

Surgery Model #: BILERET-R

Bile Duct Catheterization with Duodenal Return Care and Use Document for Rats

Anesthetic: Isoflurane to Effect

Analgesic: Buprenorphine (SQ): Dose 0.05 mg/kg

Basic Surgical Procedure Description:

An anesthetized animal is surgically prepared and draped. A 2.5-cm ventral midline skin and abdominal muscle wall incision is made with a cranial terminus near the xiphoid process. The liver is gently retracted to reveal the bile duct. Using low magnification of a dissecting scope an area is identified for catheterization below the bifurcation from the liver lobes. After placing sutures, a small incision is made into the lumen of the bile duct. The tip of the bile duct catheter is inserted into the lumen and advanced to the first silicon bead. Bile is observed flowing into the catheter and the internalized tip location is confirmed to be below the bifurcation of the duct. The catheter is secured in place with suture.

A purse string suture is made in the duodenum in an area of minimal vasculature. The tip of the duodenal catheter is inserted via a small incision and secured in place. Patency is verified by injecting a small volume of saline into the duodenum. Both catheters are exteriorized through a hole in the abdominal wall to a point between the shoulder blades and positioned so that the bile duct catheter is caudal to the duodenal catheter. Abdominal musculature is closed with absorbable suture. The abdominal skin incision and sub-scapular exteriorization sites are closed with stainless steel wound clips. A 23 gauge "U" tube connects the two catheters. Catheters are taped together for security and the patient is allowed to recover from anesthesia in a heated cage.

Catheters:

Bile duct catheter material consists of a length of sterile silicone rubber with a 10mm microrenathane tip. The access port consists of a 25mm length of PE50 tubing (0.023" ID). Duodenal catheter material consists of a length of sterile silicone rubber with a 25mm access port. The two access ports are connected with sterile 23-gauge stainless steel tubing. Fill volume of each catheter is 75ul. Catheters can also be made of polyurethane, per customer request.

Quality Control:

Patency is verified by ensuring bile readily flows from the bile duct catheter and that fluid is readily injected into the duodenal catheter on the morning of shipment. To increase the longevity of this preparation, the duodenal catheter and the stainless steel tubing should be flushed every two to three days with 0.2-0.5mL sterile distilled water. Never flush the bile duct catheter. It is recommended the animals also receive SQ fluids and analgesics as needed for maintenance; wet feed may be added to encourage eating.

Expectations:

Surgery occurs within a week of shipment. Investigators should expect the bile duct preparation to be patent upon arrival and last for roughly one week post receipt, pending proper maintenance as described in the quality control section above. Bile duct catheterizations are not stable for long periods of time and should be used as close to the date of receipt as possible. There will be a yellow color to the catheters if bile is flowing into the return. A greenish color indicates salt build-up and flushing the duodenal catheter is required.

Sampling:

During our in-house bile collection procedures, bile flows at an average rate of 1ml/hour. Collection of bile is achieved by attaching the animal to a spring tether device. During collection, be sure to plug the duodenal catheter with a solid pin to prevent digestive contents from backing into the catheter. Collection can occur for extended periods of time (up to 12 hours). After sampling periods have concluded, the duodenal catheter is flushed with dH₂O and the animal should be allowed to recover for a minimum of two days before sampling is repeated. Subcutaneous saline should be administered at a rate of 10mL/kg before and after each collection period. Analgesics are also administered as needed.

Housing:

Individually house animals to prevent cage mates from chewing on one another's catheters.

Staple Removal:

Staples should be removed 7-10 days post-operatively; do not remove staples around catheter port.