

cut the fibrous attachments between the nerve and the fallopian canal. The tympanic segment of the nerve is elevated carefully, using a curved raspator, until the level of the geniculate ganglion is reached. A nontoothed forceps is used to hold the soft tissue surrounding the nerve at the stylomastoid foramen and the anterior rerouting is carried out. A tunnel is created in the parotid gland to lodge the transposed nerve. The tunnel is closed around the nerve using two sutures. The nerve is fixed to the new bony canal, just above the Eustachian tube, using fibrin glue.

Drilling of the infralabyrinthine cells is completed, and the vertical portion of the internal carotid artery is identified. The mandibular condyle is separated from the anterior wall of the external auditory canal using a large septal raspator. The Fisch infratemporal fossa retractor is applied, and the mandibular condyle is anteriorly displaced, with care being taken not to injure the facial nerve. The anterior wall of the external auditory canal is further drilled, thus completing the exposure of the vertical portion of the internal carotid artery.

A small incision is made in the posterior fossa dura just behind the sigmoid sinus, through which an aneurysm needle is passed. Another incision is made just anterior to the sinus to allow the exit of the needle. The sinus is closed by double ligation with a vicryl suture. Suture closure of the sinus, however, may lead to gaps in the dural incision, with a higher risk of cerebrospinal fluid leakage postoperatively. Alternatively, the proximal part of the sigmoid sinus is compressed extraluminally with Surgicel; the sinus is then opened and packed distally and proximally with two large pieces of Surgicel.

The structures attached to the styloid process are severed. This process is fractured using a rongeur and is then cut with strong scissors. The remaining fibrous tissue surrounding the internal carotid artery at its ingress into the skull base is carefully removed using scissors. The internal jugular vein in the neck is double-ligated and cut. The vein is elevated superiorly, with care being taken not to injure the related lower cranial nerves. In case the eleventh nerve passes laterally, the vein has to be pulled under the nerve carefully to prevent it from being damaged. If necessary (as in the case of glomus jugulare tumors), the lateral wall of the sigmoid sinus can be removed. Removal continues down to the level of the jugular bulb. The lateral wall of the jugular bulb is opened. Bleeding usually occurs from the apertures of the inferior petrosal sinus and the condylar emissary vein. This is controlled by Surgicel packing. If there is limited intradural extension, the dura is opened without injury to the endolymphatic sac.

At the end of the procedure, the Eustachian tube is closed by a piece of muscle. The dural opening is closed by a muscle plug. A transfixing suture is passed into one

dural edge, through the muscle plug and out from the other dural edge, and then tied. The cavity is obliterated using abdominal fat and the rotated temporalis muscle.

Hints and pitfalls

The geniculate ganglion should be fully uncovered. Sharp bone left at this level might injure the anteriorly transposed nerve. The facial nerve has to be liberated in the parotid gland before anterior transposition is performed. This provides an extra length of free nerve and prevents it from being stretched during transposition.

Care should be taken while applying the Fisch infratemporal retractor so as not to injure the facial nerve. While removing the base of the styloid process, the utmost care has to be taken not to injure the internal carotid artery lying immediately deep to it.

The internal carotid artery is surrounded by a dense fibroperiosteal layer at its entrance in the skull base. The glossopharyngeal nerve lies deep to this layer and is slightly adherent to its undersurface. Care has to be taken not to injure the nerve while dissecting tumor at this level. In large glomus tumors, however, the nerve has been usually infiltrated and it is therefore sacrificed.

Due to excessive neck dissection and the connection between the soft tissues of the neck and the surgical cavity, large intradural extensions cannot be managed in one stage using this approach. Removing the large intradural portion of the tumor would necessitate a larger dural opening and therefore a higher risk of postoperative cerebrospinal fluid leakage. In such cases, following the infratemporal fossa approach type A, a second stage operation is needed to remove the intradural component of the tumor.

With glomus tumors, all cancellous bone should be removed if suspected. Drilling should continue until sound bone is reached. This is especially important in the area lying between the basal turn of the cochlea and the internal carotid artery. Bone from the petrous apex lying medial to the internal carotid artery should also be drilled if suspected. The occipital condyle may be partially removed if involved. The cochlea may be involved by glomus tumor in spite of normal preoperative hearing. In this cases, total tumor removal necessitates its removal.

In class C2 tumors, the carotid artery should be freed from the adherent tumor. This is usually feasible. Since the carotid sheath (periosteum), rather than the carotid wall itself, is the part involved by the tumor. The carotid sheath is cut at an area free of tumor, and is held with a nontoothed forceps in one hand. The sheath with the infiltrating tumor is then dissected away from the carotid using a pair of microneurosurgical scissors. Removal of the internal carotid artery may be required on