Chronic diploic hematoma of the parietal bone

Case report

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A case of chronic diploic hematoma of the parietal bone is reported. This lesion is considered to have developed over several years following minor head trauma. Clinical, radiological, and pathological findings of this rare lesion are described. To the authors' knowledge, this is the first reported case of such an uncommon traumatic lesion with a description of its appearance on magnetic resonance imaging. Also discussed are the possible pathogenetic mechanisms involved in the slowly progressive enlargement of the lesion.

KEY WORDS • diploic hematoma • cyst formation • head trauma • hyperostosis

Non-neoplastic cyst of the diploë is an uncommon lesion of the skull, although it has been described in the earlier literature. Etiology of cyst formation in the skull is usually considered a benign reparative reaction to traumatic diploic bleeding. Similar cysts have been reported as "traumatic bone cysts" in relation to the mandible. For a solitary calvarial cyst resulting from diploic bleeding, "chronic diploic hematoma" seems the most appropriate term. The radiological appearance of this lesion is unique, and magnetic resonance (MR) imaging is especially useful for diagnosis as well as for providing information on the extent of the lesion.

Case Report

This 20-year-old man was admitted to our hospital on March 27, 1989, with minor head trauma resulting from a motor-vehicle accident. In 1985, at 16 years of age, he sustained an initial minor head trauma when the right side of his head was struck in a vehicular accident. Plain x-ray films of the skull at that time showed no abnormalities (Fig. 1 left).

Examination. On admission, the general neurological examination was normal. X-ray films of the skull showed a hyperostotic change in the right parietal bone (Fig. 1 right), approximately 5 cm in diameter and 3 cm thick. Computerized tomography (CT) showed a mass in the right parietal bone with a central low-density area surrounded by sclerosis (Fig. 2). The inner table was pushed inward and showed a slightly irregular contour, although the outer table appeared normal.

Magnetic resonance imaging revealed a high-intensity mass with a central low-intensity area on T₁-weighted images (Fig. 3 left). The T₂-weighted images showed a low-intensity mass with a central high-intensity area (Fig. 3 center). After administration of contrast material, significant enhancement was seen in the central portion of the lesion (Fig. 3 right).

Operation and Postoperative Course. A right craniotomy was performed on April 13, 1989. The scalp and outer table of the skull were normal. The hard mass was removed en bloc without damaging the underlying dura mater. The inner table had a slightly irregular surface but did not adhere to the dura mater. The bone defect was repaired using a methyl methacrylate plate. The postoperative course was uneventful.

Pathological Examination. Gross examination of the lesion revealed expansion of the diploë between the inner and outer tables of the skull. A transverse section of the lesion disclosed a central cyst containing slightly xanthochromic fluid and demonstrating hyperostotic change (Fig. 4). Histologically, the cyst wall consisted of non-neoplastic granulated tissue. Thick immature bone trabeculae surrounding the granulation tissue were also visible (Fig. 5). No giant cells or hemosiderin deposits were observed. The pathological diagnosis was that of chronic hematoma of the diploë.

Discussion

Acute hematomas in various layers of the scalp and the skull present different clinical and pathological pictures. Although such hematomas commonly resolve
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spontaneously over several weeks, chronic hematomas have been reported in the subgaleal space, subperiosteal space, and diploic. In 1934, Chorobski and Davis described a diploic cyst that was diagnosed several years following head trauma. They stressed that very slight trauma was sufficient for diploic bleeding to form a diploic cyst. Recently, Yuasa, et al., reported a case of “intraosseous hematomas of the skull.” Their case is similar to ours in several respects, as follows: 1) both patients were young adults, 2) both patients had suffered minor head trauma several years previously, 3) both were diagnosed as having intraosseous cyst of the cranial vault, and 4) the histological appearance in both cases indicated a non-neoplastic cyst with hyperostotic changes.

The diagnosis of chronic diploic hematoma is made based on the histological picture. The pathogenetic mechanisms of cyst formation and hyperostosis in the lesion are noteworthy. If the diploic hematoma is not absorbed, the surrounding connective tissue usually encapsulates it, thus creating a cyst. The natural history of this connective tissue shows various stages of differentiation. Fibrous tissue, osteoid tissue, and sometimes osseous tissue form, followed by disappearance of all the foreign elements. Our case suggests that over a period of years the diploic hematoma organizes and ossifies to produce a permanent mass.

The radiological appearances of chronic diploic hematoma are unique. On plain x-ray films, hyperostotic lesions expand inward. Computerized tomography shows a sclerotic mass with a central cyst. However, Yuasa, et al., stressed that appearance on CT is not sufficient to determine whether lesion location is epidural, subdural, or intraosseous. Magnetic resonance imaging provides more precise information than CT for determining the type of bone lesion and usually demonstrates the exact location and extent of the lesion. In the present case the cyst wall was composed of granulation tissue that enhanced markedly. It is believed that this is the first reported case of MR imaging confirmation of a chronic diploic hematoma.

FIG. 1. Plain x-ray studies. Left: Film taken in 1985 showing no abnormality. Right: Film taken on admission in 1989 showing hyperostotic change in the right parietal bone.

FIG. 2. Unenhanced computerized tomography scan showing a high-density mass with a central low-density area.
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Fig. 3. Magnetic resonance images, spin-echo sequence. Left: T1-weighted (TR 500 msec, TE 30 msec) axial image showing a high-intensity mass with a central low-intensity area. Center: T2-weighted (TR 2000 msec, TE 120 msec) axial image showing a low-intensity mass with a central high-intensity area. Right: Contrast-enhanced T1-weighted (TR 500 msec, TE 30 msec) axial image showing significant enhancement in the central portion of the lesion.

Fig. 4. Transverse section of the lesion showing a central cyst and hyperostotic change. Rule is in centimeters.

In terms of differential diagnosis, osteoma, giant-cell reparative granuloma (GCRG), and non-neoplastic bone cyst must be taken into consideration. Giant-cell reparative granuloma is a rare non-neoplastic lesion of bone which is considered to be a local reparative process related to traumatic bleeding.1,3-5 Although this lesion is most frequently located in the mandible,1,4 it has rarely been reported in the skull.5,6 Roentgenograms of GCRG usually show a radiolucent defect with marginal sclerosis.1,3,4 Histologically, it is composed of fibroblastic cells and numerous characteristic multinucleated osteoclast-like giant cells throughout the lesion. The etiology and clinical course of GCRG are similar to those of chronic diploic hematoma, but radiological and pathological findings of these lesions are quite distinctive. Traumatic bone cyst has also been reported in the mandible; this lesion occurs mainly in adolescents.

The only treatment for chronic diploic hematoma is total surgical resection. No further treatment may be required. We stress that chronic diploic hematoma should be taken into account in the differential diagnosis when a cystic and/or hyperostotic solitary lesion of the skull is found.

Fig. 5. Photomicrograph demonstrating histological features of the lesion. The cyst wall is composed of fibrous connective tissue surrounded by immature bone trabeculae. H & E, × 3.5.

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References


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