Infratemporal fossa approach

Skull base tumors arising from the middle cranial fossa and invading of the infratemporal fossa (ITF) and middle cranial fossa are challenging for neurosurgeons, due to complex anatomy, and critical neuro-vascular structure involvement. The first pioneering ITF approaches resulted in invasive procedures and carried a high rate of surgical morbidity. However, the acquisition of deep anatomical knowledge, and the development of operative skills and reconstruction techniques allowed to achieve total or near-total resection of many ITF lesions with a low morbidity rate [1].

In 1961, Fairbanks-Barbosa was the first to report an infratemporal fossa (ITF) approach, indicated for advanced tumors of the maxillary sinus [2].

Transtemporal approaches described by Fisch, preauricular approaches described by Schramm and Sekhar, and transmaxillary approaches described by Terz, Janecka, and Cocke validated the efficacy of and indications for this technique and provided the framework for other modifications [3] [4] [5].

The infratemporal fossa approach closes the existing gap in the surgical management of the most hidden lesions of the temporal bone. The approach features the permanent anterior transposition of the facial nerve, resection of the mandibular condyle and mobilization of the zygoma and lateral orbital rim. Obliteration of the pneumatic spaces of the temporal bone, with permanent occlusion of the Eustachian tube and blind sac closure of the external auditory canal, avoids the danger of post-operative infection and leads to primary wound healing in the shortest time. Three types of infratemporal fossa approach are presented and dicussed on the basis of 51 operated patients [6].

Nonaka et al. describe a less invasive transcranial extradural approach to ITF parapharyngeal lesions and to determine its advantages, 17 patients with ITF parapharyngeal neoplasms who underwent tumor resection via this approach were enrolled in the study. All lesions located in the ITF precarotid parapharyngeal space were resected through a small operative corridor between the trigeminal nerve third branch (V3) and the temporomandibular joint (TMJ). Surgical outcomes and postoperative complications were evaluated. Pathological diagnosis included schwannoma in eight cases, paraganglioma in two cases, gangliocytoma in two cases, carcinosarcoma in one case, giant cell tumor in one case, pleomorphic adenoma in one case, chondroblastoma in one case, and juvenile angiofibroma in one case. Gross total resection was achieved in 12 cases, near-total and subtotal resection were in 3 and 2 cases, respectively. The most common postoperative complication was dysphagia. Surgical exposure can be customized from minimal (drilling of retrotrigeminal area) to maximal (full skeletonization of V3, removal of all structures lying lateral to the petrous segment of internal carotid artery) according to tumor size and location. Since the space between the V3 and TMJ is the main corridor of this approach, the key maneuver is the anterior translocation of V3 to obtain an acceptable surgical field [7].

Videos

In a video, Mastronardi et al. illustrated their technique for the anterior ITF approach for the surgical treatment of a middle cranial fossa meningioma invading the ITF.

This surgical video described the anterior ITF approach in a two-step. First, a standard extradural

middle fossa approach subtemporal approach is performed on cadaveric specimens, illustrating the anterior extension to the cavernous sinus. Second, the anterior ITF approach is performed for the surgical treatment of a temporal lobe meningioma with an extension to the anterior ITF.

This technique provides a minimally invasive approach for treating middle fossa lesions with anterior ITF extension [8].

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