



How I do it: surgical clipping of vertebrobasilar junction aneurysms through a far-lateral transcondylar approach

Vladimir Nakov¹ · Toma Spiriev¹ · Evgeni Stavrev²

Received: 24 November 2017 / Accepted: 5 March 2018
© Springer-Verlag GmbH Austria, part of Springer Nature 2018

Abstract

Background Vertebrobasilar junction aneurysms occur rarely, but have a higher rupture rate than supratentorial aneurysms, and higher morbidity and mortality. Their location ventral to the neuroaxis makes them a challenging surgical lesion.

Methods In this paper, we share our experience with the surgical technique for the management of these complex aneurysms.

Conclusion An in-depth understanding of the anatomy of these aneurysms, careful preoperative planning, and a meticulous surgical technique, including knowledge of every detail of the procedure—positioning, an advanced skull base technique, and careful aneurysm dissection and clipping—is essential for a successful outcome of the surgery.

Keywords Brain aneurysm · Vertebrobasilar junction aneurysms · Skull-base surgery

Relevant surgical anatomy

The vertebral arteries (V4 segments) are located in the lateral medullary cisterns, whereas the basilar artery is situated in the prepontine cistern. Therefore, the aneurysm neck in the VBJ is located on the border between the lateral medullary, the prepontine, and the premedullary cisterns, approximately on the level of the pontomedullary sulcus [9, 10]. The lower cranial nerves form definite triangles (between the XI CN lateral, the XII CN cranial direction, and the brainstem medial from C1 in the caudal direction) that can be used as surgical windows to the aneurysm [7].

Description of the surgical technique (video)

Positioning

Surgical access to the pathological processes located in the anterior medullary cistern and the caudal third of the prepontine cistern requires a visual angle from two directions: lateral and caudal. Therefore, the patient is placed on the operating table in lateral position, and the table is tilted in approximately a 20° reverse Trendelenburg position (Fig. 1). The head is positioned so that the mastoid tip is the most prominent point of the surgical field.

Soft tissue dissection and craniotomy

A far-lateral craniotomy is used. A C-shaped vertical incision is made 2.5 cm behind the mastoid process, starting from the pinna of the ear and reaching the level of the C4 vertebra. The suboccipital soft tissue anatomy is distinct with complex relation of its individual layers, described in detail by other authors [9, 10]. We do not dissect the individual muscle layers, because of the high rate of postoperative pseudomeningocele. Instead, the dissection is done in line with the skin incision and the suboccipital muscles are stripped from the bone in subperiosteal fashion [4] (Fig. 2). We never use electrocautery below the level of the mastoid tip and around C1 posterior arch in order to avoid thermal injury to the vertebral artery

Electronic supplementary material The online version of this article (<https://doi.org/10.1007/s00701-018-3512-1>) contains supplementary material, which is available to authorized users.

✉ Toma Spiriev
spiriev@gmail.com

Vladimir Nakov
vladimir_nakov@yahoo.com

¹ Department of Neurosurgery Acibadem City Clinic Tokuda Hospital, “Nikola Vaptsarov” Blvd. 51b, 1407 Sofia, Bulgaria

² Department of Neurosurgery Military Medical Academy, “Georgi Sofiiski str. No 3”, 1606 Sofia, Bulgaria