Catheterization of Jugular Vein and Carotid Artery

Services

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Arterial catheterization allows investigators to sample arterial blood as required for adequate glucose clamping (Niswender et al. J. Biol. Chem, 1997, Halseth et l. Am. J. Physiol. 1999) or other infusion/sampling purposes (Rottman et al. Am. J. Physiol. 1999) Catheterization of the right jugular vein allows the infusion of hormones, substrates, and tracers into the systemic circulation. The jugular venous catheter can be used to sample venous blood in long-term experiments because the jugular vein catheter will work for almost a month.

Arterial catheters are made from polyethylene tubing (PE-10) that is connected to silicone tubing (0.3 mm I.D., and 0.64 mm O.D.), 25 mm long. Jugular vein catheters are made from silicone tubing (0.3 mm I.D., and 0.64 mm O.D.). These catheters are connected to stainless steel tubes (0.3 mm I.D., 0.41 mm O.D., 15 mm) bent into an L shape. On the free end of the L shaped stainless steel tube a 20 mm piece of micro-renathane tubing (0.36 mm I.D., and 0.84 mm O.D.) is attached. The L shaped stainless steel tubes, attached to an arterial and a jugular vein catheter, are bundled together with silicone tubing (0.76 mm I.D. and 1.65 mm O.D.) and anchored with silastic medical adhesive (Silicone Type A). The catheters and the micro-renathane-stainless steel tubing will be heat sterilized.

The mouse is anesthetized and its skin on the interscapula and ventral surface of the neck is depilated by plucking. The depilated area is sterilized with 10% povidone-iodine. A small longitudinal incision (about 5 mm) is made in the skin over where the anterior jugular, acromeodeltoid, and cephalic veins join together. The connective tissues surrounding this junction are carefully removed. Two thin threads of silk (6-0 Silk, Davis+Gech) are passed under the jugular vein below the level of the junction. They are separated by about 3 mm. The cephalic thread, placed just below the joint, is tied to prevent bleeding. A small incision is then made just below the ligature, and the catheter is pushed 13 mm into the lumen. The catheter is fixed with the second thread and the thread previously used to tie the jugular vein. The common carotid artery is separated from the vagus nerve and muscle, and then two thin threads of silk (6-0 Silk, Davis+Gech) are passed under the artery. The cephalic thread is tied to prevent bleeding and then the artery is clamped by small bulldog clamp. A small incision is made just below the ligature, and the catheter is inserted into the lumen. The clamp is taken off and the catheter is pushed in 10 mm. The catheter is fixed with a second thread and the thread previously used to prevent bleeding. A blunt needle (16 gauge) is carefully inserted through the incision on the interscapula and pushed subcutaneously until the end comes out through the incision in the neck. The catheters will be carefully seized and pulled slowly through the needle. The incisions in the skin are then sutured. The catheters are connected to the stainless steel tubes. The bent portion of the stainless steel tubing is implanted under the skin and the incision is sutured. The implanted catheter is flushed with saline containing 200 U heparin/ml and 1 mg ampicillin/ml. Then the micro-renathane tubing is closed with a stainless steel wire. The mouse is injected subcutaneously with 150 mg/kg ampicillin. The total duration of the operation is about 50 min. Animals are removed to a post-surgical warming bed, and monitored until fully awake. Postoperative body weight and food intake are measured daily.