Pancreas Transplant Protocol

Updated May 2023

BACKGROUND:
Pancreas transplants can be done as: pancreas transplant alone; pancreas after kidney transplant; or as simultaneous kidney/pancreas (SKP) transplant.

SKP transplants account for the majority of pancreas transplants (about 80%) as most are performed in patients with DM and ESRD.

Patients on dialysis for diabetic nephropathy have a high mortality rate. 75% of insulin-dependent patients with DM do not survive > 5 years with dialysis. SKP improves patient survival when compared to either dialysis or DDKT.[1]

Goals of SKP are:

- insulin independence by restoring endogenous insulin production by beta cells
- improve quality of life
- reduce secondary complications of DM and CKD

Mortality = 2%. Cardiovascular and/or cerebrovascular events are the leading cause of death.[2]
Morbidity: graft thrombosis (5-10%); postop bleeding (5-10%); wound infection (2-6%); pancreatitis (2-4%); anastomotic leak (1%).[2]

Pancreas transplant carries the highest risk of post-op complications among all solid organ transplants. Leading cause of pancreas loss is rejection, which can occur within days or after years of a successful transplant.

BEFORE INDUCTION: Confirm with surgeon that patient & donor organ blood/HLA matching is complete.

MEDICATIONS: Ordered by the transplant surgery team. Confirm availability of medications with pharmacy pre-op. Discuss plan for timing and dosing of important meds during time out.

- **Antibiotics**
- **Steroids**
- **Immunosuppression meds** (Follow pharmacy instructions. Use a filter with thymo)

LINES/TUBES/DRAINS:

- **2 PIVs** (at least one 18 G)
- **Arterial line** for frequent labs draws & hemodynamic monitoring
- **NG tube** (stays in post-operatively)
- If present, ***assess AVF q15-30 minutes*** by palpating and documenting bruits. Careful with upper extremity positioning as pressure on an AVF can lead to thrombosis.

IV FLUIDS: Discuss fluid goals with surgeon. Typically, 2 Liters for pancreas, 2 Liters for kidney. Often a combination of crystalloid & colloid. Confirm 2 units of pRBCs are cross-matched.

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BP MANAGEMENT: Maintain within 20% of baseline. 1st-line treatment for hypotension is IVF.

GLUCOSE MANAGEMENT:

- ***Measure glucose Q1H before pancreas reperfusion, then q30 min after reperfusion for at least 3 measurements.*** You may increase or decrease blood sugar checks after that depending on the blood sugar trend.
- Favor *HYPER*-glycemia over tight control. **Keep glucose < 300—350 mg/dL before reperfusion.**
- **DO NOT correct glucose to < 180** due to risk for hypoglycemia and to assess for graft function.
- **Always communicate glucose values and insulin treatment with surgeon.**
- In the SKP procedure, the pancreas is implanted first, followed by the kidney later.
- After unclamping of the new functioning pancreas, glucose may drop rapidly.
- 40-50% of *endogenous* insulin produced by the pancreas is metabolized by the liver via first pass metabolism, whereas 30-80% of systemic insulin is metabolized in the kidney. The kidney is the main organ responsible for metabolizing *exogenous* insulin. In renal failure, insulin clearance is decreased.[3] *Thus administering IV/SubQ insulin in a patient with kidney failure can lead to "prolonged/excessive" effects of insulin → hypoglycemia.*

TWO instances in which you have a strong argument for using insulin:

- **DKA**: If the pt develops acidosis, calculate an anion gap. You need to correct Na for hyperglycemia before calculating the anion gap.
  https://www.mdcalc.com/calc/50/sodium-correction-hyperglycemia
  https://www.mdcalc.com/calc/1669/anion-gap
- **Hyperkalemia**: Remember there are other methods for temporizing hyperkalemia (albuterol, hyperventilation, bicarbonate, Lasix). Depending on the severity of hyperkalemia, insulin may be warranted.

**In either circumstance, if insulin is to be given, start with a smaller dose.*

REPERFUSION:

Before reperfusion of the kidney, give: *(see separate kidney transplant protocol for more detail)*

- **Mannitol** 0.5mg/kg (Must use filter. Do not use if crystallized.)
- **Lasix** 100-200 mg
- Have **Dopamine** in the room just in case, for expected drop in BP after reperfusion.

PAIN CONTROL:

- Primarily opioids. Avoid morphine and meperidine due to metabolite buildup in ESRD.
- Remember high dose steroids also provide opioid-sparing effects.
- Talk to the acute pain team for potential TAP blocks

RESOURCES:

1) UPDATE ON PANCREATIC TRANSPLANTATION IN THE MANAGEMENT OF DIABETES, (2021)
2) JAFFE – ANESTHESIOLOGIST'S MANUAL OF SURGIAL PROCEDURES, CHAPTER 7.12 LIVER/KIDNEY/PANCREAS TRANSPLANTATION
3) INSULIN THERAPY IN RENAL DISEASE (2008)
4) PANCREAS AND ISLET TRANSPLANTATION IN DIABETES MELLITUS, UPTODATE (UPDATED 08/2022)