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#9	Clamp, Crash, Recover: Postoperative Management of Porcine Orthotopic Liver Allotransplantation	Justin Silvey (1) Lisa Halliday (2)	University of Illinois Chicago	Abstract

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Clamp, Crash, Recover: Postoperative Management of Porcine Orthotopic Liver Allotransplantation

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Introduction:

Swine have been used extensively to study transplant immunology and rejection; however, a significant gap exists in the literature regarding clinical management. This presentation discusses postoperative care and three case outcomes for a swine orthotopic liver allotransplant survival model without venovenous bypass.

Methods:

The immediate postoperative period is focused on supporting graft function and facilitating anesthetic recovery through aggressive fluid management, respiratory support, and multimodal analgesia.

Fluids: Intraoperative hypotension is expected without venovenous bypass and acute kidney injury is a significant risk. Urinary output is used as a surrogate for renal perfusion and is managed with crystalloids (Plasma-Lyte/Mannitol) and diuretics. Plasma-Lyte is the fluid of choice as it mimics physiologic electrolytes. Intraoperative metabolic acidosis, when present, is corrected with fluids and sodium bicarbonate.

Respiratory Support: Transitioning from mechanical to spontaneous ventilation is challenging. Hyperventilation is common during recovery and can complicate correction of acid-base disturbances. It is critical that ETCO2 is maintained between 35-45 mmHg and that sufficient time is allowed for recovery of spontaneous ventilation. Extubation should be slow and deliberate, mirroring the staged approach used for brachycephalic dogs. Patients remain intubated until SpO2 is stable on room air and the animal is sternal or attempting to stand. Flowby oxygen support may be required post-extubation and reintubation may be necessary if

extubation is premature.

Analgesia: Adequate analgesia is essential for supporting spontaneous ventilation and postoperative pain management. Traditional analgesics (buprenorphine/flunixin meglumine) are inadequate. Full μ-agonists are utilized to provide analgesia and mitigate hyperventilation, providing a smoother transition to spontaneous ventilation. After extubation, analgesia consists of lidocaine/hydromorphone CRI for 2-4 days. Additional supportive care consists of GI protectants.

Results:

Postoperative complications are common and can develop despite an uncomplicated recovery. The following cases provide examples of potential postoperative complications.

Case I – Hyperacute Rejection: Hyperacute rejection remains a catastrophic complication, despite prophylactic immunosuppression. The recipient deteriorated rapidly during abdominal closure. SAP and ETCO2 decreased precipitously to 40 mmHg and 20 mmHg, respectively. IV methylprednisolone (750 mg) failed to reverse the process, and the animal succumbed to multiorgan failure despite resuscitation efforts.

Case II – Biliary Duct Rupture: On postoperative day 2, the recipient developed lethargy, inappetence, and abdominal discomfort. Yellow discoloration of the bandage and drainage of viscous fluid from the surgical site was consistent with biliary duct rupture. Revision surgery was pursued, but progressive sterile peritonitis developed over the subsequent 48 hours.

Case III – Incision Dehiscence: On postoperative day 7, the abdominal incision site appeared to be healing appropriately. On day 8, a full-thickness dehiscence was identified, and the animal was euthanized. Necropsy findings were consistent with delayed wound healing secondary to chronic immunosuppression, with the inciting event suspected to be a fall.

Conclusions: Although the technical challenges of porcine orthotopic liver transplantation can be overcome intraoperatively, the postoperative period remains a critical determinant of outcome. Clinical status can change rapidly. Frequent patient assessment, early recognition of complications, and aggressive intervention are essential for animal welfare and study outcomes