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Case Report

A case of coexisting hyperostosis frontalis interna and biparietal bone thinning ☆

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ABSTRACT

Incidental pathology of the skull is frequently detected on cross sectional imaging of the brain. In contrast to the common finding of hyperostosis frontalis interna, biparietal bone thinning is less common. A case of an 87-year-old woman showing coexistence of hyperostosis frontalis interna and biparietal bone thinning is presented. This coexistence has not been reported previously.

Introduction

Hyperostosis frontalis interna is a common incidental pathology found on brain imaging and is characterized by a frontal hypertrophy of the tabula interna of the skull [1]. In contrast, bilateral thinning of parietal bones seems to be a more seldom occurrence [2]. Both entities have been found in archeological specimen. The oldest reported case of hyperostosis frontalis interna was found in a neandertal individual in France and the oldest reported case of biparietal bone thinning was found in a specimen from the bronze age in India [3,4]. We report about a case showing hyperostosis frontalis interna as well as biparietal bone thinning on computed tomography (CT) of the head, this coexistence has not been previously reported.

Case report

An 87-year-old woman was presented at our geriatric department with progressive cognitive decline. A CT scan of the brain was performed in the work-up of dementia to rule out treatable conditions (focal brain atrophy, normal pressure hydrocephalus, subdural hematoma). The scan detected signs of generalized brain atrophy and minor vascular changes of the white matter. The skull showed typical findings of a hyperostosis frontalis interna as well as biparietal bone thinning (Fig. 1). These findings were unrelated to the patient symptoms and history was unremarkable for malignancy or endocrinological abnormalities. No local pain or tenderness was reported.

☆ Competing Interests: None.

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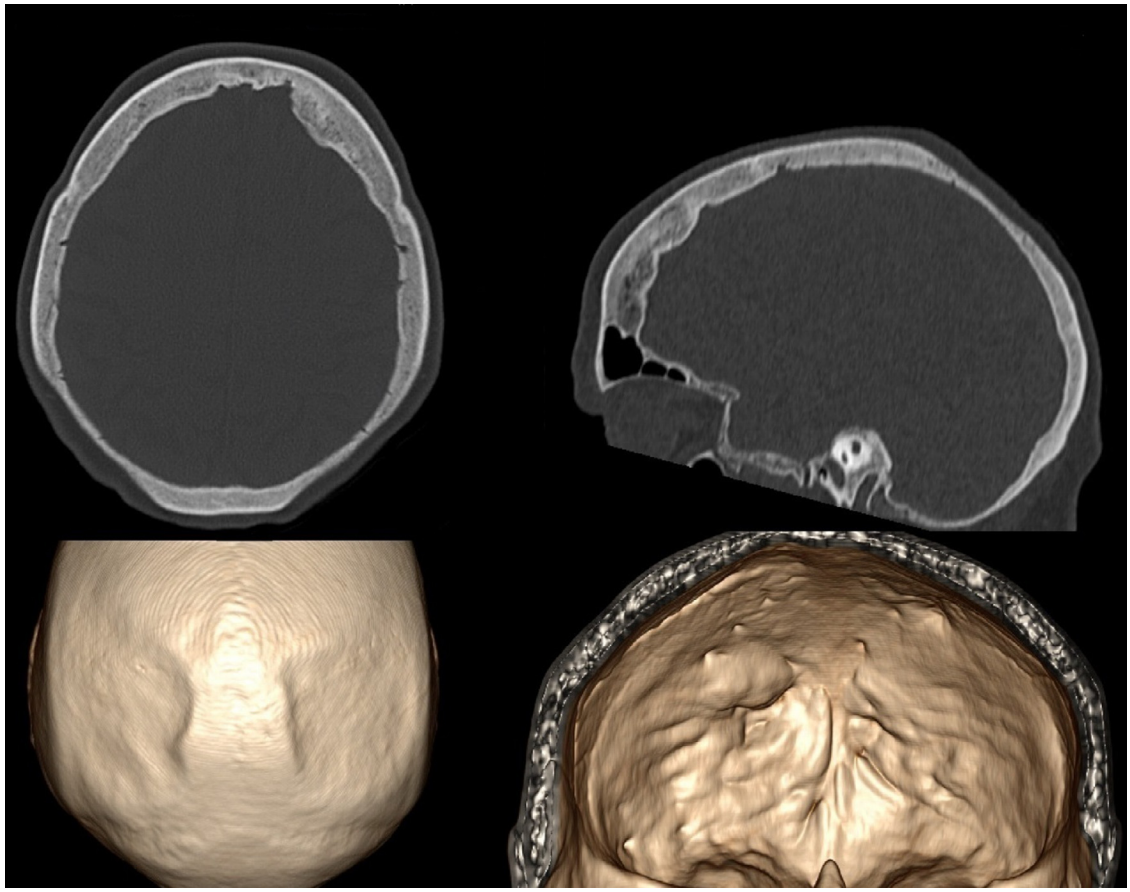

Fig. 1 – Computed tomography of the head in an 87-year-old woman undergoing imaging in the work-up of dementia. Hyperostosis frontalis interna (on the right) as well as marked bilateral thinning of the parietal bone can be seen (on the left). The volume rendered reconstructions show the aspect usually seen on gross morphology.

Discussion

Hyperostosis frontalis interna was first mentioned in a publication from 1765 by Santorini and Morgagni. It is characterized by progressive thickening of the internal table of the frontal bone [1]. In most studies, an incidence around 10% is reported, but prevalences up to 49% in postmenopausal women have been reported [5,6]. These variations can be explained by different criteria and used techniques (for example pathological vs. radiological studies) [6]. Usually postmenopausal women are affected. There are case reports linking excessive hyperostosis to clinical symptoms (for example headache, dementia or focal epilepsy), but in most cases this is an incidental finding without clinical relevance. The etiology is unknown. Because of the female predominance a hormonal etiology with prolonged estrogen stimulation is proposed. Hyperostosis frontalis interna has also been correlated to obesity. Imaging shows a typical symmetric thickening of the tabula interna of the frontal bone and is pathognomonic. In contrast, parietal bone thinning of the skull has been reported seem to be less common. The incidence of this finding has been studied in a large series of 3638 skull radiographs and biparietal bone thinning was found in 86 cases (2.37%) with a slight female predominance [2]. The mean age of the patients was 72 years in females and 63 years in males [2]. This high prevalence seems is in contrast to our experience in reporting brain CT scans, in whom we only occasionally detect biparietal bone thinning. A text search of the 947 reported brain CT examinations in the year before the reported case revealed only two reports in whom biparietal bone thinning was noted. Taking into account the inaccuracy of this approach (ie, no dedicated review for this incidental finding was performed) the estimated prevalence at our department seems to be as low as 0.02%. This low prevalence is in accordance to the study of Bruyn who reported a prevalence between 0.4% and 0.5% of the population [7]. The difference may be explained by different imaging technique. In contrast to skull radiography, which is limited by superimposed structures, CT gives an excellent overview of the bony details. It can be speculated that the thinning of the parietal bone on skull radiography may have been overdiagnosed. Morphologically biparietal bone thinning is characterized by a vanishing diploe und progressive thinning of the outer and inner table. Cases with disappearing bone have been reported [8]. The pathophysiology of this is unclear and most authors postulate an association with osteoporosis [9]. In a single case report no laboratory or morphological changes on biopsy of the thinned bone could be found and the au-

thors proposed the entity of "idiopathic calvarial thinning" [10]. Other names have been given to this disease like malum senile biparietale or senile biparietal atrophy. As both entities (hyperostosis frontalis interna and biparietal bone thinning) have been linked to increased age this seem to be the link in the coexistence in our age (prolonged estrogen stimulation and osteoporosis in an 87-year-old woman). On radiography, CT and magnetic resonance imaging the two entities have pathognomonic findings. In contrast, these two findings may cause pseudopathology on scintigraphy with increased tracer uptake in hyperostosis frontalis interna and photopenia in parietal bone thinning [10–12].

In conclusion, hyperostosis frontalis interna and coexisting biparietal bone thinning could be found incidentally on CT of the brain. Reporting physicians should be aware of these incidental findings of the skull to establish proper differential diagnosis.

Patient consent

Written consent has been obtained from the patient for the anonymized used of his medical data for scientific purposes.

REFERENCES

[1] She R, Szakacs J. Hyperostosis frontalis interna: case report and review of literature. Ann Clin Lab Sci 2004;34:206–8.
[2] Cedelund CG, Andren L, Olivecorna H. Progressive bilaterla thinning of the parietal bone. Skelet Radiol 1982;8:29–33.
[3] Garralda MD, Maureille B, Vandermeersch B. Hyperostosis frontalis interna in a Neandertal from Marillac (Charente, France). J Hum Evol 2014;67:76–84.
[4] Dutta PC. Bilateral parietal thinning in bronze age skull. Br Med J 1969;1:55.
[5] Verdy M, Guimond J, Fauteeux P, Aube M. Prevalence of hypoerostosis frontalis interna in relation to body weight. Am J Clin Nutr 1978;31:2002–4.
[6] Hershowitz I, Greenwald C, Rothschild BM, Latimer B, Dutour O, Jellena JM, et al. Hyperostosis frontalis interna: a anthropological perspective. Am J Phys Anthropol 1999;109:303–25.
[7] Bruyn GW. Biparietal osteodystrophy. Clin Neurol Neurosurg 1978;80:125–48.
[8] Nagayoshi Y, Kawano H, Sugiyama S, Kuroda Y, Ogawa H. A woman with progressive thinning of the skull. Intern Med 2009;48:1481–2.
[9] Takata S, Takao S, Yoshida S, Yasui N. Therapeutic effects of one- year alendronate treatment in three cases of osteoporosis with parietal thinning of the skull. J Med Invest 2008;55:297–302.
[10] Tsutsuma S, Yasumoto Y, Ito M. Idiopathic calvarial thinning. Neurol Med Chir (Tokyo) 2008;48:275–8.
[11] Jacobsson H, Haverling M. Hyperostosis cranii. Radiography and scintigraphy compared. Acta Radiol 1988;29:223–6.
[12] Lim ST, Sohn MH. Bilateral symmetric photon defects in the parietal bones on Tc- 99m MDP bone scintigraphy: bilateral parietal bone thinning. Clin Nucl Med 2001;26:570–1.