CLINICAL IMAGES PEER REVIEWED | OPEN ACCESS

Isolated congenital bilateral occipital perforations

Stuart A. G. Roberts, Guirish A. Solanki

CASE REPORT

A 7-month-old male Asian baby presented with headache and a large right parietal scalp hematoma after falling from a bed onto a wooden floor. The infant was previously well, born via non-traumatic vaginal delivery following uneventful pregnancy. Normal developmental and growth milestones were met. On examination, Glasgow Coma Scale was 15 with no neurological deficits. In accordance with local guidelines, the infant was investigated via low-dose computed tomography (CT) of the head. This showed a right-sided linear non-depressed skull fracture with normal intracranial appearances, seen in a volume-rendered 3D-CT scan (Figure 1). This was managed conservatively via overnight admission to a pediatric unit for observation, and discharged home at 24 hours with post-head injury advice for his parents. Isolated bilateral symmetrical occipital perforations were noted as an incidental finding. The foramina could be palpated gently without discomfort, and were not visibly pulsatile. The volume rendered 3D-CT scan shows full thickness bilateral 6mm circular foramina with smooth contours in the occipital bone (closed arrows), each 25mm from the midline (Figure 1). At final follow-up, the infant was well, all scalp hematoma had resolved, however perforations could still be palpated. No further investigations or treatment were performed.

Stuart A. G. Roberts[1], Guirish A. Solanki[2]

Affiliations: [1]MB ChB BSc (Hons) MRCS, Clinical Research Fellow, Department of Paediatric Neurosurgery, Birmingham Children's Hospital, Birmingham, West Midlands, United Kingdom, B4 6NH; [2]MB BS FRCS (SN), Consultant Neurosurgeon Department of Paediatric Neurosurgery, Birmingham Children's Hospital, Birmingham, West Midlands, United Kingdom, B4 6NH, Guirish.

Corresponding Author: Stuart A. G. Roberts, Department of Neurosurgery, Birmingham Children's Hospital, Birmingham, West Midlands, United Kingdom, B4 6NH; Email: stuartroberts@nhs.net

Received: **********
Accepted: **********
Published: **********

DISCUSSION

Cranial foramina are holes within the skull, formed during development, permitting passage of blood vessels and nerves. Animal studies suggest they are formed during cranial development via a process independent

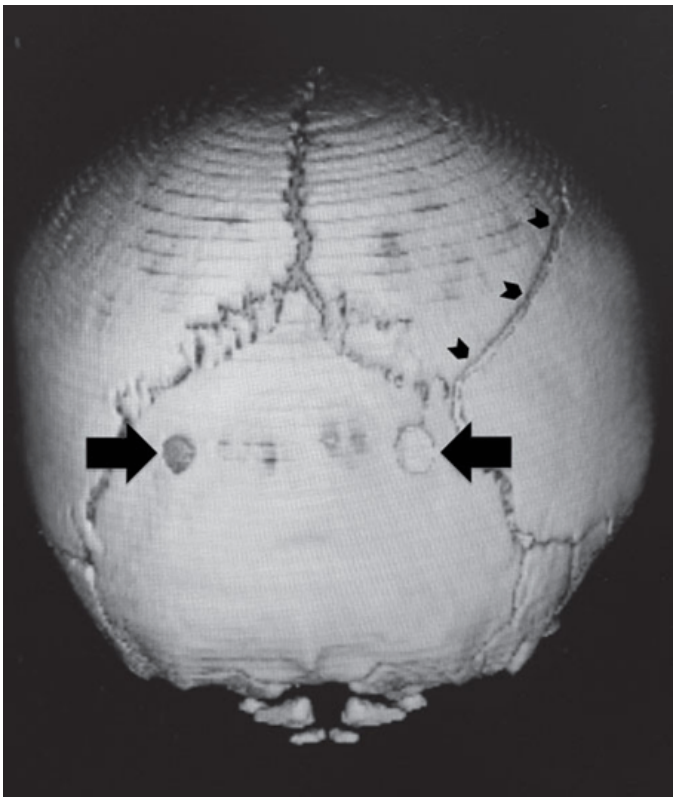


Figure 1: A volume rendered 3D-CT scan of the skull of a seven-month old male pediatric case, performed following head injury. The arrowheads show a horizontal right-sided linear parietal skull fracture extending posteriorly and terminating at the lambdoid suture. Also noted are bilateral 6mm circular full-thickness foramina with smooth contours in the occipital bone (tailed arrows), each 25 mm from the midline.

of apoptosis, reliant upon local nerve/blood vessel-derived restriction of intramembranous ossification [1]. Historically, midline or slightly mesial symmetrical apertures of the occipital bone related to occipital emissary veins are described [2]. This is inconsistent with our findings. Occipital emissary veins connect the transverse sinus to the occipital vein, draining into the vertebral venous plexus. Larger studies of occipital emissary foramina have not shown bilateral symmetrical foramina, with single foramen consistently closer to the foramen magnum than the occipital protuberance in all specimens, not the case here [3]. Unlike occipital foramina, parietal foramina are well described, resulting from delayed or deficient intramembranous ossification of the parietal bone. Parietal perforations occur as an isolated autosomal dominant trait or as part of a syndrome, and this normally is of no clinical significance [4, 5]. Comparative osteoarchaeological studies describe occipital perforations occurring commonly in cattle but rarely in other species. These perforations are variously attributed as congenital, secondary to tumors, parasites, trauma or infection [6].

CONCLUSION

In view of radiological and clinical findings, we believe these isolated symmetrical occipital perforations are a rare congenital abnormality of the occipital bone, possibly resulting from delayed or deficient intramembranous ossification of the occipital bone. With no apparent precedent, we believe they are of no clinical significance and will resolve as the child grows. This could interest trainees as an anatomical variant they may see whilst reviewing pediatric imaging. To the best of our knowledge, this is the first described case of bilateral symmetrical occipital perforations, with this distribution in the cranium.

****

Author Contributions

Stuart A. G. Roberts – Substantial contributions to conception and design, Acquisition of data, Analysis and interpretation of data, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published
Guirish A. Solanki – Analysis and interpretation of data, Revising it critically for important intellectual content, Final approval of the version to be published

Guarantor

The corresponding author is the guarantor of submission.

Conflict of Interest

Authors declare no conflict of interest.

Copyright

© 2016 Stuart A. G. Roberts et al. This article is distributed under the terms of Creative Commons Attribution License which permits unrestricted use, distribution and reproduction in any medium provided the original author(s) and original publisher are properly credited. Please see the copyright policy on the journal website for more information.

REFERENCES

1. Akbareian SE, Pitsillides AA, Macharia RG, McGonnell IM. Occipital foramina development involves localised regulation of mesenchyme proliferation and is independent of apoptosis. J Anat. 2015; 226(6):560-74.
2. Sper JR, Silverman FN. Symmetrical Occipital Apertures: A Case Report. Radiology. 1964; 83:1071-2.
3. Murlimanju BV, Prabhu LV, Pai MM, Jaffar M, Saralaya VV, Tonse M, et al. Occipital emissary foramina in human skulls: an anatomical investigation with reference to surgical anatomy of emissary veins. Turk Neurosurg. 2011; 21(1):36-8.
4. Stibbe EP. Skull showing Perforations of Parietal Bone, or Enlarged Parietal Foramina. J Anat. 1929; 63(Pt 2):277-8.
5. Zabek M. Familial incidence of foramina parietalia permagna. Neurochirurgia (Stuttg). 1987; 30(1):25-7.
6. Fabiš M, Thomas R. Not just cattle: Cranial perforations revisited. International Journal of Osteoarchaeology. 2011; 21(3):347-50.