December 2011 Newsletter

Academy of Surgical Research

Surgical Savvy

Tech Tips: Utilizing the Iliac Vein in Swine: A Minor Surgery for Large Device Compatibility

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Announcements

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The iliac vein is a valid alternative to the superficial femoral vein as a vascular access point in Yorkshire or Yucatan swine (50kg or larger) and can easily accommodate larger diameter devices or catheters. This surgery does not require intra-abdominal access, therefore is considered a minor surgery.

Our preferred method for sedation is 4-6mg/kg Telazol intramuscularly. Following anesthetic induction, we establish intravenous access, intubate, and prepare the right or left inguinal region for aseptic surgery.

The standard superficial femoral vein access starts with an approximately 3-4cm incision along the femoral groove and requires dissection through the muscle planes to access the underlying vessels (**Figure 1a)**. In contrast, the iliac vein access begins with an approximately 4-6cm incision made across the inguinal ligament (**Figure 1b**). Using blunt dissection and following along the deeper muscle planes, the proximal region of the femoral artery, the profunda, and the internal and external iliac vein branches will become visible extending up through the muscles (**Figure 2**). Manual retraction of the inguinal ligament may be required for better access and visibility of these vessels. There may be slight variation depending on the species and size of the animal.

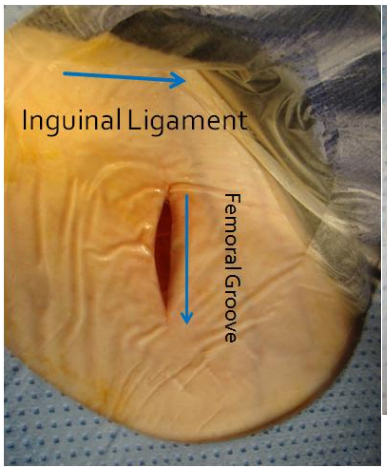


Figure 1a: Incision: Superficial Femoral Vein Access

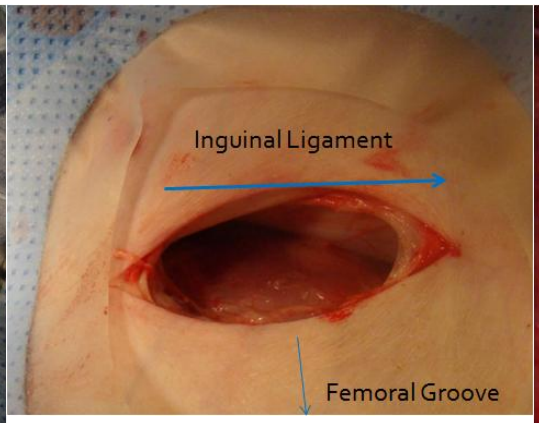


Figure 1b: Incision: Iliac Vein Access

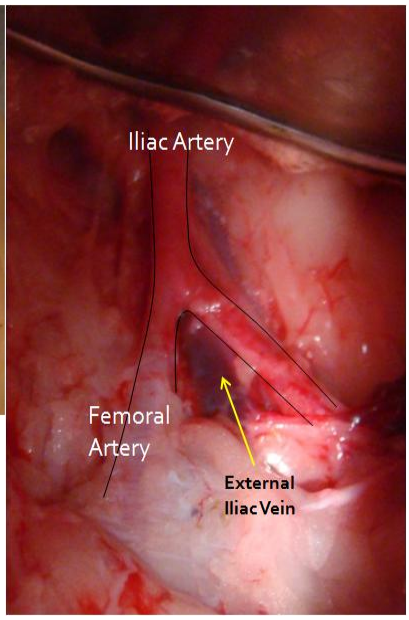


Figure 2:Vasculature prior to manipulation

Isolation and ligation of the profunda using silk and vessel clips must be done in order to obtain access to the iliac vein. Once ties and clips are placed at a proximal point (close to the iliac artery/femoral artery) and a distal point (as far across distal as is visible) the profunda is transected to expose the iliac vein and its branches (**Figure 3**). The iliac artery/femoral artery should not be ligated in order to prevent the possibility of ischemia.

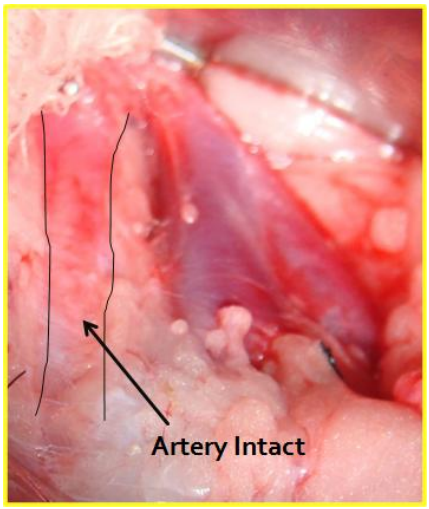


Figure 3: Profunda has been ligated; iliac vein exposed

With the iliac vein and its branches exposed, perform blunt dissection to place umbilical tape or vessel loops in a double-loop fashion around the internal, external, and main iliac trunk to control and occlude the vessels during access (**Figure 4**). Excess adventitia should be removed to prevent vessel constriction that may complicate access. After umbilical tape or loops are placed, the vessel may be bathed in 2% lidocaine (~5mL) to reduce vasospasm that may have occurred during manipulation. Heparin (150-200U/kg) is administered intravenously and allowed to circulate for at least three minutes prior to vessel occlusion to prevent clotting.

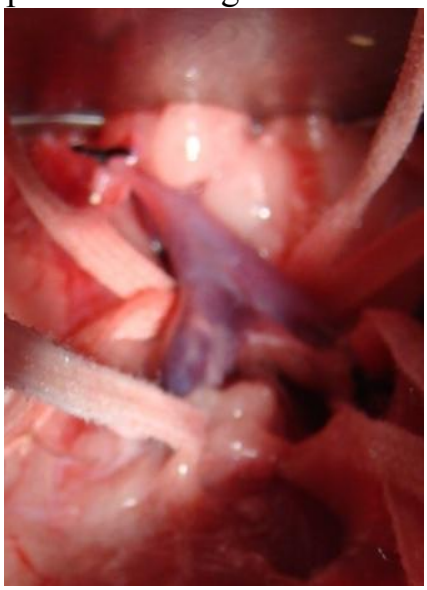


Figure 4: Iliac vein and branches are isolated

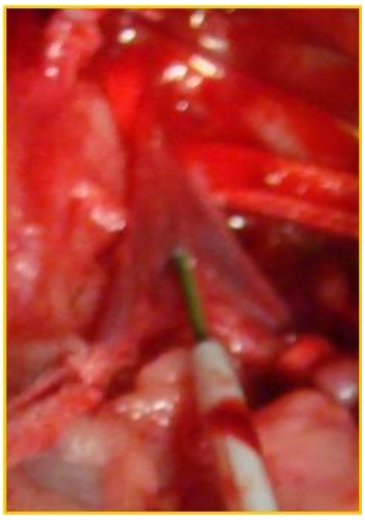


Figure 5: Iliac vein access

The internal and external branches and the iliac are occluded at this time using the previously placed ties to prevent bleeding and/or air emboli. Our established method of initial access is made immediately proximal to the bifurcation of the internal and external branches at the largest diameter of the iliac vein trunk using an angiographic needle and a 0.035" wire; once the wire is ready to be advanced the proximal tie on the iliac should be released (**Figure 5**). A 16F sheath may be placed easily to obtain diagnostic images if necessary. Following imaging the angiographic wire is placed back into the vessel, the branches and main trunk are re-occluded and the sheath can be removed. Depending on the size of the catheter or device, dilation of the iliac vein may be necessary to prevent trauma or tearing during device introduction. This can be achieved using rhino horn dilators, "sizing up" (using successively larger diameter sheaths to dilate the vessel), or other dilation devices. It is recommended that the angiographic wire remains in place to aid in identifying the initial access point. Once the larger device/catheter is in place, the distal ties on the branches may be loosened, however this is not necessary as long as appropriate activated clotting times are monitored.

After delivery of the catheter/device and completion of the procedure, the iliac vein should be repaired rather than ligated. Prior to device removal, the internal and external branches should be re-occluded if necessary. Once the device is out, the main trunk should be quickly occluded using the previously placed proximal umbilical tape or vessel loop (**Figure 6**). Vessel repair should be done using 5-0 Prolene in a continuous cross-stitch pattern (**Figure 7**). Gel foam may be used to aid in clotting. The distal branches should be released first to restore blood flow to the site and reduce any air that may be trapped in the site before the main trunk is released. The site should be irrigated with sterile saline or similar physiologic solution and any clots present should be removed. The site should be closed using standard closure techniques and all attempts to reduce dead-space should be made using the subcutaneous layers.

Our preferred post-operative analgesic is Buprenorphine HCl (0.01-0.03mg/kg IM given pre-operatively then every 4-12 hours for 36 hours). Animals should be monitored for any signs of hematoma, pain/distress, infection, seroma or other complications that may arise following surgery.

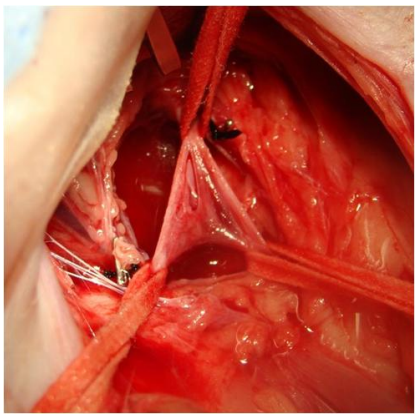


Figure 6: Following device removal

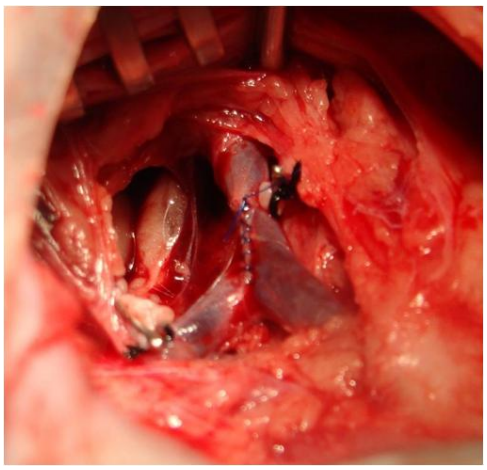


Figure 7: Repaired iliac vein

Announcements:

In 2012 the ASR will be presenting a series of **free** webinars to assist you in achieving technical skills such as anesthesia, suturing, aseptic technique, and exam preparation reviews.

2011 27th Annual ASR Meeting Congratulations to:

Andreas von Recum Award: Thomas Long, Lomir Biomedical, N.D. de I'ile Perrot, QC.

Michael DeLeo Award: Nance Moran, Genzyme Corporation, *Development of an Arthroscopic In Situ Polymerization Technique for Cartilage Repair in Goats.*

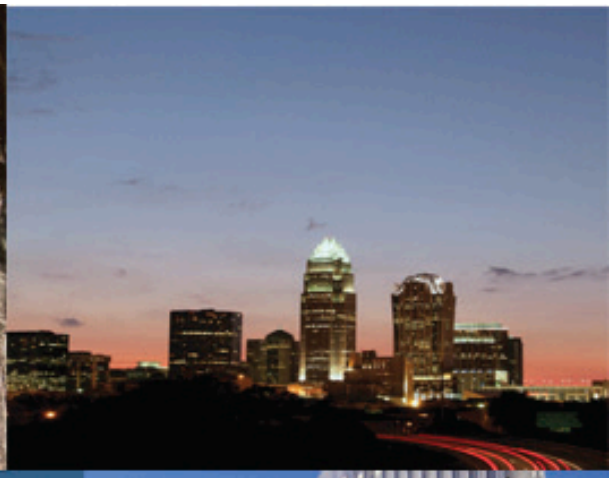
Congratulations to our top exam scorers of 2011!

Barry Sauer Award: SRS- Elizabeth Carter, American PreClinical Services, SRT- Katherine Drouin, Genzyme Corporation, SRA- Tricia Galassi, Abbott Laboratories

C.W. Hall Award:

H. Daneshvar, T. Edwards, K. Voss, K. Landis, T.Gleason, P. Atterson. *Cardiovascular assessment in radiotelemetry-implanted pregnant rats.* Journal of Investigative Surgery 24: 25-33, 2011.

P. Cotogni, R. Bini, A. Trombetta, G. Olivero. *Pyrolidine dithiocarbamate modulates HSP70, iNOS, and apoptosis during hemorrhagic shock resuscitation in rats.* Journal of Investigative Surgery 23: 307-14, 2010.



28th Annual Meeting

ASR

Charlotte, North Carolina
October 4–6, 2012

What do you want to talk about?

Send us a tech tip or article to share your knowledge with other members! CEU's may be awarded!

Submission deadlines: June 1st and November 1st. Please send in Times New Roman font, and attach any pictures as a ".jpg" file format.

Submit electronically to: nance.moran@genzyme.com