Clinical History:

An 81-year-old woman presented at the Accident and Emergency Department for a suspected broken nose. What incidental finding is seen on the skull radiographs (**Figures 1 & 2**)?

Figure 1: Lateral skull radiograph

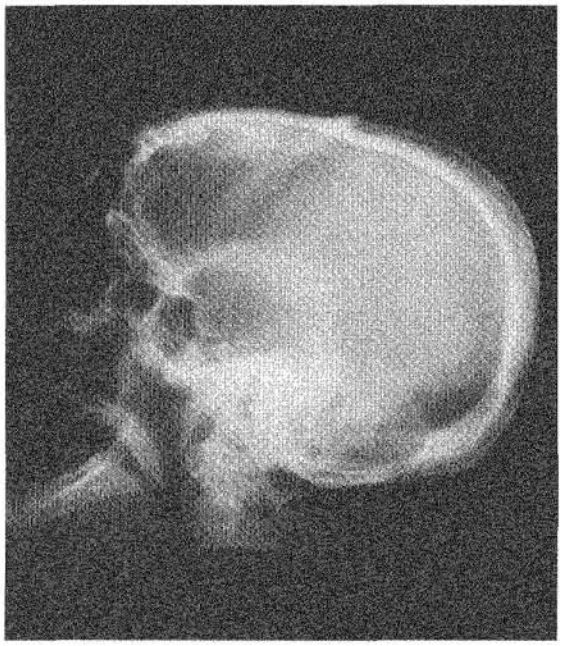
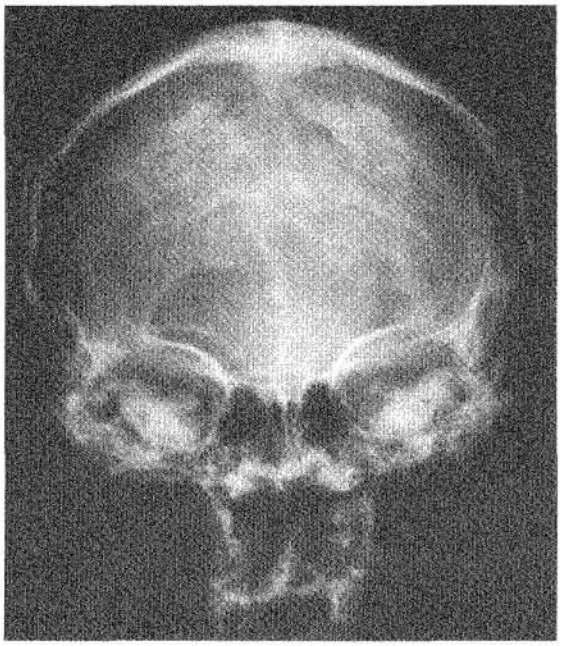


Figure 2: Frontal skull radiograph



Answer on page 638

What is the diagnosis?

a) Meningioma

b) Metastasis

c) Paget's disease

d) Sclerosing osteomyelitis

e) Hyperostosis frontalis interna

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Answer:

e) Hyperostosis frontalis interna

Radiological findings

The frontal and lateral radiographs of the skull show moderate bilateral and symmetrical thickening of the frontal skull vault. It involves mainly the inner table (**Figures 3** & **4**). The midline is spared. The other parts of the skull vault are not affected. The pituitary fossa is of normal size and contour. There is no abnormal calcification. The vascular grooves appear normal. The paranasal sinuses are clear.

Discussion

Hyperostosis frontalis interna

Hyperostosis frontalis interna is a descriptive term applied to hyperostosis involving predominantly the inner table of the frontal bone. It is usually found in women over 40 years of age. Men are rarely affected. Radiographically, there is mild to moderate thickening of the inner table of the frontal bone, producing a "choppy sea" appearance. It is bilateral and symmetrical. The midline is spared because the superior sagittal sinus is usually not involved. The occipital bone is also spared. This condition is benign and does not cause any significant symptomatology.[1,2]

Figure 3: Same radiograph as Figure 1 with the addition of arrows. There is thickening of the inner table of frontal bone (arrows)

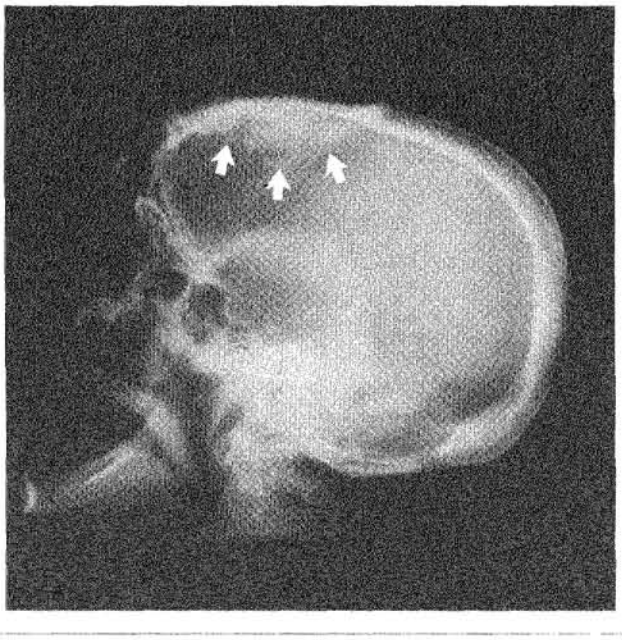
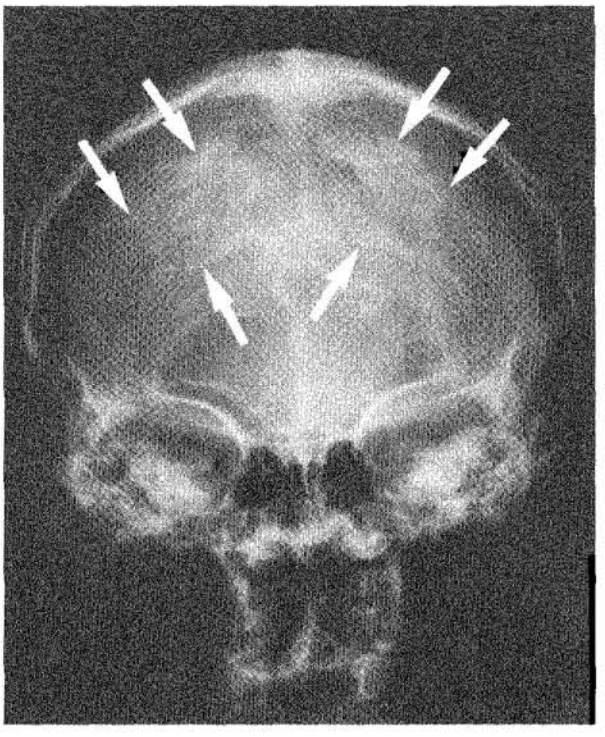


Figure 4: Same radiograph as Figure 2 with the addition of arrows. The typical "choppy sea" appearance, which is symmetrical and bilateral, is seen (arrows)



Meningioma

Meningioma is the most common non-glial primary brain tumour. Frequently-affected sites include the cerebral convexities, parasagittal region and sphenoid ridge. Clinical manifestations depend on the location of the lesion. Frontal meningiomas often grow to a large size before causing symptoms. Visual field defects can

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be caused by basisphenoid lesions, while seizure and hemiparesis are common presentations for parasagittal or convexity tumours.

Radiographical findings include bone erosion, enlarged vascular channels, hyperostosis, tumoural calcification and expanded paranasal sinuses. Hyperostosis associated with meningioma is always unilateral, and there is usually dilation of grooves of the anterior branches of the middle meningeal artery. There may be sellar changes due to intracranial hypertension.[2] Meningiomas are best diagnosed by computed tomography and/or magnetic resonance scans. In this case, the clinical presentation, lack of unilateral involvement of the skull vault, and absence of dilated vascular grooves makes meningioma highly unlikely.

Metastasis

Osteosclerotic metastasis of the skull usually arise from carcinoma of the prostate in men and the breast in women.[3] Other less common primaries include lymphoma, malignant carcinoid, medulloblastoma, mucinous adenocarcinoma of the gastrointestinal tract, and transitional cell carcinoma of the bladder. Radiographically, multiple sclerotic areas of different sizes are seen in the skull vault. There is no known primary tumour in our patient and the radiographical appearance excludes this diagnosis.

Paget's disease

Paget's disease (osteitis deformans) is a disease affecting middle-aged and elderly patients, with a male predominance. It shows interesting geographical variations in incidence, with a preponderance in certain races or population groups, particularly those of Caucasian origin.[4] The disease is biphasic, with an active osteolytic phase followed by an inactive osteosclerotic phase. An intermediate osteolytic-osteosclerotic phase may be present. The axial skeleton is predominantly affected. The proximal long bones, particularly the femur, are also commonly affected.[5]

In the skull, the two phases of the disease are usually in coexistence, giving rise to a "woolly" appearance of patchy increase in density alternating with irregular areas of lucency.[4] Sharply demarcated areas of bone lysis ("osteoporosis circumscripta") may be seen. The skull vault is typically thickened, up to 2-5 times the normal thickness. There may be basilar invagination due to bone softening in advanced disease. Involvement of the facial bones is uncommon.[1,5] None of the features of Paget's disease were seen in our patient.

Sclerosing osteomyelitis

Sclerosing osteomyelitis is an infection of the bone in its subacute and chronic stages. Radiographically, periosteal bone formation and thickened trabeculae, leading to considerable radiodensity and contour irregularity of the affected bone, is seen.[5] Cystic changes may also occur. The absence of periosteal reaction and the lack of clinical symptoms make the diagnosis of osteomyelitis unlikely in our patient. ■

References

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