A rapid and simple procedure for chronic cannulation of the rat jugular vein

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HARMS, P. G., AND S. R. OJEDA. A rapid and simple procedure for chronic cannulation of the rat jugular vein. J. Appl. Physiol. 36(3) : 391-392. 1974.-An easy-to-prepare cannula and simple procedure is described for chronic cannulation of the jugular vein of the rat. Cannulas permit blood sampling without disturbance to the animal and remain patent for as long as 2 months.

jugular vein cannula; blood sampling

PLASMA LEVELS OF PITUITARY HORMONES are affected by the method used for blood collection. These alterations are due at least in part to the stress of handling and/or anesthesia (1, 8, 14). Recent studies (4, 6) also indicate that hormone levels may fluctuate in a circadian pattern under normal physiologic conditions. Consequently, for studies on physiologic plasma levels of the pituitary hormones, it is necessary to obtain sequential blood samples without disturbing the animal.

Such studies in the rat have been hampered by the lack of simple effective procedures for chronic blood vessel catheterization. Venous or arterial cannulas have been described for the rat; however, the majority of such cannulas are less than easy to prepare and/or their implantation is laborious (3, 5, 9, 12, 13). The present communication describes a cannula that is easy to prepare and a cannulation procedure that is simple and fast.

MATERIALS AND METHODS

Cannula preparation. A 10-cm length of Silastic brand silicon medical-grade tubing (0.05 cm ID, 0.09 cm OD) is passed through a rectangular silicon sheet (Silastic brand: 1 x 3 cm on each side and 0.02 cm in thickness) as illustrated in Fig. 1. Exact dimensions may need to be modified to accommodate rats of varying sizes. Animals used for the present work weighed between 230 and 270 g. The silicon sheet is divided longitudinally into three approximately equal pars. Part A is then folded back upon the tubing and bonded to part B with Silastic brand silicon adhesive type A, securing the tubing to the sheet. When the adhesive has cured, the sheet is trimmed as shown in Fig. 1 and the cannula is ready for implantation.

Implantation needle preparation. The implantation needle shown in Fig. 2 is constructed from a 2.5-cm 20-gauge and a 1.9-cm 23-gauge hypodermic needle. Upon removal of the hubs from both needles, the beveled portion of the 23-gauge needle is milled down and fitted snugly into the end (opposite the beveled end) of the 20-gauge needle. The beveled end of the 20-gauge needle is then bent slightly as illustrated in Fig. 2. Needles of the above size were utilized since the silicon tubing fit tightly on the 23-gauge needle, yet was of the same outside diameter as the 20-gauge needle, permitting the cannula to pass readily into and out of the vein. One implantation needle can be used for many implantations.

Surgical implantation. With the animal under general (ether) anesthesia, a longitudinal skin incision is made over the area where the right external jugular vein passes dorsal to the pectoralis major muscle. The area is freed of loose subcutaneous tissue; however, dissection of the vein from the surrounding tissue is unnecessary. As illustrated in Fig. 2, the implantation needle with the cannula attached is thrust into the lumen of the vein approximately 5 mm cephalad to the muscle and then out again through the muscle. The cannula is consequently passed into and out of the vessel. After disconnection from the needle, the cannula is pulled back into the vessel and then, under gentle pressure, is advanced down the vein toward the heart. With the cannula inserted in the vein up to the junction with the silicon sheet, it is anchored in place by suturing of the sheet to the muscle. The free end of the cannula is then threaded subcutaneously through a 16-gauge hypodermic needle which has been previously passed through the skin and subcutaneously from the top of the neck down to the incision. After withdrawal of the needle, the free end of the cannula is left exteriorized through the skin of the dorsum of the neck just posterior to the ears. The cannula is filled with physiologic saline.
REFERENCES


