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## Unilateral mastoid hypertrophy.

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# Unilateral Mastoid Hypertrophy

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Radiographic demonstration of the mastoid air cells has revealed great variability in the size and number of air cells present. Very rarely, mastoid cell development has been excessive with air cells extending into the occipital bone as far posterior as the midline. An example of unilateral hypertrophy of mastoid air cell development is described.

## Case Report

A 34-year-old man lacerated his forehead and was brought to the emergency room. Skull films (figs. 1A and 1B) showed small and large radiolucent, air-containing cells extending from the upper posterior region of the mastoid area on the left side, across the temporal-occipital suture into the squamous portion of the occipital bone, and into the posterior part of the parietal bone. The septa of the numerous air cells were delicate and showed no evidence of thickening. The cells measured 2–30 mm. The mastoid air cells on the opposite (right) side were well developed, of normal size, and showed no extension beyond the temporal bone.

The patient's history was completely negative and the physical examination was negative. Computed tomography (CT) (figs. 1C and 1D) showed external symmetry of the skull. It showed that the excessive air-cell development caused inward displacement of the inner table of the skull with encroachment of the upper posterior fossa and supratentorial region of the left posterior calvaria. The lumen of the air cells contained gas with a CT attenuation value of –1,000 Hounsfield units (H). The inward displacement of the left occipital lobe area caused 1.0 mm of displacement of the pineal gland to the right of the midline. There was no displacement or deformity of the ventricular system of the brain, but the quadrigeminal cistern (cistern of Galen) had minimal flattening of its left lateral border. The diploic space between the internal and external tables of the skull was widest in the occipital squamous region where it measured 20 mm.

The patient remained well during a year of follow-up.

## Discussion

The function of the mastoid air cells is unknown. One theory is that the air cells serve as some type of resonating chamber for hearing; another theory is that they might serve as an air-pressure-regulating mechanism for the middle ear; but the consensus of opinion [1, 2] is that the mastoid is an embryologic vestigial gill organ from our aquatic or amphib-

ious ancestors that served a respiratory or flotation function. Phylogenetically, all vertebrates have air or water surrounding their auditory apparatus.

The air cells of the middle ear are underdeveloped at the time of birth, and further development continues through infancy and early childhood. Before birth these tiny cells, as well as the external and middle ear, are filled with a gelatinous fluid that is progressively displaced by air after birth. The absorption of the fluid and replacement by air occurs in the external and middle ear of the neonate within hours after birth as a result of crying, swallowing, and movement. However, the air displacement of the numerous mastoid cells is a progressive growth process that probably takes months or years to be accomplished, and it probably continues until skull bone growth is complete.

Radiographs of children and adults show a wide variation in the degree of air-cell development. The consensus of opinion today supports the theory that auditory air-cell development is a genetic message, but that infection in infancy or early childhood may arrest development or obliterate cells. The cause for overdevelopment of auditory air cells has not been studied; nothing is known about it nor have any theories been proposed. There have been a few reports of overgrowth of mastoid cells [3, 4], but no report of unilateral hypertrophy similar to this case could be found in the literature. It is of interest that the air-cell development of this case was halted at the midline of the occipital bone, suggesting its proliferation was by some inherent design and not as a pathogenic consequence.

This case of unilateral hypertrophic development of mastoid air cells apparently produced no symptoms or physical findings and was probably a normal growth variant.

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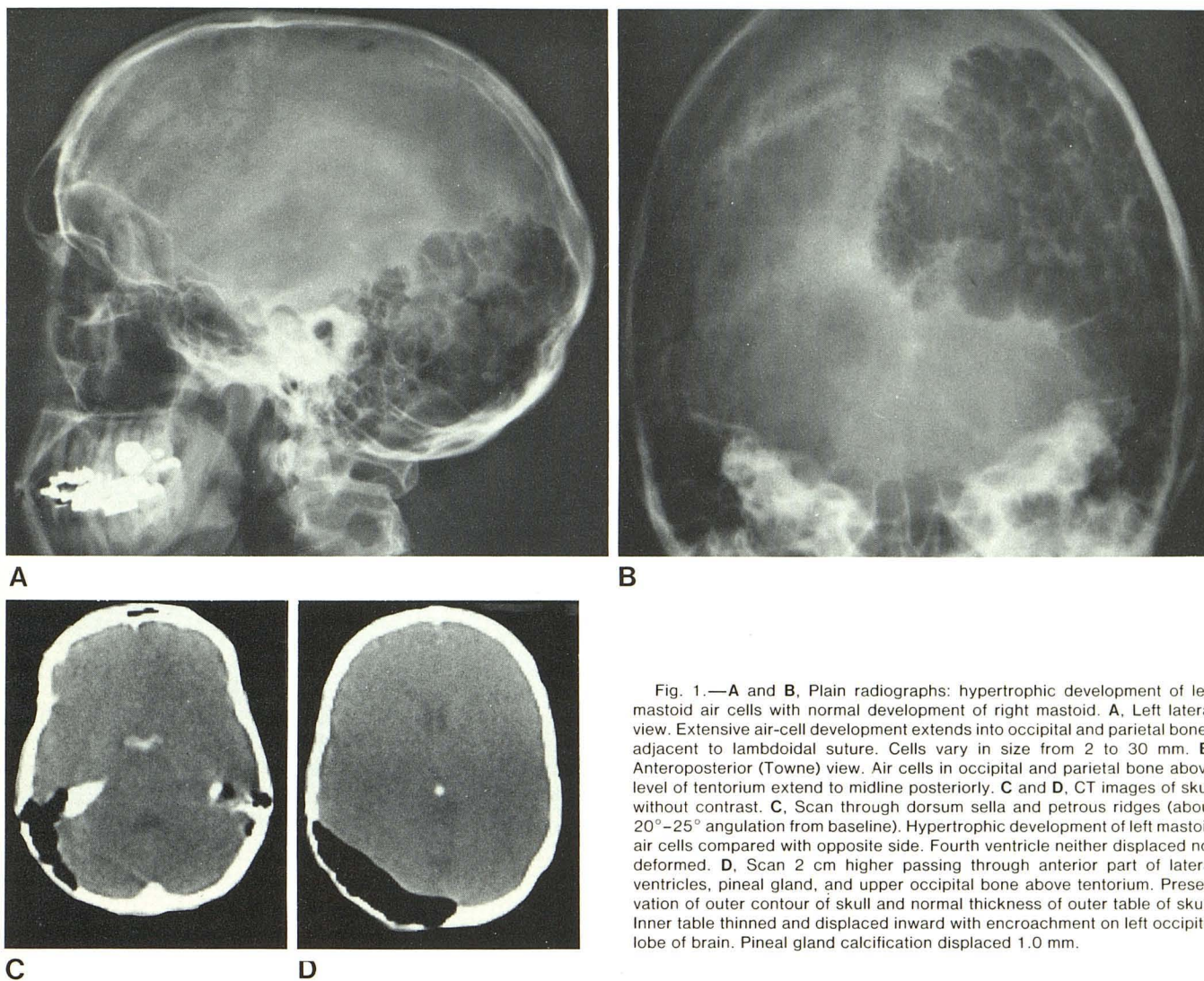


Fig. 1.—**A** and **B**, Plain radiographs: hypertrophic development of left mastoid air cells with normal development of right mastoid. **A**, Left lateral view. Extensive air-cell development extends into occipital and parietal bones adjacent to lambdoidal suture. Cells vary in size from 2 to 30 mm. **B**, Anteroposterior (Towne) view. Air cells in occipital and parietal bone above level of tentorium extend to midline posteriorly. **C** and **D**, CT images of skull without contrast. **C**, Scan through dorsum sellae and petrous ridges (about 20°–25° angulation from baseline). Hypertrophic development of left mastoid air cells compared with opposite side. Fourth ventricle neither displaced nor deformed. **D**, Scan 2 cm higher passing through anterior part of lateral ventricles, pineal gland, and upper occipital bone above tentorium. Preservation of outer contour of skull and normal thickness of outer table of skull. Inner table thinned and displaced inward with encroachment on left occipital lobe of brain. Pineal gland calcification displaced 1.0 mm.