Surgical Anatomy Of The Anterolateral Approach- Step By Step Dissections

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Introduction

The jugular foramen is a difficult area to access because of its complex relationship with neurovascular structures and its deep location, representing surgical challenge. Because of its complexity, surgical access usually requires combined approaches. The most common tumors that settle in this area are paragangliomas, meningiomas, schwannomas, chordomas and chondrosarcomas.

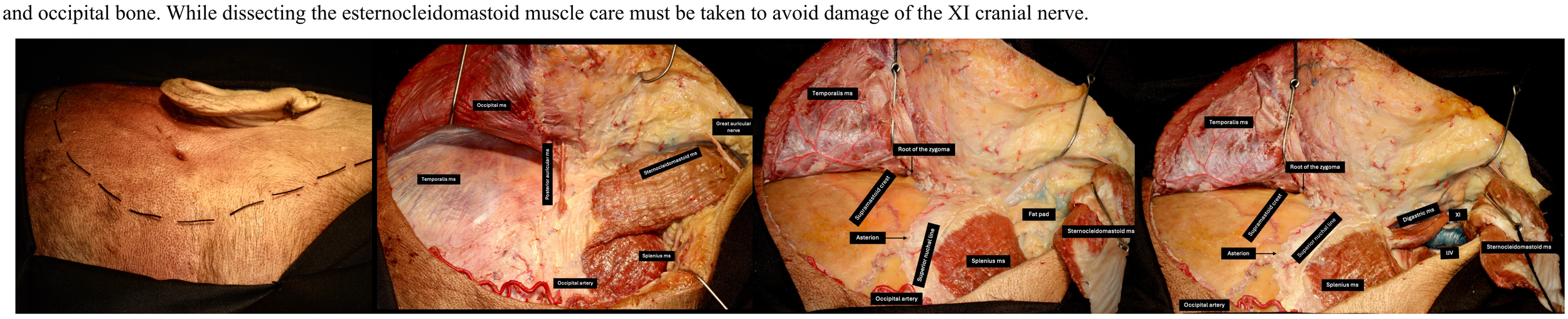
The anterolateral approach described by Bernard George, provides access to the jugular foramen with posterior, anterior and lateral exposure, as well as extension to the high cervical region, craniocervical junction, inferior clivus and into de posterior fossa intradurally.

Materials and Methods

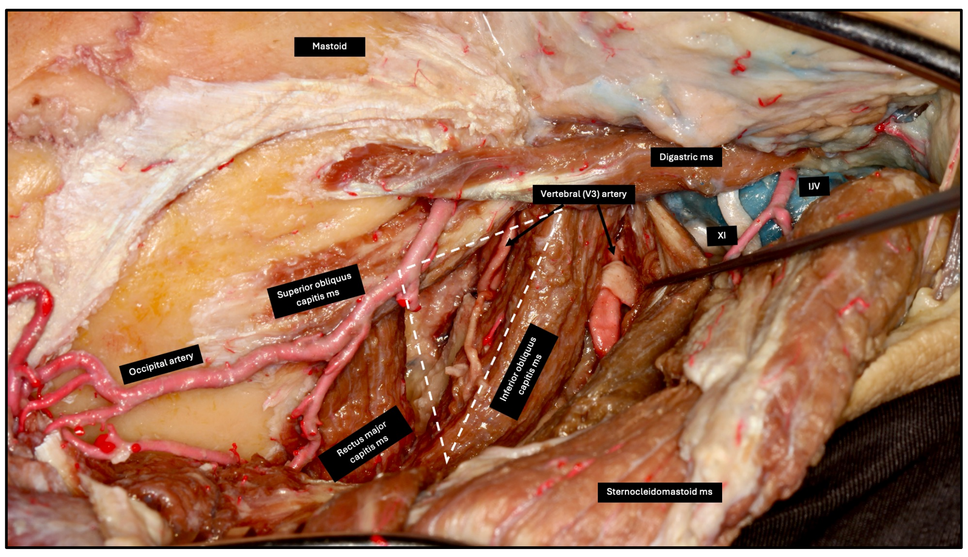
Three latex- injected cadaveric head specimens were dissected in a stepwise fashion. After each step was completed, the dissections were photo documented with a high definition camera.

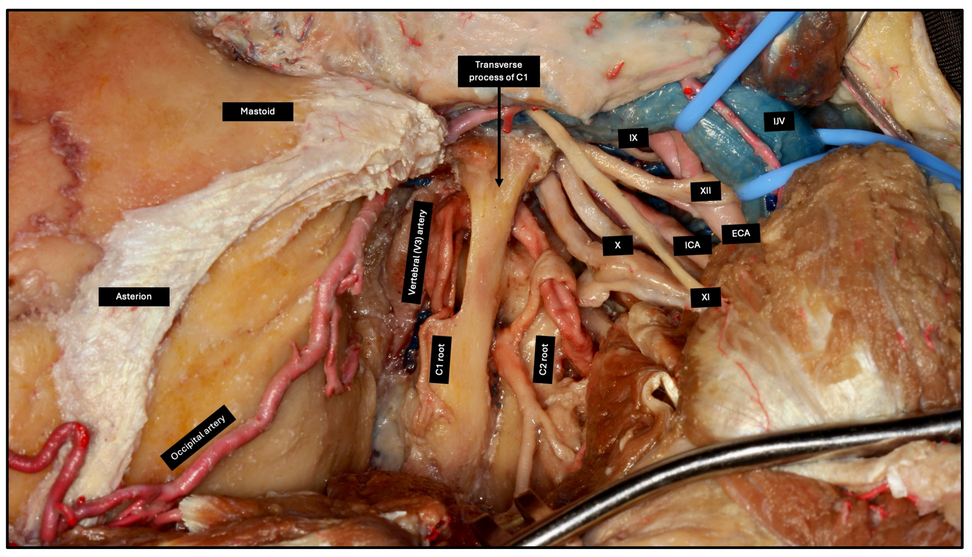
Results

Muscle dissection (esternocleidomastoid muscle and accessory nerve): The patient is placed in a supine position with the head turned laterally. Retroauricular C-shaped incision with extension to the neck along the anterior margin of the esternocleidomastoid muscle. The posterolateral neck muscles are reflected posteriorly, exposing the mastoid, the suboccipital triangle and occipital bone. While dissecting the esternocleidomastoid muscle care must be taken to avoid damage of the XI cranial nerve.

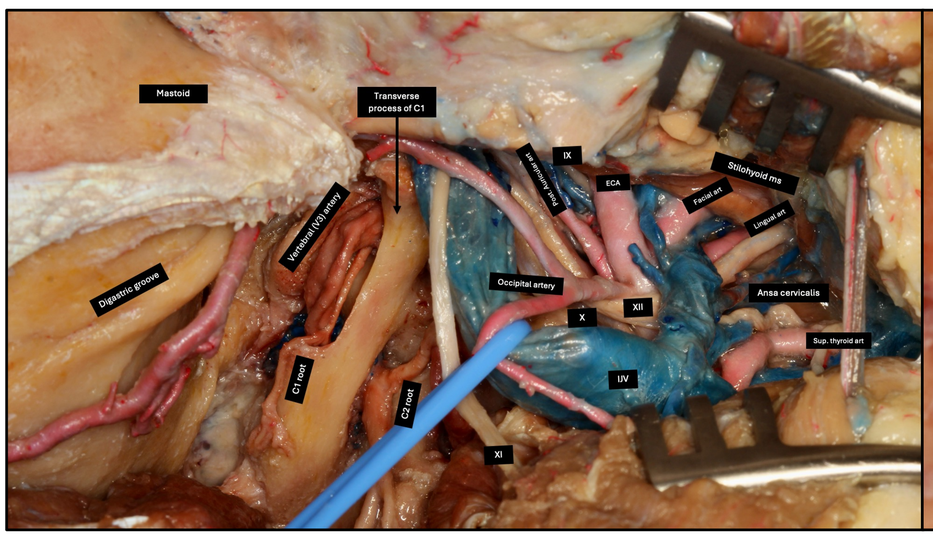


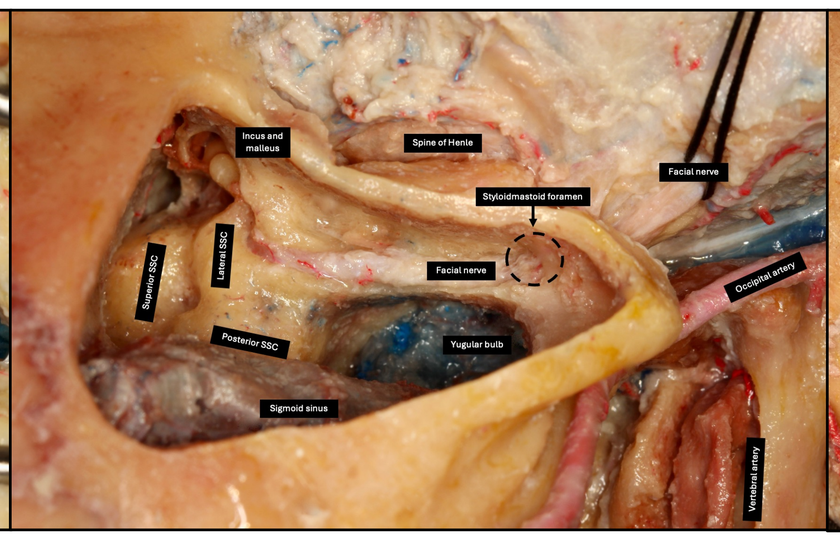
Exposure of transverse process of C1 and mobilization of vertebral artery: The transverse process of C1 is a key anatomical landmark for the V3 segment of the vertebral artery, and the lateral margin of the interior jugular vein and its relationship with the spinal accesory nerve. Unroofing of the C1 transvere foramen allows for vertebral artery transposition.

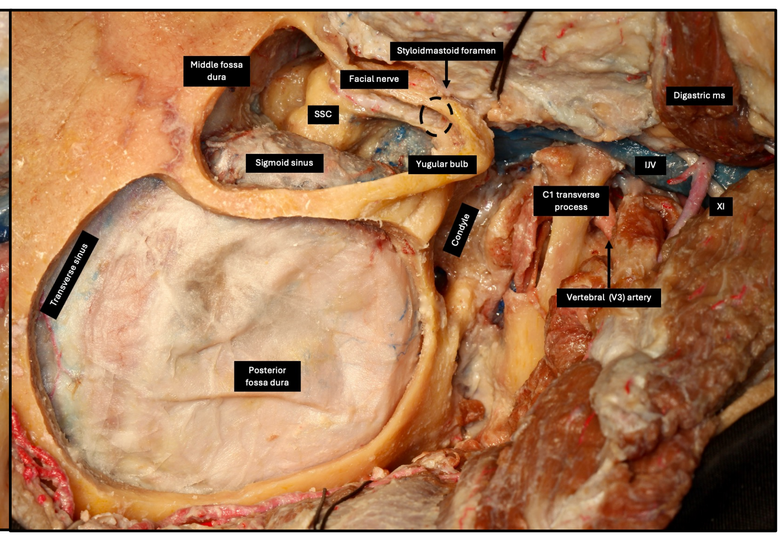




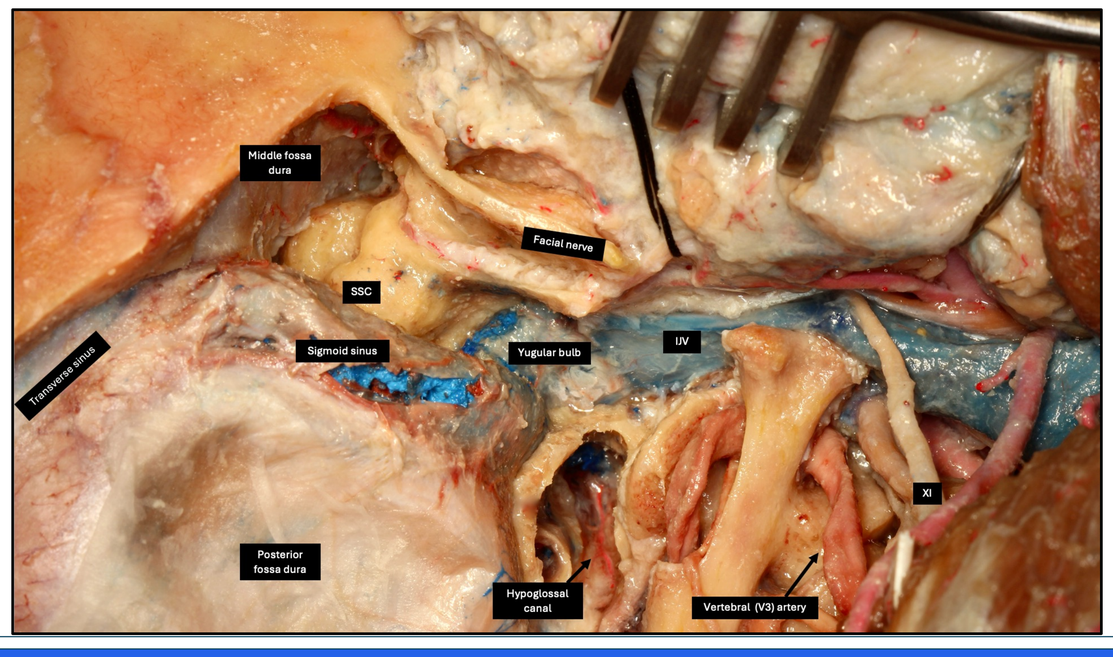
Extradural exposure (mastoidectomy, high cervical approach) and paracondilar drilling: The exposure is completed with high cervical dissection which allows for identification of the extracranial portion of the lower cranial nerves, internal jugular vein and carotid artery. Posteriorly, a complete mastoidectomy is performed which involves the skeletonization of the sigmoid sinus and jugular bulb, identification of fallopian canal and semicircular canals, exposure of the presigmoid and middle fosa dura, as well as a suboccipital craneotomy/craniectomy with foramen magnum opening. The extracranial exposure is completed after occipital condyle and jugular tubercle drilling. This approach grants a transjugular transsigmoid access to de jugular foramen.

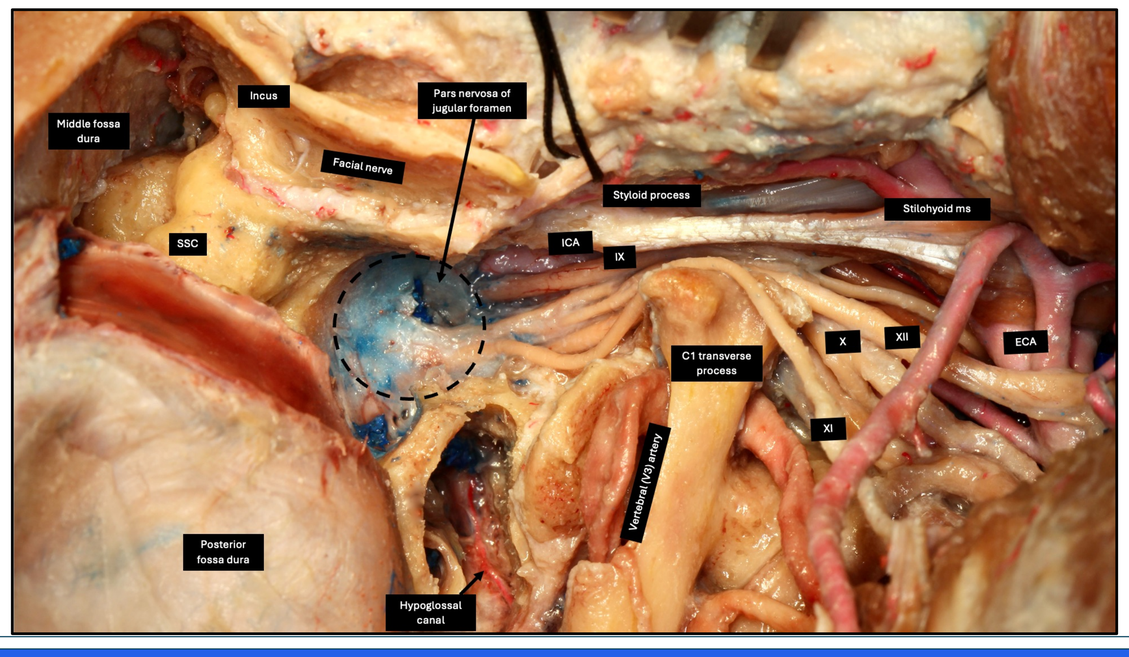






Intradural dissection: A retrosigmoid dural oppening can be performed, as well as hypoglossal canal opening and drilling of the stylomastoid foramen permits translocation of the facial nerve. The craniocervical junction can be reached by drilling of the lateral mass of C1, if necessary.





Conclusions

The anterolateral approach is versitile procedure which allows multidirectional access involving the jugular foramen, craniocervical junction and high cervical region, with extradural as well as intradural expossure. It is important to have a clear understanding of the anatomy involved because of the complex neurovascular structures involved.