Main menu

Petrous apex and its approaches

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Introduction:

Petrous apex is the medial portion of petrous bone that lies between the inner ear and clivus. Since this is a difficult region anatomically various approaches have been designed over the ears to access this area.

This portion of the temporal bone is pyramidal in shape wedged in the skull base between the sphenoid and occipital bones. It is directed medially, forwards and slightly upwards.

It has an apex, base, three surfaces and three angles.

Base: This portion of the petrous bone is fused with the internal surfaces of the mastoid and squamous portion of the temporal bone.

Apex: This is rough and uneven and is placed in the interval between the greater wing of sphenoid and occipital bone. It has the internal orifice of the carotid canal. It forms the postero lateral boundary of the foramen lacerum.

Anterior surface:

The anterior surface forms the posterior portion of the middle cranial fossa in the skull base. It continues with the inner surface of the squamous portion of temporal bone with which it is united by the petro squamous suture line. This suture line is distinct even in the later phases of life. This surface is marked by the depressions and convolutions of the brain.

Features of this surface include:

1. Near its centre lies the arcuate eminence which overlies the projection of superior semicircular canal.
2. In front and slightly lateral to this eminence lie a depression which indicates the position of the middle ear cavity. The bone in this area is very thin and is known as the tegmen plate.

Eagleton's approach:

This is the superior approach to the petrous apex that involves removal of the tegmen to the base of the zygoma together with removal of part of the squamous temporal bone. The dura of the middle cranial fossa can now be elevated to expose the petrous apex.

Thornvaldt's operation:

This approach is also along the supra labyrinthine tracts. As the dissection proceeds it merges with that of Eagleton's approach.

Almoor's approach:

This is an inferior approach to the petrous apex through a space bounded by the cochlea, the carotid artery and the tegmen tympani.

Ramadier's operation:

This approach is slightly anterior to that of Almoor's operation that pursues the peritubal cells to the petrous apex that exists between the cochlea and the carotid artery.

Frenckner's operation:

This approach to the petrous apex is through the arch of the superior semicircular canal. The blood supply to the arch arises from within this arch and some labyrinthine loss is almost inevitable with this approach. It has to be combined with an inferior approach.

Transpetrosal approaches also include a variety of surgical approaches through the petrous portion of the temporal bone to provide access to:

1. Cerebello pontine angle
2. Petro clival region
3. Basilar artery
4. Brain stem

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