

A preparation of the spinal cat by an anterior approach

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A method for preparation of the spinal cat through an anterior approach is described. It has certain advantages over the classical posterior approach and is particularly useful in preparations for studying the superior cervical ganglion or nictitating membrane since the entire procedure may be carried out through the same exposure.

DESPITE the frequent use of the spinal cat-nictitating membrane preparation for the study of autonomic drugs, the operational details have been infrequently described. Most investigators use Dale's method as described by Burn (1952) for preparation of the spinal cat. This method is somewhat inconvenient because one must first do a tracheotomy and temporarily clamp the carotids, then turn the cat over and carry out the posterior approach to the spinal cord.

The removal of the larynx and oesophagus as suggested by Trendelenberg (1957) offers a clearer operative field for the necessary manipulations of the superior cervical ganglion and the post ganglionic fibres to the nictitating membrane. When this was done, it was found that a simple retraction from the midline of the anterior spinal muscles exposed a natural space between the skull and the first cervical vertebra, especially on hyperextension of the head. It was covered only by a dural membrane and offered a simple approach for the transection of the spinal cord.

Not only was the posterior dissection eliminated, but other advantages accrued. By avoiding the thick and vascular spinal muscles, less trauma and haemorrhage was inflicted. No bones or cartilage had to be resected, and the approach avoided the vertebral arteries.

Method

The cat was anaesthetised with diethyl ether in an ether box. Anaesthesia was maintained with ether by the open drop technique using a nose cone. A tracheotomy was performed just above the sternal notch, anaesthesia now being maintained with an ether vapouriser attached to the tracheotomy tube. The trachea and oesophagus were severed between a double ligature placed immediately cephalad to the tracheotomy tube. These two structures were then easily peeled away from the anterior spinal muscles. A second ligature was placed around these structures above the larynx. The larynx, trachea, and oesophagus were now removed. Careful ligation of the branches of the carotid, such as the thyroid artery, virtually eliminated all haemorrhage.

The anterior spinal muscles were then retracted from the midline between the base of the skull and the first cervical vertebra. For better exposure of the superior cervical ganglion, the anterior spinal muscles on the desired side might be pulled away or even resected (Fig. 1).

Transection of the spinal cord was best performed with the head hyperextended. A small incision was made in the dural membrane of

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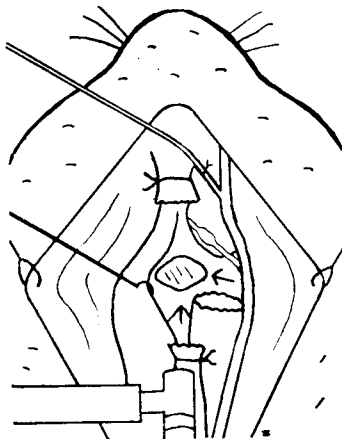


FIG. 1. Anterior view of the cervical region of the cat. A tracheal tube is in place and connected to the respirator tube. A ligature is around the base of the oropharynx at the cephalic end. The larynx, trachea and oesophagus are removed. The left anterior spinal muscles are severed, the right is retracted. The left carotid artery is outlined and a catheter is in the cut end of the lingual branch. The left superior cervical ganglion is seen against the tympanic bullae, as the post ganglionic trunk enters the skull. An arrow points to the natural opening between the base of the skull and the first cervical vertebra, through which the procedure is carried out.

the now exposed space between the skull and the first cervical vertebra. The spinal cord was severed with a suitable instrument such as a small, curved, blunt spatula. Then the instrument was quickly passed through the foramen magnum and the brain destroyed. Obviously, destruction of the brain may be omitted in preparations where it is unnecessary or undesired. Ether anaesthesia was now stopped and artificial respiration instituted. Pledgets of cotton were held ready to be packed into the spinal canal immediately after the instrument was removed. When the canal was tightly packed, pressure was maintained over the opening with a gauze sponge for a few min until all bleeding stopped. The opening may be covered with beeswax.

During the transection, bleeding could be avoided by applying bulldog clamps to both carotids. Egress of spinal fluid was minimised by first aspirating through the dura with a wide bore needle and syringe before it was cut. In over 20 cats prepared in this fashion, the described operative procedure proved to be eminently satisfactory in all respects.

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