transplantation
india

SIMULTANEOUS PANCREAS KIDNEY TRANSPLANTATION : IS IT FEASIBLE ?

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ABBREVIATIONS

DM	diabetes mellitus	ESRD	end stage renal disease
SPK	simultaneous pancreas kidney		

INTRODUCTION

In early days diabetes mellitus (DM) was regarded as a contraindication for renal transplantation, but with advancements in this field excellent results were achieved in diabetic patients undergoing renal transplantation. Since then selected patients have received pancreas in addition to kidney. Kelly and Lillehei made the first attempt of simultaneous pancreas kidney (SPK) transplantation more than 35 years ago[1]. At present a number of centers around the world perform this procedure of dual transplantation. The International Pancreas Transplant registry reported that nearly 19,000 pancreas transplants were performed till October 2002 [2]. The pancreas can be transplanted simultaneously with a kidney from the same donor. Hence the recipient undergoes one surgery and receives induction immunosuppression only once, and the kidney serves as a marker for rejection. The staged procedure involves two separate operations and thus two courses of induction immunosuppression.

We did our first SPK transplantation in a diabetic patient with end stage renal disease (ESRD). The pancreas was kept in right iliac fossa while the kidney was placed in the left iliac fossa. Exocrine secretions were drained through bladder drainage. Post-operatively blood glucose and urinary amylase levels were monitored daily. Ultrasonography and Doppler studies also showed good pancreatic graft. Unfortunately we lost the patient on 7th post-operative day due to cardiac arrest with functioning grafts.

Recipient Selection

Potential candidates for SPK transplantation are a subset of patients with DM and ESRD. Ongoing peripheral gangrene, severe coronary insufficiency with angina, cardiac decompensation or severely incapacitating autonomic and peripheral neuropathy are contraindications to SPK [3].

The Donor

All cadaveric kidney donors should be considered for pancreatic graft donation, except the donors with history of DM, chronic pancreatitis or traumatic pancreatic damage. The laboratory parameters of the donor should be diligently evaluated include blood glucose, serum amylase and

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glycosylated hemoglobin. On retrieval normal pancreas appear yellowish, soft and homogenous in consistency. If there is sclerosis, calcification or marked discoloration the pancreas should not be used [4].

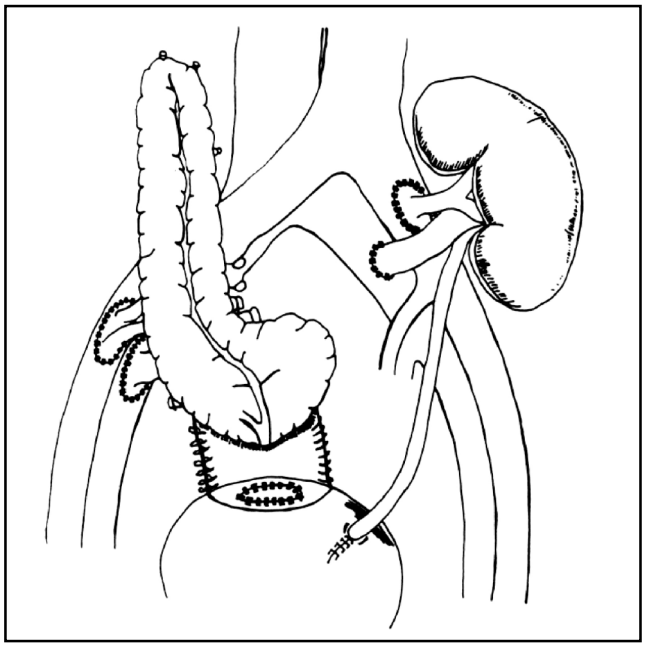
Organ Retrieval

Most pancreatic grafts are obtained from multi-organ donors, usually pancreaticoduodenal graft is used, consisting of the entire pancreas and a segment of the duodenum. A long midline or cruciate incision is used. The lesser sac is opened by ligating and dividing the gastrocolic ligaments from the pylorus to the short gastrosplenic vessels. The splenic vessels are ligated in the splenic hilum. The pancreatic tail is reflected medially following the lower margin until superior mesenteric vein is reached. Inferior mesenteric vein is identified and ligated superiorly and celiac axis is identified. The left gastric artery is ligated and divided. The diaphragm is incised to access aorta and the celiac axis and superior mesenteric artery. The duodenum and the pancreatic head are mobilized by kocher maneuver. The common bile duct is divided and ligated, and the hepatic artery is ligated and divided distal to the gastroduodenal artery. The right gastric and gastroepiploic arteries are divided. The portal vein is dissected free. The portal is divided to provide a 2 to 3 cm length. The superior mesenteric vein and the superior mesenteric artery are ligated over the duodenum. The duodenum is divided just distal to the pylorus and at the lower band, closing the cut ends with staples or sutures. The aorta is cross clamped above the celiac axis and the organ cooling and flushing are accomplished by intraaortic infusion of a cool perfusion solution through a tube inserted in the lower aorta. Thus, the pancreas and also the two kidneys are perfused. The inferior vena cava is also cannulated for drainage. The pancreatic graft is then removed with an aortic patch containing the celiac and superior mesenteric arteries.

The techniques used for flushing, cooling and storing the pancreatic graft are similar to that used for kidney grafts. UW (University of Wisconsin) or Collins solutions are used for flushing and preservation.

Surgical technique for pancreatic transplantation

The pancreas is recovered in continuity with a short duodenal segment from the cadaveric donor. The pancreaticoduodenal graft is placed intraperitoneally or extraperitoneally in the lower part of the abdomen in the recipient. The portal vein-iliac vein anastomosis is performed first; acute angulation at the portal vein-splenic vein junction should be avoided. (figure)



The Carrel patch encompassing the coeliac artery and superior mesenteric artery is anastomosed to the external iliac artery. Diversion of graft exocrine secretion is often performed to the recipient's urinary bladder [4]. The anti-mesenteric border of the duodenum is opened for approximately 5 cm for anastomosis between the bladder and duodenum. The total length of duodenal segment should be approximately 10 cm. Staple line should be inverted using non-absorbable or slowly absorbing suture material. The bladder anastomosis is then performed in standard two-layer technique using vicryl or dexon. A drain is kept adjacent to the graft and brought out through the stab wound. Some groups use enteric exocrine diversion primarily [5]. In that situation, an exteriorized pancreatic duct catheter can be used to monitor allograft amylase secretion but may contribute to the development of acute graft pancreatitis [6].

POST-OPERATIVE MANAGEMENT

After transplantation the exocrine function of the pancreatic graft is monitored by daily measurement of serum and urinary amylase levels. The endocrine function of the graft is monitored by the measurement of the blood glucose levels and changes in insulin requirement. Usually, blood glucose levels become normal or near normal within hours after

transplantation leading to discontinuation of exogenous insulin requirement. Inadequate blood glucose control and marked hyperamylasemia soon after transplantation indicate severe damage to the graft from ischaemia, acute rejection or vascular thrombosis. Ultrasonography is used to assess the graft status or peripancreatic fluid collection and Doppler is used to assess arterial and venous flow. Angiography is indicated when partial or complete graft thrombosis is suspected. Post-operative ileus is more common after pancreatic transplantation. Graft thrombosis occurs more commonly in pancreatic grafts than in renal grafts. Prophylactic antibiotics should be effective against staphylococcus, enteric and urinary tract organisms. For immunosuppression, sequential four-drug immunosuppression is used.

Surgical complications

The usual complications, such as bleeding and wound infection are more common; hence meticulous hemostasis is essential. The incidence of wound infection is also increased, probably due to contamination from recipient's bladder or intestine or from the duodenal segment of the graft. The urological complications consist of duodenocystostomy fistula, hematuria and urinary tract infection. The pancreatic enzyme secretion may lead to dysuria syndrome, urethral disruption, urethral stricture, reflux pancreatitis etc [7].

Rejection in graft

In recipients of SPK transplant, diagnosis of rejection is based upon changes in the kidney. In recipients of bladder drained pancreatic grafts, a drop in urinary amylase level is commonly used as marker of acute rejection [8]. Fine needle aspiration and core-needle biopsy have been used to diagnose rejection rejction [9]. Pancreatic graft biopsies entail a risk of pancreatitis and pancreatic fistula formation and should be done with caution. In chronic rejection, episodes of hyperamylasemia and progressive deterioration in blood glucose levels occur.

CONCLUSION

SPKT has become a reality for low risk patients with ESRD secondary to DM. Successful pancreas transplantation results in normal glucose levels in the fasting and fed states, and normalization of glycosylated hemoglobin [10]. Many groups have reported stable pancreatic function at 10 years post-transplant in SPK transplant recipients, with superior survival compared to only kidney transplant recipients. Hence, SPK transplantation rather than kidney transplantation alone should be offered to type I DM patients with end stage diabetic nephropathy [11]. Hence it is time that SPK Transplantation becomes an acceptable procedure for diabetie with ESRD in India. In spite of 20,000 peocedure in the west, why is it eluding us in India ?

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