ESJ Natural/Life/Medical Sciences Peer-reviewed

Profile of Temporal Bone Computed Tomography Examinations at the University Hospital Center (CHU) Campus of Lomé

Judith Edwige Guiaba Kette Mokpondo
Department of Radiology, CHU-Campus Lomé, Lomé, Togo
Timothee Mobima
National Center for Medical Imaging, Bangui, Central African Republic
Aime Stephane Kouzou
Community Hospital Center of Bangui, Bangui, Central African Republic
Chrispin Euloge Tapiade
Francky Kouandongui Bangue Songrou
Christ Borel Tambala
National Center for Medical Imaging, Bangui, Central African Republic
Heritier Yannick Sombot Soule
Maman Elisabeth DOMITIEN Hospital Center, Bangui,
Central African Republic
Lantam Sonhaye
Victor Adjenou
Department of Radiology, CHU-Campus Lomé, Lomé, Togo

Doi:10.19044/esj.2026.v22n6p74

Submitted: 25 August 2025
Accepted: 15 February 2026
Published: 28 February 2026

Cite As:
Guiaba Kette Mokpondo, J.E., Mobima, T., Kouzou, A.S., Tapiade, C.E., Kouandongui Bangue Songrou, F., Tambala, C.B., Sombot Soule, H.Y., Sonhaye, L. & Adjenou, V. (2026). *Profile of Temporal Bone Computed Tomography Examinations at the University Hospital Center (CHU) Campus of Lomé.* European Scientific Journal, ESJ, 22 (6), 74. https://doi.org/10.19044/esj.2026.v22n6p74

Abstract

Introduction: The petrous bone is the inferior part of the temporal bone. It plays a crucial role in hearing and balance in the human body and is the site of a wide variety of pathologies, making it a public health concern. The aim of this study was to determine the profile of petrous bone computed tomography (CT) examinations.

ISSN: 1857-7881 (Print)
e-ISSN 1857-7431 (Online)

Methods: This was a prospective, descriptive study conducted over a 6-month period, involving 34 petrous bone CT examinations performed in the CT unit of the CHU-Campus in Lomé. The parameters analyzed included epidemiological data and lesions identified on CT imaging.

Results: Out of 6,328 CT examinations performed during the study period, 34 were petrous bone CT scans, representing 0.5%. All age groups were affected, with a predominance of the 31-40 year age group (23.5%). Males were predominant, with a sex ratio of 2.1. Drivers were the most represented occupational group (23.5%). The most frequent indication was petrous bone trauma (44.1%), with road traffic accidents being the leading cause (73.3%). In all cases, the examination was performed without contrast injection. CT findings were pathological in 70.6% of cases, mainly in trauma, conductive hearing loss, chronic otitis media, external auditory canal (EAC) stenosis, and pulsatile tinnitus. The main traumatic lesion identified was extra labyrinthine fractures (91.7%). Incudo-malleolar dislocation was the most common ossicular lesion (25%). Hemotympanum was observed in 83.3% of cases. CT scans were normal in 29.4% of cases, particularly in patients with vertigo/tinnitus, mixed hearing loss, conductive hearing loss associated with tinnitus, otalgia, and non-traumatic facial paralysis.

Keywords: Computed tomography, petrous bone, profile, trauma, hearing loss, Lomé

Introduction

The petrous bone is the inferior part of the temporal bone, located on each side of the skull. It has the shape of a quadrangular pyramid and forms the internal and horizontal portion of the temporal bone. The petrous bone contains the middle ear (the tympanic cavity and the ossicular chain) and is traversed by the facial nerve (Le Petit Larousse, 2017). It plays a crucial role in hearing and balance in the human body (Prades, 2010). It is the site of a wide polymorphism of pathologies (infectious, traumatic, tumoral, and malformative), for which specific monitoring must be instituted. Its complex composition and the presence of multiple adjacent structures make its evaluation difficult using conventional imaging (Grace, 2012; Ahmed, 2012). Computed tomography (CT), also known as scanography, is defined as a tomographic radiological system that measures the attenuation of an X-ray beam as it passes through an anatomical volume, with matrix-based reconstruction of a digitized image (Sonhaye, 2017; Masson, 2023). It remains one of the cross-sectional imaging modalities that plays an essential role in the exploration of the petrous bone. In high resolution, it allows detailed osseous assessment of the different compartments of the ear (Grace, 2012; Ahmed, 2012). When performed with iodinated contrast injection, it enables the

ISSN: 1857-7881 (Print)
e-ISSN 1857-7431 (Online)

evaluation of vascular and soft-tissue structures (Prades, 2010; Amy, 2018); moreover, it is widely available and accessible. Its limitations in otology, and more broadly in ENT practice, concern the evaluation of vertigo, balance disorders, and non-traumatic facial paralysis (Amy, 2018).

Methods

This was a prospective and descriptive study conducted over a six-month period from July 1 to December 31, 2022, at the University Hospital Center (CHU) Campus of Lomé, which is equipped with a General Electric (GE) Bright Speed Elite multi-slice CT scanner allowing the acquisition of 16 slices per 0.5-second rotation. This equipment has been in operation since 2010. The parameters used were those referred to as "petrous bone helical bone," as follows: field of view: 20 cm; matrix: 512^2; mAs: 220; kV: 140; reconstruction slice thickness: 0.6 mm; CTDI vol: 96.6 Gy. Strict patient immobilization was ensured.

Included in this study were patients who underwent a petrous bone CT examination, while those who presented for follow-up examinations were excluded. None of the patients received an iodinated contrast injection. Data were collected using a pre-established data collection form including the variables studied and were analyzed and processed using Epi Info software version 3.5.3. Data confidentiality was guaranteed. The names of patients and referring physicians do not appear in any document related to the results of this study.

Results

During the study period, 6,328 CT examinations were performed, including 34 petrous bone CT scans, corresponding to an overall frequency of 0.5%. Males were the most represented, accounting for 67.6% of cases. The mean age of patients was 37 years (range: 1 to 75 years), and the 31-40-year age group was the most represented, with 23.5% (Figure 1).

ISSN: 1857-7881 (Print)
e-ISSN 1857-7431 (Online)

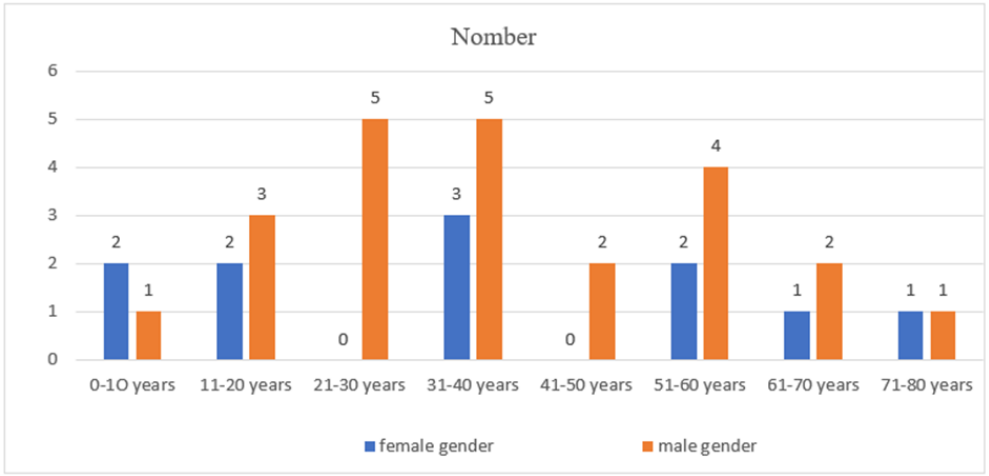

Figure 1: Distribution of patients according to age groups and sex

Regarding patients' professions and occupations, drivers were the most represented, accounting for 23.4%.

The majority of patients were referred from the Emergency Department (50%), and the main indication was trauma in 44.1% of cases (Table I).

Table I: distribution of patients according to the indication for petrous bone CT scans by referring department.

	Emergency Department n (%)	**ENT Department n (%)**	**Other Departments n (%)**	**Total n (%)**
Trauma	**12(35,3)**	**2(5,9)**	**1(2,9)**	**15(44,1)**
Conductive hearing loss	0(0,0)	5(14,9)	0(0,0)	5(14,9)
EAC* stenosis	2(5,9)	2(5,9)	0(0,0)	4(11,8)
Chronic otitis media	2(5,9)	2(5,9)	0(0,0)	4(11,8)
Otalgia	0(0,0)	0(0,0)	1(2,9)	1(2,9)
Mixed hearing loss	0(0,0)	1(2,9)	0(0,0)	1(2,9)
Sensorineural hearing loss / tinnitus	0(0,0)	1(2,9)	0(0,0)	1(2,9)
Pulsatile tinnitus	0(0,0)	1(2,9)	0(0,0)	1(2,9)
Tinnitus / vertigo	0(0,0)	0(0,0)	0(0,0)	1(2,9)
Facial paralysis / otalgia	1(2,9)	0(0,0)	1(2,9)	1(2,9)
Total	**17(50)**	**14(41,3)**	**3(8,7)**	**34(100)**

n (%): number (percentage)
***EAC*:** External Auditory Canal
***ENT*:** Otorhinolaryngology

ISSN: 1857-7881 (Print)
e-ISSN 1857-7431 (Online)

Other departments: Other university hospital departments, private practices, and clinics.

Regarding prescribers, interns or resident physicians (DES) were the main prescribers, accounting for 58.8%.

The techniques used for petrous bone CT examinations were dominated by craniocerebral CT, which accounted for 55.8% of cases.

Regarding the results of petrous bone CT examinations, 70.6% of cases were pathological across the different indications, as shown in Table II.

Table II: Distribution of patients according to petrous bone CT findings by indication

	Normal CT n (%)	**Pathological n (%)**	**Total n (%)**
Trauma	**3(8,8)**	**12(35,3)**	**15(44,1)**
Conductive hearing loss	2(5,9)	3(8,8)	5(14,7)
EAC* stenosis	0(0,0)	4(11,8)	4(11,8)
Chronic otitis media	0(0,0)	4(11,8)	4(11,8)
Otalgia	1(2,9)	0(0,0)	1(2,9)
Mixed hearing loss	1(2,9)	0(0,0)	1(2,9)
Sensorineural hearing loss / tinnitus	0(0,0)	1(2,9)	1(2,9)
Pulsatile tinnitus	1(2,9)	0(0,0)	1(2,9)
Tinnitus / vertigo	1(2,9)	0(0,0)	1(2,9)
Facial paralysis / otalgia	1(2,9)	0(0,0)	1(2,9)
Total	**10(29,4)**	**24(70,6)**	**34(100)**

Hemotympanum was the most frequently observed lesion (83.3%), followed by fracture of the temporal squama in 75% of cases (Table III).

Table III: Traumatic lesions observed

Traumatic lesions	**Number (n)**	**Percentage (%)**
Hemotympanum	**10**	**83,3**
Temporal squama fracture	9	75
Mastoid air cell opacification	8	66,7
Tympanic bone fracture	7	58,3
Mastoid fracture	5	41,7
Ossicular lesions	3	25
Tegmen tympani fracture	1	8,8
Fracture of the medial wall of the middle ear	1	8,8

n (%): number (percentage)
EAC = External Auditory Canal

ISSN: 1857-7881 (Print)
e-ISSN 1857-7431 (Online)

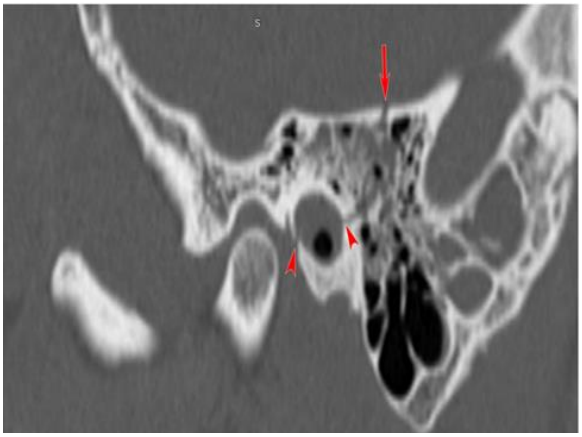

Figure 2: CHU-Campus Image (Lomé)

A 22-year-old male patient with head trauma associated with otorrhagia. Sagittal CT reconstruction of the left petrous bone showing a disruption of the left temporal squama, consistent with an extra labyrinthine fracture (arrowhead), associated with opacification of the tympanic cavity consistent with hemotympanum, and a discontinuity of the tegmen tympani (arrow).

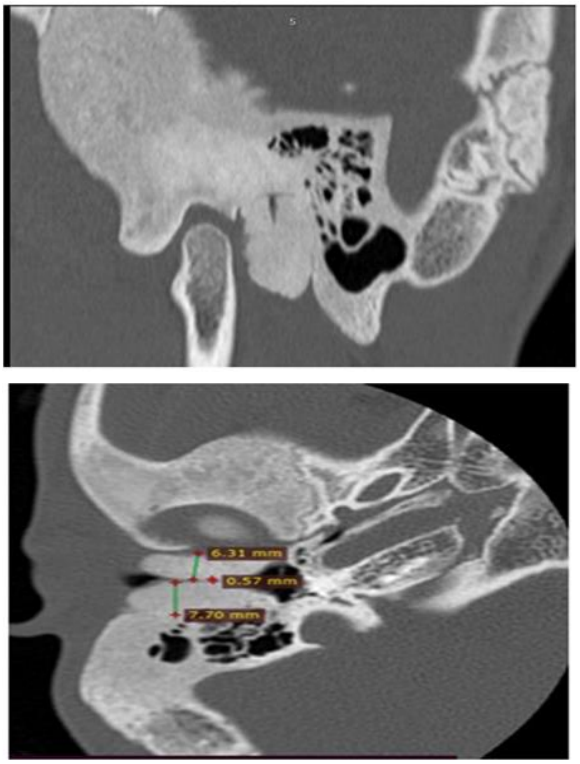

Figure 3a, b: CHU-Campus Image (Lomé)

ISSN: 1857-7881 (Print)
e-ISSN 1857-7431 (Online)

A 40-year-old male patient presenting with stenosis of the right external auditory canal. Sagittal reconstruction (a) and axial CT slice (b) of the right petrous bone show a ground-glass appearance of the bone marrow involving the medullary bone of the outer third of the petrous portion of the temporal bone, associated with cortical expansion and cortical thinning without bone lysis, resulting in stenosis of the right external auditory canal.

Discussion

This study is the first of its kind conducted at the CHU-Campus of Lomé. One of its strengths lies in the availability of complete information and all the necessary data. No major difficulties were encountered during the study. During the study period, 6,328 patients underwent CT examinations, including 34 petrous bone CT scans, corresponding to an overall frequency of 0.5%. This indicates that requests for petrous bone CT examinations remain low in our setting.

The mean age was 37 years, with extremes ranging from 1 to 75 years. A marked predominance of the 21-40-year age group (38.2%) was observed, compared with 23.3% for the 0–20-year age group. In accordance with the indications for petrous bone CT (Prades, 2010), all age groups were concerned, with a predominance among young adults. Males were more frequently represented (67.6%) than females (32.3%), with a sex ratio of 2.1. This may be explained by the high frequency of traumatic petrous bone CT examinations in this study (44.1%) (Table II). This male predominance among young adults undergoing CT for traumatic petrous bone injuries has also been reported by Sonhaye et al. (Sonhaye, 2017), who found 57.7% in the 20–40-year age group and a male predominance of 77.4% versus 22.6% for females, corresponding to a sex ratio of 3.42. Similarly, Hiroual et al. (Hiroual, 2010) reported a marked male predominance with a ratio of 16 men for one woman. This male predominance, observed both in the literature and in the present series, may be explained by the fact that trauma predominantly affects men.

Anyone, regardless of profession, may develop petrous bone pathology. Road traffic accidents involving two-wheeled vehicles are a frequent cause of more than 50% of deaths among young adults aged 15-44 years (WHO, 2015).

In this series, petrous bone trauma accounted for 44.1% of cases among young adults aged 21-40 years. This result is comparable to that reported by Issa et al. (Issa, 2020), who found a proportion of 42.9%. Among the 15 petrous bone CT requests for trauma, vehicle drivers were the most represented (53.3%), including 75% two-wheeled vehicle drivers and 25% four-wheeled vehicle drivers. Drivers of two-wheeled vehicles were therefore particularly exposed to petrous bone trauma.

ISSN: 1857-7881 (Print)
e-ISSN 1857-7431 (Online)

The main indication for petrous bone CT was trauma (44.1%), followed by conductive hearing loss (14.7%), and, with equal proportions of 11.8%, chronic otitis media and external auditory canal stenosis. Otalgia, mixed hearing loss, sensorineural hearing loss/tinnitus, pulsatile tinnitus, tinnitus/vertigo, and facial paralysis/otalgia each accounted for 2.9%. These findings are consistent with those of Amy et al. (Amy, 2018), who reported that CT remains the first-line imaging modality for the evaluation of petrous bone trauma and conductive hearing loss with a normal tympanic membrane.

However, CT is often complemented or replaced by MRI when evaluating facial paralysis, tinnitus, and vertigo (Masson, 2013). Nevertheless, CT is indicated in chronic otitis media only for preoperative assessment when surgical treatment is considered because of significant conductive hearing loss (WHO, 2015). CT also retains its role in the evaluation of otalgia with positive otoscopy, particularly in necrotizing or complicated external otitis, or in otalgia secondary to tumors of the external auditory canal or middle ear (Prades, 2010).

Petrous bone CT examinations were mainly requested by interns and resident physicians on call, accounting for 58.8%, followed by ENT specialists (32.3%), while other physicians accounted for 8.8%. Similarly, the main referring departments were the surgical emergency department (50%) and ENT departments (41.2%). These findings are consistent with those reported in the literature (Sonhaye, 2017). This may be explained, on the one hand, by the predominance of traumatic petrous bone injuries in this study and, on the other hand, by the fact that in Lomé both university hospitals had surgical emergency departments, but only the CT unit of CHU-Campus was operational. Outside trauma, the main indications for petrous bone CT fall within the ENT specialty (hearing loss, chronic otitis media, EAC stenosis, otalgia, pulsatile tinnitus, tinnitus/vertigo, and facial paralysis/otalgia).

The most frequently performed technique was craniocerebral CT followed by petrous bone CT using the “helical bone” protocol, accounting for 55.9%, mainly in patients evaluated for petrous bone CT in the context of acute head trauma with suspected petrous bone fracture. Saraiya (Saraiya, 2009) justified this approach by highlighting the inadequacy of conventional brain CT with thin-slice bone window reconstruction of the petrous bone, which may lead to imprecise lesion assessment, with nearly one-third of petrous bone fractures remaining undetected. Furthermore, Amy et al. (Amy, 2018) reported that 18-22% of skull fractures involve the temporal bone, and Sun et al. (Sun, 2011) noted that 90% of patients with petrous bone trauma present with associated brain injury. This underscores the need to complement craniocerebral CT with dedicated petrous bone CT in such contexts. In this series, direct performance of petrous bone CT using the “helical bone” protocol accounted for 32.3%, mainly in patients examined at a distance from

ISSN: 1857-7881 (Print)
e-ISSN 1857-7431 (Online)

the trauma who had already undergone brain CT, and in other indications, particularly conductive hearing loss with suspected otosclerosis. This technique allows better assessment of ossicular lesions due to resorption of hemotympanum in the days following trauma (Amy, 2018). In patients with conductive hearing loss and suspected otosclerosis, petrous bone CT using the "helical otosclerosis" protocol accounted for 11.8% in this series. It should be noted that focused centering on the tympanic cavities, labyrinthine capsule, and internal auditory canal provides a "magnification effect" compared with conventional axial slices. All examinations were performed without iodinated contrast injection. Contrast administration is indicated only in cases of suspected expansive lesions or malignant external otitis.

Petrous bone CT findings were pathological in 70.6% of cases and normal in 29.4%. The high rate of pathological findings was mainly observed in trauma, chronic otitis media, and EAC stenosis. This can be explained by the excellent natural contrast between air and ossicles, facilitating CT evaluation of the middle ear, and by the high sensitivity of CT in detecting bone lesions, particularly petrous bone fractures, as reported by Darrouzet et al. (Darrouzet, 2010).

Extra labyrinthine fractures were the most frequent (91.7%), followed by mixed fractures (8.3%). These results are consistent with those reported in the literature (Sonhaye, 2017). Barreau (Barreau, 2011) reported that extra labyrinthine fractures account for more than 90% of petrous bone fractures, and Amy et al. (Amy, 2018) reported proportions ranging from 94% to 97%. In contrast, Traoré et al. (Traoré, 2022) found a lower proportion of 79.3%.

Several lesions were associated with fractures, mainly hemotympanum (83.3%), followed by hemorrhagic opacification of mastoid air cells (66.7%). These proportions are lower than those reported by Sonhaye et al. (Sonhaye, 2017), who found 96.7% for hemotympanum and 80.3% for mastoid air cell opacification. Conversely, Traoré et al. (Traoré, 2022) reported lower rates, with 72.4% for hemotympanum and 55.2% for mastoid air cell opacification. The high sensitivity of CT in detecting hemotympanum may explain these elevated rates.

Ossicular lesions were identified in 25% of cases, a proportion higher than that reported by Melaine et al. (Melaine, 2020), who found 19.4%, and comparable to the 26.7% and 28.9% reported by Sonhaye et al. and Hiroual et al., respectively (Sonhaye, 2017; Hiroual, 2010). These lesions mainly consisted of Incudo-malleolar dislocations. In accordance with the literature (Amy, 2018), dislocations remain the most frequent ossicular lesions and may be associated with one another.

All four CT examinations requested for chronic otitis media were positive (100%). All patients showed opacification of the mastoid air cells and tympanic cavity, associated with mastoid cortical osteolysis and/or

ISSN: 1857-7881 (Print)
e-ISSN 1857-7431 (Online)

osteosclerosis; only one patient had ossicular erosion. These findings are consistent with data from the literature (Varoqueux, 2010; Amy, 2015; Shekhrajika, 2019). CT commonly shows opacification and sclerosis of the mastoid air cells. Other lesions should be sought to explain conductive hearing loss, including tympanic membrane perforation, middle ear cavity opacification, or post-inflammatory ossicular erosion (sequelae otitis) (Varoqueux, 2010). Secondary cholesteatoma is a major complication of chronic otitis media (Amy, 2015), accounting for one-third of chronic otitis media with a perforated tympanic membrane and occurring at any age. At an early stage, CT shows a small, round opacity with convex margins located in the external attic or "Prussak's space." Erosion of the inferior angle of the scutum is an important diagnostic sign (Varoqueux, 2010). At a more advanced stage, it may appear as a larger convex opacity eroding adjacent bony structures or as complete opacification of the attic or tympanic cavity. Finally, it may be evacuated spontaneously or by the clinician during examination. In such cases, CT may appear almost normal, sometimes revealing only residual signs left by the evacuated cholesteatoma, such as marked widening of the external attic with blunting of the scutum tip, destruction of the supra meatal squama, ossicular destruction, or tegmen tympani dehiscence (Varoqueux, 2010). Middle ear cholesteatoma is considered a dangerous form of chronic otitis because of its progressive nature and potentially life-threatening complications. Its evolution differs significantly between adults and children.

External auditory canal stenosis can occur at any age and has a wide range of etiologies. In this study, 11.7% of petrous bone CT requests were for EAC stenosis, and all results were pathological. Among these patients, the first two were infants aged 1 and 2 years, and the other two were aged 39 and 40 years. Three of them (75%) presented with soft-tissue opacification of the EAC, with or without associated findings. The first patient, aged 1 year, showed near-total soft-tissue opacification of the right EAC and partial opacification on the left, associated with bilateral ossicular fixation. The second patient, aged 2 years, showed near-total soft-tissue opacification of the right EAC. In the third patient, aged 39 years, CT demonstrated soft-tissue opacification of both EACs with more marked bony erosions on the left. According to the literature (Bensimon, 2010; Varsha, 2012; Charfeddine, 2016), EAC pathologies may have similar clinical presentations, and soft-tissue opacification on CT may suggest several diagnoses, including epidermoid pathologies (cholesteatoma, epidermoid cyst, cholesterol granuloma) and neural pathologies (meningioma, schwannoma) (Benson et al., 2022). In the fourth patient, aged 40 years, CT showed a ground-glass appearance of the medullary bone involving the outer third of the petrous portion of the temporal bone, with cortical expansion and thinning without

ISSN: 1857-7881 (Print)
e-ISSN 1857-7431 (Online)

bone lysis, resulting in right EAC stenosis secondary to fibrous dysplasia of the temporal bone. These classic CT features have been described in the literature (Mahoudeau, 2022). Fibrous dysplasia is a rare disease that can involve any bone, particularly those of the face. In the craniofacial region, the maxilla, zygoma, frontal bone, ethmoid, and mandible are most frequently affected, whereas temporal bone involvement is rare, accounting for only 11–12% of craniofacial fibrous dysplasia cases (Benson, 2022). CT also allows detection of possible stenoses of the skull base foramina.

In this study, conductive hearing loss accounted for 14.3% of petrous bone CT requests, including one case of ossicular chain malformation with an inverted (downward-oriented) Incudo-malleolar joint. Other minor forms of ossicular chain malformations have been described in the literature. According to the literature, 50% of pediatric sensorineural hearing loss cases are of genetic origin, while environmental causes include cytomegalovirus infection, neonatal distress, and meningitis. Genetic causes are most often isolated but may be syndromic in 30% of cases (Veillon, 2010).

Conclusion

This study shows that petrous bone CT remains the primary imaging modality, although its utilization remains low and is mainly requested by interns, resident physicians in surgical emergency departments, and ENT specialists. Both sexes were affected, with a male predominance, and the 31-40-year age group was the most represented. The most frequent indication remains petrous bone trauma, in which computed tomography plays a central role, followed by conductive hearing loss, external auditory canal stenosis, and chronic otitis media. In contrast, CT has a limited role in the evaluation of vertigo/tinnitus and non-traumatic facial paralysis. Ear pathology represents a public health issue and has a negative impact on interpersonal relationships.

Conflict of Interest: The authors reported no conflict of interest.

Data Availability: All data are included in the content of the paper.

Funding Statement: The authors did not obtain any funding for this research.

Declaration for Human Participants: This research followed the Ministry of Higher Education and Scientific Research in Togo and its guidelines for research ethics involving human subjects, and the Science Council of Togo's Code of Conduct for Scientists. The research was approved by the institutional review board at the Faculty of Health Sciences at the University of Lomé, Togo.

ISSN: 1857-7881 (Print)
e-ISSN 1857-7431 (Online)

References:

1. Ahmed AR, Benj0*amin Y. 2012. Lesions of the Petrous Apex: Classification and Findings at CT and MR Imaging. Radiographics; 32:151-173.
2. Amy FJ, Daniel TG, Gul M. 2015. Imaging Review of the Temporal Bone: Part II. Traumatic, Postoperative, and Non-inflammatory Non-neoplastic Conditions. Radiology; 276(3):655–672.
3. Amy F, Juliano I. 2018. Cross-sectional imaging of the ear and temporal bone. Head and Neck Pathology; 12(3):302-320.
4. Barreau X. 2011. Imaging of temporal bone fractures. Journal de Radiologie; 92:958-966.
5. Benson JC, Lane IL. 2022. Temporal bone anatomy. Neuroimaging Clinics of North America; 32(4):763-775.
6. Charfeddine S, Chahed H, Besbes G, Dziri S. 2016. Severe to profound bilateral hearing loss in adults: etiologies and therapeutic indications. Journal of Medical Rehabilitation: Practice and Training in Physical and Rehabilitation Medicine; 36(4):173-184.
7. Darrouzet V, Merriot P, Veillon F. 2010. Temporal bone trauma. In: Imaging of the Ear; pp. 321-334.
8. Grace SP, Sung ELG, Michael R, Yoshimi A. 2012. Interactive Web-based Learning Module on CT of the Temporal Bone: Anatomy and Pathology. Radiographics; 32:E85-E105.
9. Hiroual MR, Zougarhi A, Cherif Idrissi El Ganouni N, Essadki O, Ousehal A, Tijani Adil O, et al. 2010. Contribution of CT in temporal bone trauma: a series of 38 cases. Journal de Radiologie; 91:53–58.
10. Issa, Konaté, Lambert, Yao B, Kouassi K, Bravo T, Emile AB, Maru VK, D'dri K. 2020. Epidemiological, clinical, and CT features of cranio-encephalic injuries in road traffic accident victims involving two-wheeled vehicles in Bouaké (Côte d'Ivoire). Journal Africain d'Imagerie Médicale; 12-2.
11. Le Petit Larousse de la Médecine. 2017. However, CT of the temporal bone remains limited in the exploration of vertigo/tinnitus and non-traumatic facial paralysis. Scanner: 1152-853.
12. Mahoudeau P, Tringali S, Fieux M. 2022. External auditory canal stenosis. Annales Françaises d'Oto-Rhino-Laryngologie et de Pathologie Cervico-Faciale; 139(1):50-53.
13. Masson F, Dangin X, Baudin P. 2013. Computed tomography: principles and image formation. In: CT Scanner and X-ray. Elsevier Masson:119-174.
14. World Health Organization (WHO), Geneva. 2011. Global Plan for the Decade of Action for Road Safety 2011-2022. Available at: www.who.int (accessed August 20, 2015).

ISSN: 1857-7881 (Print)
e-ISSN 1857-7431 (Online)

15. Prades JM, Veyret CH, Saliou G, Lescanne E, Christian M. 2010. Anatomy and normal imaging of the human temporal bone. In: Christian M, editor. Imaging of the Ear and Temporal Bone. SFORL-SFR-CIREOL:37-73.
16. Saraiya A. 2009. Temporal bone fractures. American Journal of Emergency Radiology; 16:255-260.
17. Shekhrajika N, Moonis G. 2019. Imaging of non-traumatic temporal bone emergencies. Seminars in Ultrasound, CT and MRI; 40(2):116–124.
18. Sonhaye L, Bah OA, Kolou B, Amadou A, Adambounou K, Tchaou M, Bah MO, Adjenou KV, N'dakena K. 2017. Temporal bone trauma: CT findings in 60 cases in Lomé. Revue CAMES Santé; 5(1):57-61.
19. Sun GH, Shoman NM, Samy RN, Cornelius RS, Koch BL, Pensak ML. 2011. Contemporary temporal bone fracture classification systems reflect concurrent intra crânial and cervical spine injuries. Laryngoscope; 121(5):929-932.
20. Traoré O, Guindo I, Wakrim S, Dembele M, Cisse I, Dackouo M, Keita AD. 2022. Role of helical CT in temporal bone trauma: a series of 12 cases at Ibn Rochd University Hospital, Casablanca. Pan African Medical Journal; 41-1.
21. Bensimon JL. 2010. Otalgia. In: Christian M, editor. Imaging of the Ear and Temporal Bone. SFORL-SFR-CIREOL:277-296.
22. Varsha MJ, Shantanu KN, Ravi KG, Jitender RK, Vinay KEC. 2012. CT and MR Imaging of the Inner Ear and Brain in Children with Congenital Sensorineural Hearing Loss. Radiographics; 32:683-698.
23. Varoquaux A, Cassagneau P, Jacquier A, Louis G, Champsaur P, Bartoli JM, et al. 2010. Radio-anatomy of the ear. In: Dubrulle F, Martin-Duverneuil N, Moulin G, editors. ENT Imaging. Elsevier Masson:251-271.
24. Veillon F, Fraysse B, Escudé B, Deguinne O, Robier A. 2010. Conductive and mixed hearing loss with normal tympanic membrane in adults. In: Christian M, editor. Imaging of the Ear and Temporal Bone. SFORL-SFR-CIREOL:95-137.