Supraorbital craniotomy

The supraorbital craniotomy allows a wide, intracranial exposure for extended, bilaterally situated, or even deep-seated intracranial areas, according to the strategy of keyhole craniotomies. The supraorbital craniotomy offers equal surgical possibilities with less approach-related morbidity owing to limited exposure of the cerebral surface and minimal brain retraction. In addition, the short skin incision within the eyebrow and careful soft tissue dissection result in a pleasing cosmetic outcome. In addition, the short skin incision within the eyebrow, the careful soft tissue dissection, and the single burr hole trephination result in a pleasing cosmetic outcome [1)]. [2)].

The supraorbital craniotomy and its modifications provide an ideal anterior subfrontal approach through which a wide variety of pathology can be approached. This technique has particular considerations in comparison to traditional cranial base approaches that must be taken into account before it is utilized [3)].

Through a 4 to 5 centimeter (cm) long eyebrow incision an orbital roof craniotomy (measuring 2 cm by 3 cm), including the supraorbital arch, is made as a single piece bone flap. The orbital roof is opened up to the superior orbital fissure and to the optic canal by additional removal of the bone in the orbital roof. This will expose the globe and the orbitofrontal dura mater. When the dural incision is made at the orbital portion of the dura mater, the orbital contents are retracted by tack-up sutures. The tumor is removed utilizing the orbital space rather than the intracranial space. Brain retractors are not necessary and are not used to execute the tumor resection. This technique has been used in three patients with craniopharyngiomas, seven patients with meningiomas, and one patient with a subfrontal teratoma. Gross total resection was achieved in three patients with craniopharyngiomas and in five patients with subfrontal or parasellar meningiomas. Subtotal resection of the tumor was achieved in two patients with recurrent meningiomas and in the patient with a subfrontal teratoma. The surgeon's operating space through this exposure was sufficiently ample to achieve the goals of the operation. The direct eyebrow incision provides an additional vital working space with a width of more than 1 cm at the skull base by eliminating the scalp flap which a coronal incision employs [4)].

The PubMed and Embase databases were searched up to December 2017 for full-text publications that report the treatment of aneurysms with the eyebrow variant of the supraorbital craniotomy

(SOC), the mini-pterional craniotomy, or the eyelid variant of the SOC. The anatomical distribution of aneurysms, the postoperative aneurysm occlusion rate, and the type and rate of complications were examined using univariate analysis.

Sixty-seven publications covering treatment of 5770 aneurysms met the eligibility criteria. The reported experience was the largest for the eyebrow variant of the SOC (69.4% of aneurysms), followed by the minipterional approach (28.2%), and the eyelid variant of the SOC (2.4%). The anterior communicating artery (ACoA) was the most frequent aneurysm location for the SOC (eyebrow variant: 33.2%; eyelid variant: 31.2%). The middle cerebral artery (MCA) was the most frequent aneurysm location in the minipterional cohort (55.2%). In the eyelid variant of the SOC cohort, the rate of complete aneurysm occlusion was the lowest (eyelid variant: 90.8%; eyebrow variant: 97.8%, $p < 0.001$; minipterional approach: 97.9%, $p < 0.001$), and the postoperative infarction rate was the highest (eyelid variant: 7.2%; eyebrow variant: 3.5%, $p = 0.025$; minipterional approach: 2.6%, $p = 0.003$).

Each approach has a specific safety and efficacy profile. Surgeons selected the eyebrow variant of the SOC for many aneurysm locations including in particular the ACoA. There is a recent tendency however to opt for the minipterional approach above all for MCA aneurysms [5].

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see Lateral supraorbital approach.

Compared to endoscopic endonasal approach (EEA), supraorbital craniotomy provides substantial cost-savings in the treatment of olfactory groove meningioma. Given potential effectiveness differences between approaches, a cost-effectiveness analysis should be undertaken [6].

Supraorbital minicraniotomy

see Supraorbital minicraniotomy.

References

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