Scholars Journal of Applied Medical Sciences
Abbreviated Key Title: Sch J App Med Sci
ISSN 2347-954X (Print) | ISSN 2320-6691 (Online)
Journal homepage: https://saspublishers.com

OPEN ACCESS

Radiology

Radioanatomy of the Petrous Bone

Zidani Ayoub[1*], K. Aalloula[1], Pr. Slioui[1], Pr. N. Hammoune[1], Pr. Mouhsine[1]

[1]Radiology Department, Avicenne Military Hospital, Marrakech, Morocco

DOI: https://doi.org/10.36347/sjams.2024.v12i10.025 | **Received:** 21.09.2024 | **Accepted:** 25.10.2024 | **Published:** 31.10.2024

***Corresponding author:** Zidani Ayoub
Radiology Department, Avicenne Military Hospital, Marrakech, Morocco

Abstract **Review Article**

The high-resolution computed tomography (HRCT) scan used in the 1980s offers a distinct advantage in interpreting images of the temporal bone. To obtain a right image reconstruction and to provide meaningful information, a certain degree of tilt is required so that radiologists and clinicians can get more real imaging information on structural abnormalities in the temporal bone and its soft tissue constituents. The technique or protocol in HRCT of the temporal bone becomes an essential primary aspect in presenting the analyzed structure, the assessment of the small form of the auditory bones, the soft tissue of the inner ear and the cranial nerves that pass through the temporal bone structure is much easier to analyze, of course with the help of reconstruction according to the HRCT protocol for temporal bone, however, soft tissue evaluation is preferable to MRI. In the end, the standard structure, congenital abnormalities and pathological problems in the temporal bone structure can be identified and informed to the clinician as a step to determine further treatment action.

Keywords: Anatomical structures-petrous pyramid-medical imaging-Computed tomography.

INTRODUCTION

The petrous bone is a complex anatomical region, containing the organs of hearing and equilibrium. The importance of his study stems from the wealth of sensory and neurovascular elements that cross it as well as the diversity of its pathological attacks.

The purpose of this work is to recall the anatomical bases of the petrous pyramid allowing a good interpretation of the radiological examinations of the petrous bone while noting the main anatomical variants to be noted on a report that may have a surgical risk.

ANATOMICAL OVERVIEW

The petrous bone is the most complex part of the temporal bone because of the large cavities it contains and the many ducts that pass through it.

It is a quadrangular pyramid with posterolateral base and anteromedial apex. It can be subdivided into 3 compartments:

- "Outer ear: represented by the MAE which is in continuity with the auricle.
- "Middle ear: represented by the eardrum
- "Internal ear: consisting of the cochlea, the vestibule and the semi circular canals.

We will study the various cavities dug inside the petrous pyramid as well as the sensory and vasculonervous elements that cross it.

EXPLORATION AND NORMAL RADIOANATOMY:

The variability of the anatomical structures of the petrous pyramid is studied by medical imaging.

Computed tomography is the most frequently used technique, both to make the diagnosis and to choose the best surgical approach. Magnetic resonance imaging is used in the detection of retrocochlear and intracranial pathologies. It allows the complementary evaluation of the liquid spaces of the inner ear as well as their freedom. These two examinations have a complementary role in the characterization and the extension assessment of the lesions of this space.

The place of cone beam imaging (Cone Beam) in the exploration of the ear is not yet well defined at present. Conventional radiology has lost its place in favor of CT while keeping indications limited to the effects of Schüller and Stenvers.

ANATOMICAL VARIANTS AND TRAP IMAGES:

The petrous bone has several variants, some of which may have a surgical impact. They can evoke in certain cases false pathological images.

The most important anatomical variants are:

- Variants of pneumatisation:
  - Sclerotic mastoid in the right (Figure 1)
  - Pneumatization of the mastoid (Figure 2)
- Septum Korner on ear malformed (Figure 3)
- Pr**é**mallear bone plate (Figure 4)
- Anteriior tympanic recessus (Figure 5)
- Deep sinus tympani (Figure 6)
- Sigmoid sinus located befor (Figure 7)
- Absurd trajet of the carotid atery (Figure 8)
- Variants of jugular vein
  - An asymmetry of the bays of the jugular vein (Figure 9)
  - A high gulf of the jugular vein situated, (Figure 10)
  - A diverticule of the jugular vein (Figure 11)
  - And a déhiscence of the jugular vein (Figure 12)
- Variants of facial nerve
  - The variations of division of the facial nerve
  - Variation of route of the facial nerve
  - The procidence of the canal of the facial nerve
  - The déhiscence of canal of facial nerve

Sutures and fissures can be interpreted as a pathological images. We will report the principal anatomical variants of the petrous pyramid to report on an imaging report.

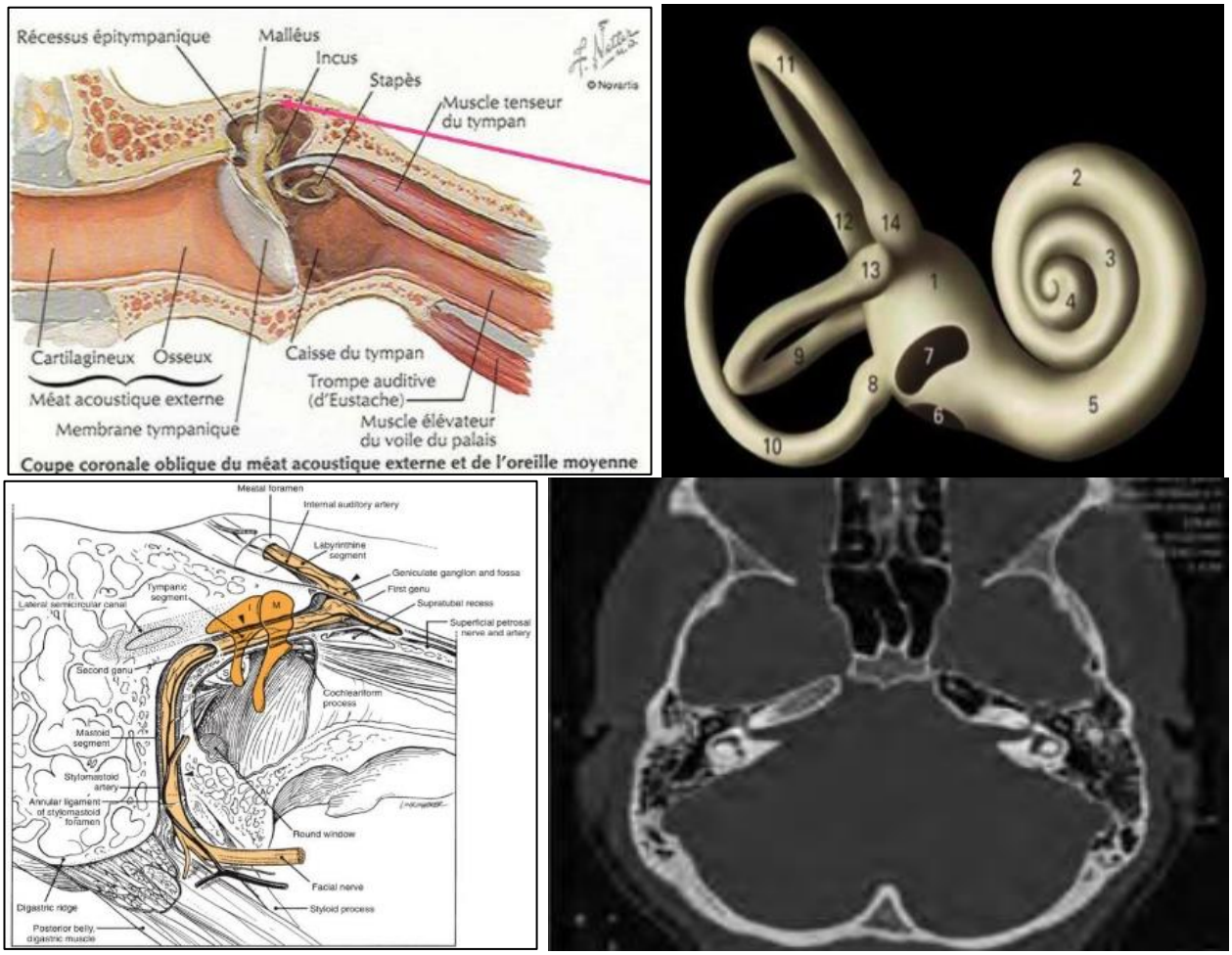

Figure 1: Sclerotic mastoid in the right

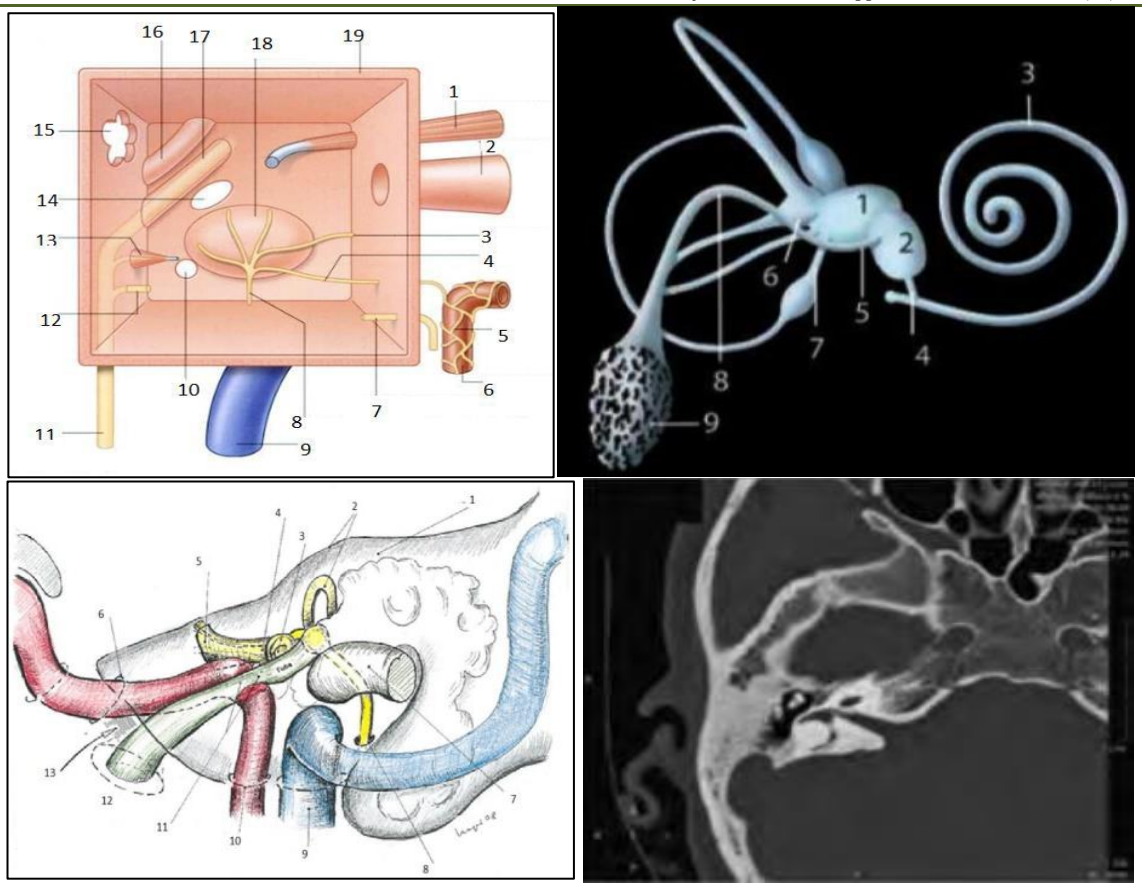

Figure 2: Pneumatization of the mastoid

Figure 3: Septum Korner on ear malformed

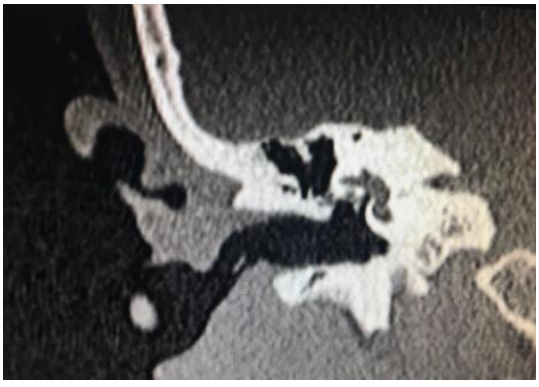

Figure 4: Pre mallear bone plate

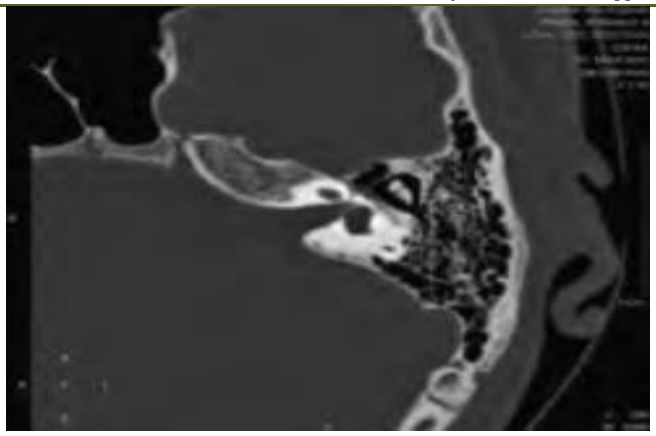

Figure 5: Anterior tympanic recesses

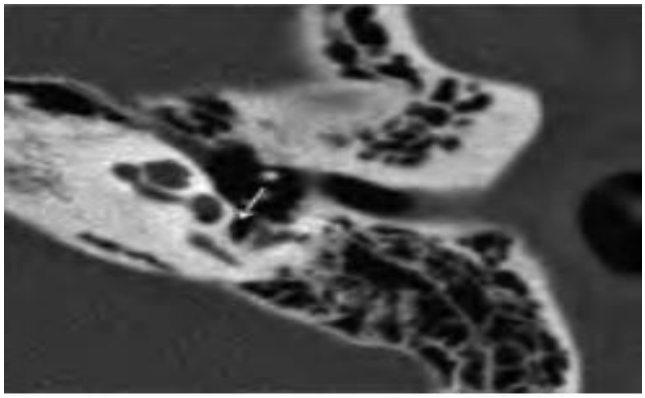

Figure 6: Deep sinus tympani

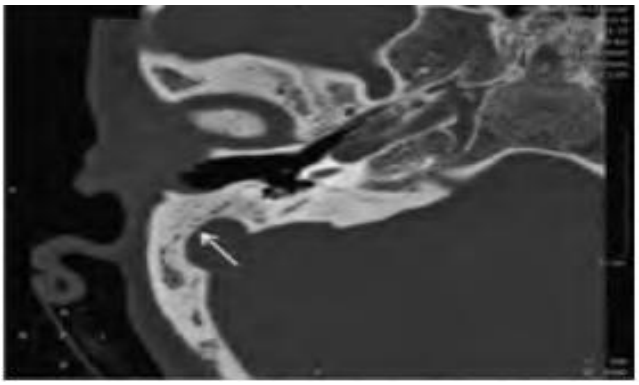

Figure 7: Sigmoid sinus located before

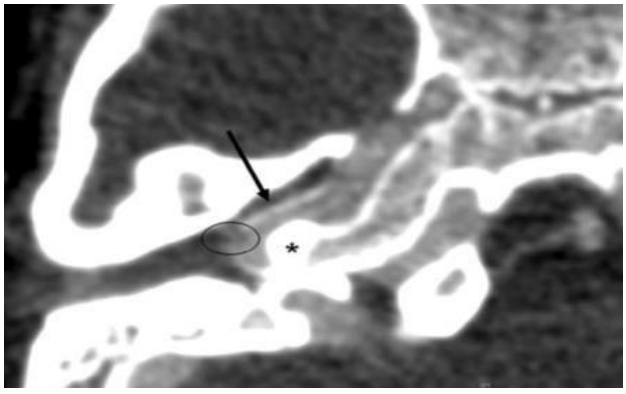

Figure 8: Absurd trajet of the carotid artery

Figure 9: An asymmetry of the bays of the jugular vein

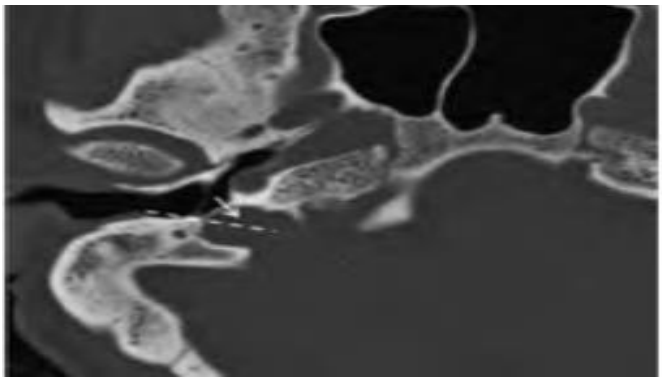

Figure 10: A high gulf of the jugular vein situated

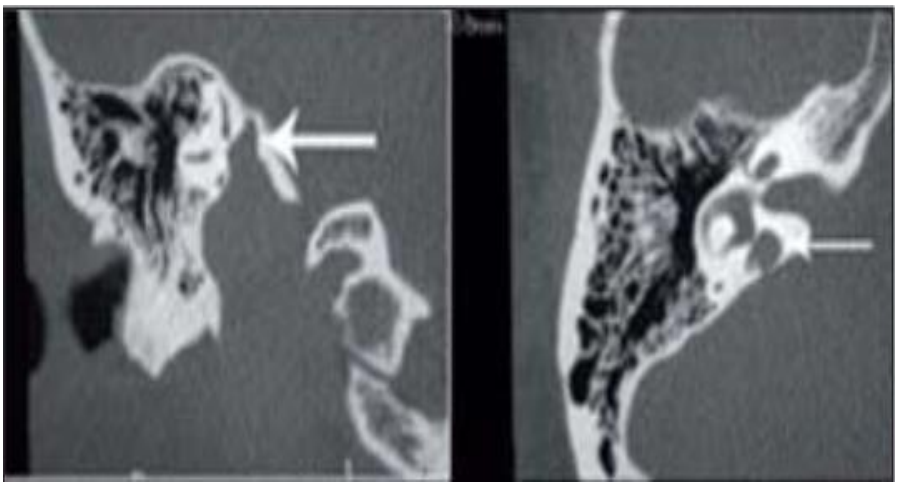

Figure 11: A diverticule of the jugular vein

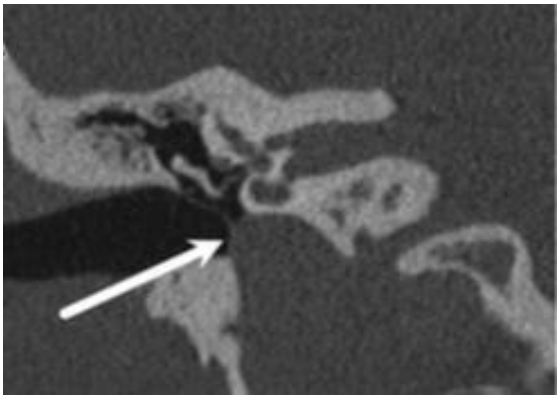

Figure 12: Dehiscence of the jugular vein

CONCLUSION

The petrous pyramid is a complex anatomical region, its exploration is based on computed tomography and complemented by MRI. Good knowledge of radioanatomy of the petrous bone is essential for a better diagnostic approach.

BIBLIOGRAPHY

- A Lahlaidi, F. B. (1986). *Anatomie topographique, Applications anatomo- chirurgicales du système nerveux.* (L. I. Sina, Éd.) (1986).
- Schuknecht's, G. A. (2007). *Anatomy of the temporal bone with surgical implications.* (T. G. university, Éd.) third edition.
- Imagerie de l'oreille. F.Veillon. Masson.
- Veillon, F. (2010). Anatomie de l'os temporal. EMC.
- Haj riffi, H. Radio-anatomie du rocher. Poster JFR.
- Dubrule, F. Radioanatomie noramale du rocher. Kit d'auto- enseignement. Poster JFR
- Hugh D., & Curtin, R. G. *Embryology, Anatomy and imaging of the temporal bone.*
- Martin, C. (2010). *Imagerie de l'oreille et du rocher.* France: Société d'oto- rhino-laryngologie et de chirurgie de la face et du cou.