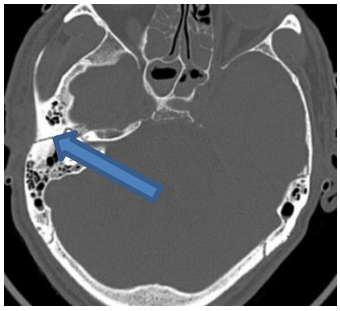
EDITORIAL

Petrous Temporal Bone Fractures



In this edition of the Orient Journal of Medicine we have a bumper catchment of publications. A report from the Cancer Registry by Ukah and Nwofor, histology of prostate specimens by Okeke, *et al*, CT evaluation of petrous temporal fractures by Ebubedike, *et al*, high cost of healthcare services by Enemchukwu, findings in lymphnode examinations by Kanmodi, testicular volume measurement by Kolade-Yunusa, *et al*, negative pressure wound dressing by Opara, family planning by Jagun, stigmatization against HIV/AIDS by Kanu, nasopharyngeal carcinoma by Onwukamuche, and finally, labial fusion following episiotomy by Aminu and Dattijo, make up the articles for this edition.

Petrous temporal bone fractures are an important pathology affecting the base of the skull, or neurocranium, more so, because the wedged, pyramidal petrous bone forms the tangential boundary between the middle and posterior cranial fossae.

The causes of these fractures are usually traumatic, accompanying the other causes of head injury. Epidemiologically, the incidence is 2-3times more in the paediatric age group.[1] Petrous fractures are broadly classified into vertical and longitudinal, and the clinical manifestations may not be similar, depending on the neurovascular structures involved. And these fractures could be single or multiple, at the same time.

Longitudinal fractures, which are more common [*ratio 9:1*], run parallel to the external auditory canal [EAC], and would usually spare the VIIth and VIIIth cranial nerves, as the fracture line passes between the cochlear and semicircular canals.[1,2] The vertical, which is much less common and runs perpendicular to the EAC, is associated with ossicular chain disruption. In the latter trajectory, the VIIth and VIIIth nerves are frequently injured, resulting in unilateral infra nuclear facial nerve palsy, which could be diagnostic; just like the presence of Battle's sign.[2,3,4,5]

Haemotympanum, otorrhoea and auditory impairments - conductive, sensorineural or mixed deafness, may accompany the fracture. Most will resolve spontaneously but, for those with persistent auditory impairment on serial audiogram, a middle ear exploration is recommended.

Diagnosis of petrous fractures can be made occasionally by plain skull x-ray studies but, cranial computed tomography, with petrous temporal bone fine slice multiplanar bone window reformats, is the modality of choice.[1,6] Magnetic resonance imaging [MRI] may be useful in cranial nerve injuries, so too, angiography [MRA] in vascular injuries.

These fractures and their neurological sequelae usually resolve on non-operative treatment using steroids and analgesics but, in persisting facial nerve palsy or very severe and extensive fractures, surgical intervention to decompress the entrapped cranial nerve, is undertaken.

The operative treatment of petrous fractures is still controversial, but pre-operative electromyography of the muscles of the face, in order to fully evaluate the extent and location of the VIIth nerve compression, may be advised.[7] Electroneuronography (ENOG) is the most effective method for testing facial nerve function.[1,2,8] The timing of the surgery is determined by the speed of evolution and severity of the lesion.

The surgical approaches to temporal bone fractures include:[2]

Transmastoid: This is suitable for lesions distal to the geniculate ganglion. Once the facial nerve injury is located, any bone chips should be removed and the area should be examined for stretching, compression, laceration, or transection. If the nerve is largely intact, decompression of the epineural sheath is performed. Partial transection can be repaired by suturing, but separation of more than 50% of the axons usually requires an interpositional nerve graft. The greater auricular nerve is often used as the source of graft because of its size and proximity.

Middle cranial fossa: This is best for patients who have facial nerve injury proximal to the geniculate ganglion and with no sensorineural hearing deficits.

Transmastoid-translabyrinthine: For those with sensorineural hearing loss that is unlikely to improve, this approach which has less associated morbidity than the middle cranial fossa approach, can be employed.

The most significant difference between children and adults with regard to complications from temporal bone trauma is a markedly lower incidence of facial nerve paralysis in children compared to adults (3% in children compared with 30 to 70% in adults) in different series.[2]

References

1. Mark S Greenberg. Handbook of Neurosurgery 7th ed. Thieme, New York 2010. P888-889.
2. Alpen Patel, Eli Groppo. Management of Temporal Bone fractures. Craniomaxillofac Trauma Reconstr. 2010 Jun; 3(2):105–113. Pre-published online 2010 May 31. doi: 10.1055/s-0030-1254383
3. Goodwin WJ Jr. Temporal bone fractures. *Otolaryngol Clin North Am* 1983; 16(3):651–659.
4. Lee D, Honrado C, Har-El G, Goldsmith A. Pediatric temporal bone fractures. *Laryngoscope* 1998; 108(6):816–821.
5. Harwood-Nash D C. Fractures of the petrous and tympanic parts of the temporal bone in children: a tomographic study of 35 cases. *AJR*1970; 110 (3):598–607.
6. Exadaktylos A K, Sclabas G M, Nuyens M, et al. The clinical correlation of temporal bone fractures and spiral computed tomographic scan: a prospective and consecutive study at a level I trauma center. *J Trauma* 2003; 55(4):704–706.
7. Esslen E. Electrodiagnosis of facia lnerve palsy. ***In:*** Surgery of the Facial Nerve. Miehlke A [ed]. WB Saunders, Philadelphia, 2nded 1973; p45-51.
8. Fisch V. Management of intratemporal facial palsy of traumatic origin. ***In***: Fisch V (editor). Facial Nerve Surgery. Birmingham: Kugler/Aesculapius 1977.

Jude-Kennedy C EMEJULU *MBBS, FWACS, FICS, PGD, MPA, FAANS*
Professor of Neurosurgery, Nnamdi Azikiwe University & Teaching Hospital, Nnewi, Nigeria
Phone: +234 803 328 3976
Email: j.emejulu@unizik.edu.ng, judekenny2003@yahoo.com