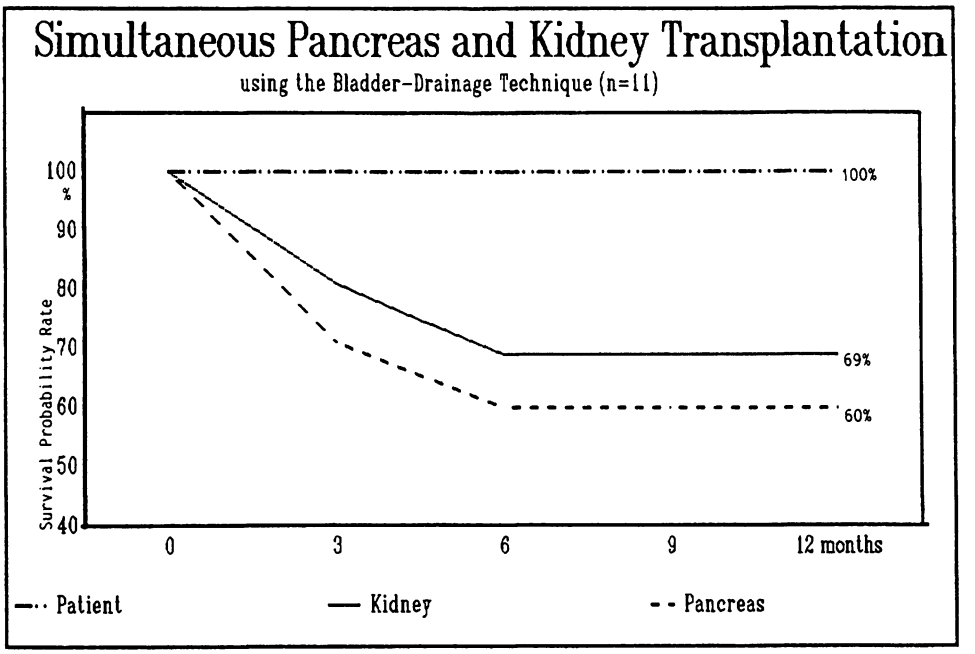

Fig. 2. Patient and graft survival probability in combined pancreas and renal transplantation using the bladder-drainage technique ($n = 11$) (Cutler/Ederer formula).

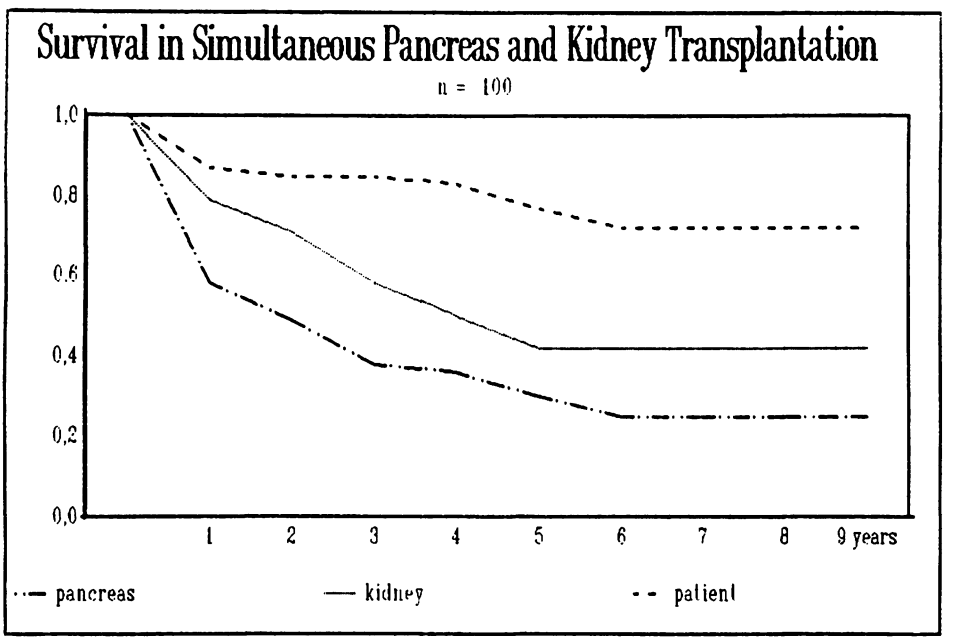

Fig. 3. Long-term results in simultaneous pancreas and kidney transplantation in duct-occluded segmental allografts ($n = 100$) (Cutler/Ederer formula).

the result in the long-run is a vascularized islet cell graft without any exocrine activity and with no risk for the recipient. The induced destruction of exocrine tissue by prolamine is not associated with a deterioration of the endocrine function. Our early clinical observations with the bladder drainage show a remarkably high rate of local infection-complication following urinary tract infection also with subsequent graft loss. Patients with a history of bladder dysfunction as a side effect of long-term diabetic disease might therefore be better candidates for the duct-occlusion technique.

The surgical complication rate is acceptable. Still unsolved is the problem of a transplanted gland with an aggressive enzymatic secretion at the bladder mucosa, as well as for the recipient himself. With this technique postoperative complications may not only develop on the side of the pancreas but also from the duodenal segment. Further experience and long-term results must be gained to find out the best surgical technique.

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