**Anesthesia for pancreas transplant**

Background

Most pancreas transplants will be combined with kidney transplants (simultaneous pancreas kidney transplant – SPK) for patients with type 1 diabetes mellitus (DM) and end-stage renal disease (ESRD). Recipients may also include patients with type 1 diabetes with preserved renal function and those with type 2 diabetes, but these patients are less common. The other types of pancreas transplant include pancreas after kidney transplant (PAK) and pancreas transplant alone (PA), but these are also less common.

Patients undergoing SPK benefit from improved overall survival, decreased diabetic nephropathy of kidney graft, improved neuropathy, decreased arterial vascular disease, and decreased cardiovascular death.

Patient exclusion criteria (determined by the transplant surgeons) include age < 18 or > 60, BMI > 35, positive stress test without correctable coronary artery disease, smoking history with moderate to severe smoking related comorbidities, moderate to severe peripheral vascular disease, and hypercoagulable disorders.

Surgeons

Drs. Bleszynski and Oldani (hepatobiliary surgeons) will perform pancreas transplants, supported by Drs. Kim, Chartier-Plante, Harriman, and Nguan.

Cases

The yearly goal is 25 pancreas transplants which will be a combination of SPK, PAK, and PA transplants.

Preoperative assessment (anesthesia relevant)

* ECG, TTE
* MIBI +/- cardiology consultation if abnormalities identified on TTE or MIBI
* Investigations will be similar to kidney transplant recipients

Pre-operative checklist:

* Should have received oral tacrolimus on call to OR (or earlier in the day)
* Antibiotic prophylaxis: 2g cefazolin, 500mg metronidazole, 200mg fluconazole
* NG tube during OR
* CVC
* 500mg methylprednisolone (intra-op)
* Mannitol
* ATG (intra-op – filter tubing required)
* +/- furosemide, heparin

Perioperative management

Pancreas transplants will be booked in a manner similar to lung and liver transplants, in that the “in-room time” is planned in communication with the donor site.

These cases are performed through a large midline incision extending from the pubis to halfway above the umbilicus. The kidney is implanted first followed by the pancreas. The expected surgical time is approximately 5-6 hours.

For pain control, Drs. Bleszynski and Oldani would rather us use PCA +/- fascial plane blocks/catheters and not place thoracic epidurals. Consideration should be given to reducing the maximum dose of local anesthetic in the context of ESRD. Some of these patients have significant autonomic dysfunction and are at risk of hemodynamic instability post operatively, which may be exacerbated by the sympathectomy of epidural block. This instability can contribute to hypoperfusion of the pancreas, kidney, and intestinal anastomoses, leading to graft failure and other complications. As a comparison, most pancreas transplants are performed without epidurals at other institutions. Patients who are predominantly younger and healthier could be considered for an epidural, but this should be discussed with the transplanting surgeon. Regardless of the analgesic modality, these patients should be followed by POPS.

Large bore IV access, arterial line monitoring, and CVC are required (all SPK will receive ATG, and post-operative ward bloodwork is facilitated by a CVC). There is a suggestion of 2 litres of crystalloid for the kidney transplant with an additional 2-3 litres of crystalloid for the pancreas transplant. This is in the range of 10 ml/kg/h which is like that published in the RELIEF trial (NEJM 2018) for other major abdominal surgeries. A dynamic indicator of volume status like the Flotrac or SPV is useful to guide fluid therapy and maintain euvolemia and graft perfusion.

It is expected that there will be no exogenous insulin requirements following reperfusion and adequate functioning of the new pancreas. If an insulin infusion is running in the OR it should be turned off at the time of reperfusion. Glucose checks should be performed pre- and post-reperfusion to ensure graft function. Post-operatively, no form of insulin or diabetic medication should be ordered. If there is post-operative hyperglycemia, the attending surgeon should be informed immediately, as it can be an indication of rejection, graft failure, or vascular thrombosis. There should be no post-operative insulin orders including sliding scale.

Post-operatively these patients can be extubated in the OR and taken to the PACU. They will have a mandatory stay in the PACU of 6 hours, like a kidney transplant recipient, before discharge to the transplant ward. They will be followed closely in PACU by transplant nephrology. They will have an ultrasound performed on POD 1 as well as DVT prophylaxis started. If the OR is very stable and smooth, ASA may start on POD 1.

Post-operative complications

* Graft thrombosis (venous or arterial)
* May require anticoagulation
* Hemorrhage
* Bowel leak
* Pancreatitis
* Re-look laparotomy
* Graft pancreatectomy
* Rejection

References

1. Mittel, A and Wagener, G. *Anesthesia for Kidney and Pancreas Transplantation,* Anesthesiol Clin 35, 2017:35;439-452.
2. Kronish, K and Hirose, R 2020, *Pancreas Transplant,* UCSF Department of Anesthesia and Perioperative Care, accessed 23 October 2023, < <https://anesthesia.ucsf.edu/clinical-resources/pancreas-transplant>>.
3. Kandaswamy et al. *OPTN/SRTR 2020 Annual Data Report: Pancreas*, American Journal of Transplantation, 2022:Vol 2 Supp 22;pp137-203.