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HOW I DO IT

How I do it: cervical hemangioblastoma resection. Surgical technique and complication avoidance

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Abstract

Background Spinal cord hemangioblastomas are benign, highly vascular neoplasms that affect the brain and, rarely, the spinal cord. They can be solitary or as part of von Hippel-Lindau syndrome. Radiosurgery is not a suitable treatment option. Endovascular embolization can only be adjunct to surgery.

Method We present a detailed approach to resection of a spinal cord hemangioblastoma. A video demonstrates the microsurgical technique and discusses complication avoidance.

Conclusion The pitfalls to consider are preservation of normal spinal cord vessels, protection of the pia-arachnoid cleavage plane, and avoidance of tumor piecemeal removal. Careful microsurgical resection and detailed preoperative planning are key.

Keywords Hemangiobalstoma · Surgery of spinal cord · Microsurgical resection · Von Hippel-Lindau · Electrophysiological neuromonitoring

Relevant surgical anatomy

The cervical segment of the spinal cord is supplied with blood by three longitudinal arteries—anterior spinal and two posterior spinal arteries and by the radicular anterior and posterior arteries, with variable origin and presented most frequently under the 6th cervical segment [2]. The anterior spinal artery gives off the central arteries, which enter the anterior median spinal fissure and supply blood to the central regions of the spinal cord. Longitudinal arteries and radicular arteries form numerous, primarily superficial anastomoses, forming the so-called arterial vasocorona, which distributes superficial pial blood supply. Hemangioblastomas could be fed both by branches of the arterial vasocorona or by branches of central arteries, the latter being a less favorable alternative [6].

Venous outflow is accomplished through a superficial pial venous network and an intramedullary venous network [2]. The former drains blood to segmental veins and to the superficial variable four to six longitudinal veins. The latter is centripetally oriented and drains the blood mainly into the constant anterior spinal vein and to the variable longitudinal veins [2]. The segmental veins drain into the radiculo-medullary veins and further into the extravertebral venous plexus. The longitudinal veins drain into the cerebellar veins or into the venous sinuses of the cranial dura mater. The abundance of anastomoses in the venous systems determines a decreased risk of venous hemorrhage. The constant anterior spinal vein drains blood from the centrally located gray matter of the brain through multiple direct veins, with their interruption or that of the anterior spinal vein being a real prerequisite for the occurrence of venous infarction. Knowledge of spinal cord blood supply is important as hemangioblastomas are located either completely within the spinal cord, in which case they are not visible on the surface, or they grow eccentrically and when they reach the surface, they are visible under the arachnoid. Preserving the normal spinal cord blood supply is very important during spinal cord hemangioblastoma resection (Fig. 1).

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