En Bloc Simultaneous Pancreas-Kidney Transplant Demonstrates Similar Clinical Outcomes to Traditional Techniques

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BACKGROUND

- Simultaneous pancreas-kidney transplant (SPK) is the gold standard therapy for patients with concurrent end-stage renal disease and diabetes mellitus
- Traditional SPK involves separate implantation of the kidney and pancreas. This requires the use of both the left and right recipient iliac vessels
- Alternative techniques to implant the organs en bloc have been described, but data comparing outcomes after the different SPK techniques are limited

OBJECTIVES

Primary Objective

- Compare the rates of kidney or pancreas allograft survival between traditional and en bloc SPK techniques

Secondary Objectives

- Length of hospital stay, urine creatine 90 days after transplant, blood glucose 90 days after transplant, incidence of delayed graft function, emergency department presentations, readmissions, reoperations, total anastomosis time, and total operating time

METHOD

- Single-institution retrospective analysis of 42 patients who underwent SPK transplant using either traditional or en-bloc techniques from July 2021 to May 2023
- Backbench preparation of en bloc graft consisted of donor pancreas portal vein to donor kidney inferior vena cave and Y graft from donor common iliac artery to donor renal artery, donor splenic artery, and donor superior mesenteric artery
- Implantation of en bloc graft was performed via anastomosis of inferior vena cava to recipient external iliac vein and donor common iliac artery to recipient external iliac artery
- Data were analyzed using SPSS

RESULTS

Independent Variables	Operation Type		Test Statistic		
	En-Bloc SPK (n=22)	Traditional SPK (n=20)	t	dF	p value
Length of Stay (days ± SD)	7.64 ± 3.36	7.95 ± 4.75	0.249	40	0.805
90 Day Urine Creatinine (mg/dL ± SD)	1.36 ± 0.67	1.33 ± 0.45	-0.185	40	0.854
90 Day Blood Glucose (mg/dL ± SD)	99.23 ± 15.65	100.92 ± 31.31	0.224	40	0.824
Total Anastomosis Time (min ± SD)	36.77 ± 13.19	63.50 ± 10.15	7.305	40	**<0.001**
Total Operative Time (min ± SD)	214.91 ± 40.5	293.35 ± 43.98	6.018	40	**<0.001**
Delayed Graft Function (%)	3 (13.63%)	2 (10%)	Fisher's exact test		1.000
Emergency Department Visit < 90 days (%)	7 (31.82%)	8 (40%)	Fisher's exact test		0.749
Readmission < 90 days (%)	15 (68.18%)	9 (45%)	Fisher's exact test		0.212
Reoperation < 90 days (%)	6 (27.27%)	2 (10%)	Fisher's exact test		0.243
Pancreas Rejection < 1 year (%)	2 (9.09%)	3 (15%)	Fisher's exact test		0.656
Kidney Rejection < 1 year (%)	2 (9.09%)	1 (5%)	Fisher's exact test		1.000
Any allograft rejection < 1 year (%)	4 (18.18%)	4 (20%)	Fisher's exact test		1.000

Table 1: Comparison of outcomes of en bloc simultaneous pancreas kidney transplants vs traditional simultaneous pancreas kidney transplants.

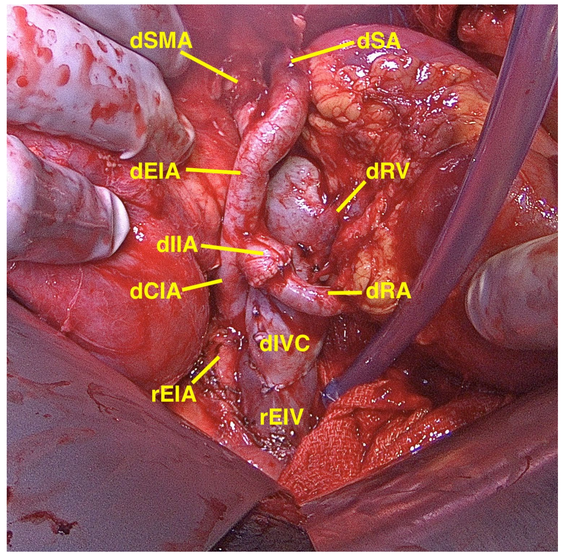

Figure 1. Anastomoses of en bloc graft

Donor SMA (dSMA), donor splenic arter (dSA), donor external iliac arter (dEIA), donor internal iliac artery (dIIA), donor common iliac artery (dCIA), donor renal vein (dRV), donor renal artery (dRA), donor inferior vena cava (dIVC), recipient external iliac artery (rEIA), recipient external iliac vein (rEIV)

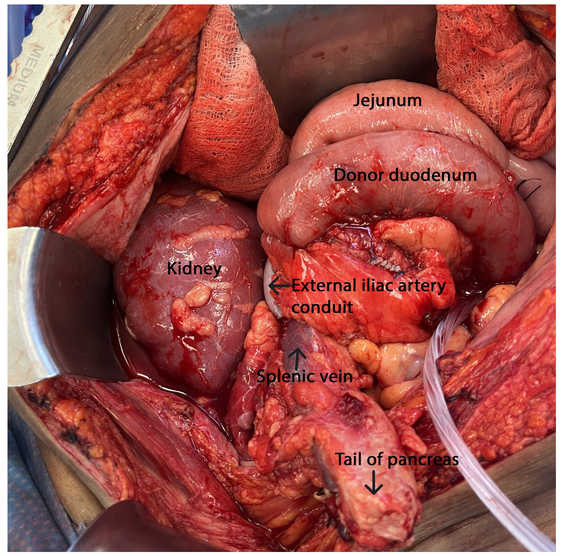

Figure 2. In vivo example of en bloc SPK

Here you can see the proximal duodenal-jejunal anastomosis well visualized

SURGICAL TECHNIQUE

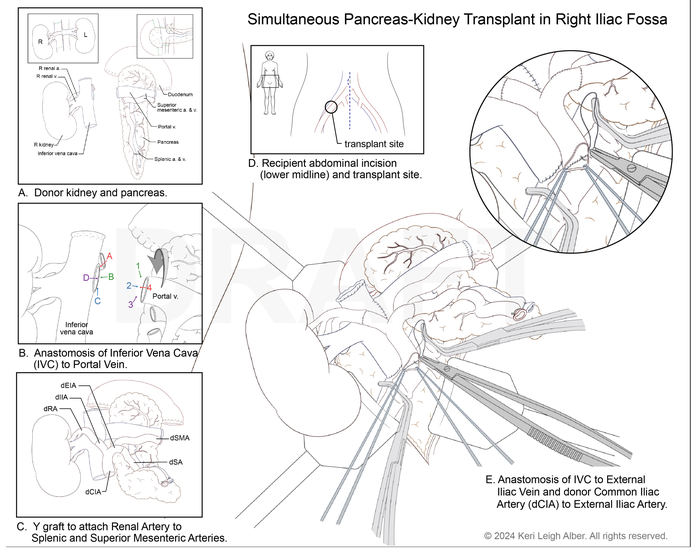

Figure 3: Schematic representation of the technique used for en bloc SPK graft reconstruction and implantation

CONCLUSIONS

- En bloc simultaneous pancreas kidney transplant is a novel technique with similar safety and efficacy to traditional SPK in our limited, single institution cohort
- En bloc SPK allows for significantly reduced anastomosis and total operative time
- There was no significant difference in graft function or rejection, length of initial hospital stay, or rates of reoperation or hospital readmission

FUTURE STEPS

- Limitations of the study include a modest patient cohort limiting the power of our analyses, reliance on a single surgeon to demonstrate the novel operative technique, and follow up time of only one year
- Future multi-institutional studies could replicate these findings and expound on the utility of developing en bloc SPK as an alternative technique with similar patient outcomes