

Transplant Medical Note

Portal Vein Blood Flow Measurement during Auto Islet Cell Transplantation after Pancreatectomy

Flow Measurement during Islet Infusion

Excising a diseased pancreas removes not only pancreatic cells that produce digestive enzymes but also islet of Langerhans cells that produce insulin to control blood sugar. Without insulin a patient becomes diabetic and requires lifelong use of insulin to control blood sugars.

Auto islet cell transplantation takes these islet of Langerhans cells from the pancreas and transplants them to the liver to reduce the diabetic risk. To do this, the removed pancreas is processed to isolate the insulin-producing islets of Langerhans cells. The isolated cells are suspended in a solution and are then slowly infused through the splenic vein back into the patient's liver where it is hoped that they will implant, grow and produce insulin to metabolize sugar.

Typically, 800 - 1500 cc of solution is infused into the portal vein distal to the splenic vein (Fig. 2) over an extended period of time. The team may elect to infuse a small amount over 5 minutes and allow the patient to recover before resuming the infusion. Blood pressure and flow are monitored continuously and for ten minutes after the infusion is completed (Fig. 1).

Flow Measurement during Islet Infusion

Surgeons measure portal venous flow during islet cell infusion to detect any sudden decrease in flow that may foreshadow a problem with the infusion. A 10 mm to 14 mm Perivascular Flowprobe is placed on the portal vein and flow is measured continuously. The Flowprobe is chosen to comfortably encompass - but not constrict - the portal vein. If needed, saline can be used to provide acoustic contact between the vein and Flowprobe. Readings stabilize within 1-2 minutes. Wide fluctuation of measurements may indicate improper positioning of the Flowprobe with poor alignment or fat within the ultrasonic sensing window. Repositioning can normally correct this problem.

Discussion

In this high stakes auto islet cell transplantation procedure, Flowprobes provide a continuous volumetric measure of portal vein flow to inform the surgeon about the safety, fluidity and success of auto islet cell transplantation.

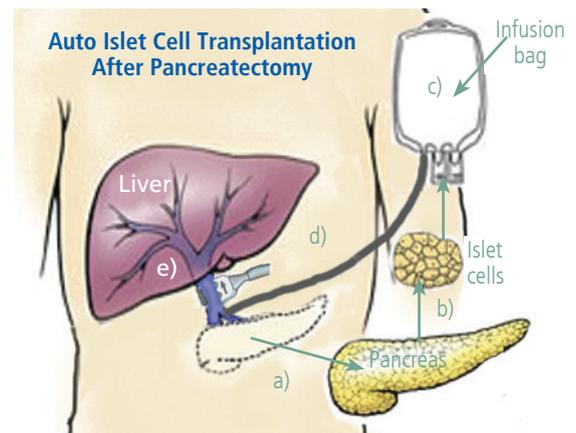


Fig. 1: Steps: Auto Islet Cell Transplantation
 a) Removal of pancreas (pancreatectomy)
 b) Isolation of Islet cells from removed pancreas
 c) Islet cells placed in Infusion bag with solution
 d) Islet cells infused into splenic vein
 e) Islet cells implant in liver

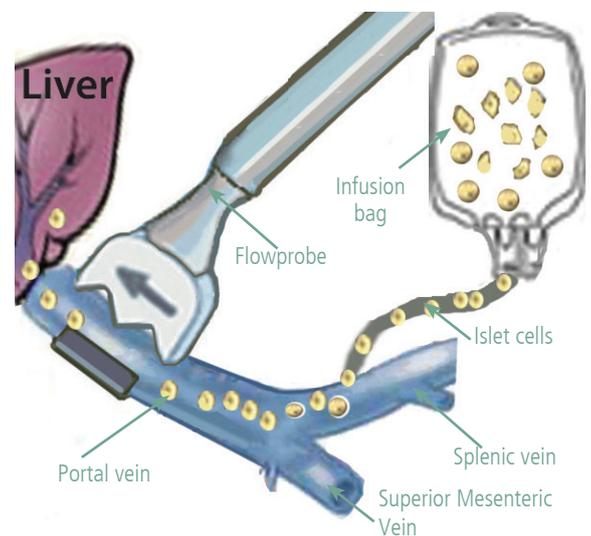


Fig. 2: Enlarged view of islet cell infusion into the splenic/portal venous system.

Portal Vein Blood Flow Measurement during Auto Islet Cell Transplantation after Pancreatectomy Cont.

Equipment Needs



HT354 Single-channel Optima Flowmeter. Acquire precise actual flow measurement quickly, easily and cost effectively.



8 mm to 14 mm FMV Vascular Handle Flowprobes are recommended for portal venous flow measurements during islet cell infusion.



Confidence Flowprobe®

Confidence Flowprobes® provide highly accurate measurements in vessels with fluctuating flows such as the portal vein. The Probes may be left in place for extended measurements and then easily removed via a ring attached to the pliable liner that cushions and protects the vessel.

References

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