

OPERATIVE APPROACHES TO THE CERVICAL SPINAL GANGLIA OF THE CAT

S. P. Semenov

UDC 616.839.16-092.9-089.12

The topographical anatomy of the first, second, and third cervical spinal ganglia of the cat is described and sparing methods of operative approach to these ganglia are suggested.

* * *

The approach to the spinal ganglia, in laboratory animals [3, 5] as well as in man [4, 6], is usually made by laminectomy. Many investigators consider that wide excision of the vertebral arches is dangerous, because the large veins lying in the epidural space do not collapse when injured, and severe bleeding results. To reduce the general trauma and to avoid damage to the spinal cord, a method of opening the vertebral canal in the thoracic and lumbar regions by means of a drill has been suggested [2]. The technique of operations on the spinal cord has been fully described [2-4, 5, 6]. However, in textbooks of anatomy of the cat [1, 7, 8] no information is given on the topography of some of the cervical spinal ganglia. Sparing methods of approach to the various cervical ganglia have not been developed.

The present investigation was carried out to fill this gap.

The cervical roots of the spinal cord leave it in a lateral direction. In the cat all sensory ganglia except the first and second lie in the vertebral canal immediately next to the intervertebral foramina.

A distinguishing feature of the first pair of cervical ganglia is their position in the short transverse canals running in the anterior part of the dorsal arch of the atlas. The approach to the first ganglion is the most complicated and it calls for the maximum of accuracy and care. Access to the point of emergence of the nerve from the canal is attended by injury to the vertebral artery, which intersects the nerve, and to its branch which enters the canal. The most acceptable method of approach to this ganglion is therefore by

drilling a hole in the arch of the atlas, leading into the canal. Drilling must be either with the drill itself or with an abdominal scalpel 3 mm medially to the point of emergence of the canal and nerve on the surface, after which the hole must be widened carefully in the lateral direction as far as the point where the nerve leaves the canal (Fig. 1). Extirpation of the first ganglion is accompanied by severe arterial bleeding, and for this reason this is best done by means of the thermocautery.

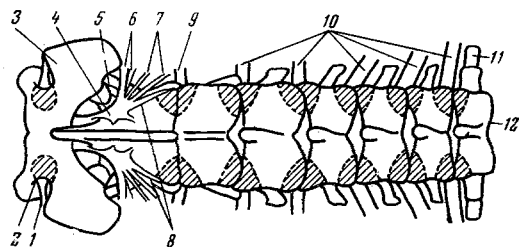


Fig. 1. Scheme of approach to cervical spinal ganglia of the cat (vertebral column viewed from above; shaded parts of arches and bodies of vertebrae to be removed). 1) Cervical nerve I; 2) canal of arch of atlas; 3) wing of atlas; 4) ganglion of nerve II; 5) vertebral artery; 6) ventral rami of nerve II; 7) dorso-caudal branches; 8) ramus communicans to nerve III; 9) nerve III; 10) nerves from IV to VIII; 11) first rib; 12) thoracic spine.

The second spinal ganglion lies laterally to the root of the arch of the 2nd cervical vertebra beneath the transversospinalis muscle, which arises from the lateral border of the flat transverse process, or wing, of the atlas and is inserted into the flat spinous process of the 2nd cervical vertebra. Its many branches give the ganglion a stellate shape (Fig. 1). The ganglion gives off 1-2 thin dorsal branches, 2-3 branches in a dorso-caudal direction to the neck muscles, 1-2 rami communicantes to nerve III and, finally, 2 ventral rami lying laterally to the vertebral artery. To obtain an approach

Department of Cytology and Histology, A. A. Zhdanov Leningrad University (Presented by Academician V. N. Chernigovskii.) Translated from *Byulleten' Éksperimental'noi Biologii i Meditsiny*, Vol. 68, No. 7, pp. 122-124, July, 1969. Original article submitted June 28, 1968.

to the ganglion the transversospinalis muscle is detached from the spinous process and carefully retracted laterally, so as not to injure the ganglion, the branches issuing from it, and the vertebral artery.

To approach the third ganglion, the articular processes of the second and third vertebrae must be removed with Luer's bone-cutting forceps or scissors. When detaching the muscles from the spinous process and arch of the 2nd cervical vertebra care must be taken not to injure the second ganglion and the rami communicantes of nerve II which lie anteriorly, and also not to seize the vertebral artery as it leaves the foramen at the base of the transverse process of the second vertebra (Fig. 1).

To approach the remaining ganglia (from the 4th to the 8th) as a rule all that is necessary is to remove the articular processes of two adjacent vertebrae by means of Luer's forceps or, in small, young animals, with scissors. To widen the hole thus made, the arches of the vertebrae can be forced apart.

After removal of the necessary portions of the vertebrae the internal periosteum is stripped by means of a scalpel and forceps, and the ensuing bleeding is stopped. Access is thus gained to the corresponding nerve, the dorsal root, and the spinal ganglion.

LITERATURE CITED

1. I. P. Zapadnyuk, V. I. Zapadnyuk, and E. A. Zakhariya, *Laboratory Animals, Their Breeding, Care, and Use for Experimental Purposes* [in Russian], Kiev (1962).
2. K. S. Zdanevich, *Nauchn. Zapiski Belotserkovsk. Sel'skokhoz. Inst.*, 4, 223 (1956).
3. A. N. Maksimenkov (editor), *Short Textbook of Operations on Animals for the Course of Topographical Anatomy and Operative Surgery* [in Russian], Leningrad (1953).
4. A. L. Polenov and I. S. Babchin (editors), *Fundamentals of Practical Neurosurgery* [in Russian], Leningrad (1954).
5. E. N. Speranskaya, *Methods of Operations on Dogs and Management of Chronic Experiments in Physiology* [in Russian], Moscow-Leningrad (1953).
6. N. B. Chibukmakher and M. S. Gorbachev, *Atlas of Operations on the Spinal Cord* [in Russian], Kiev (1965).
7. P. Popesko, *Atlas of Topographical Anatomy of Farm Animals* [in Russian], Vol. 2, Bratislava (1962).
8. H. E. Field, *An Atlas of Cat Anatomy*, Chicago (1950).