Case Reports

Post-Traumatic Leptomeningeal Cysts of the Brain

Report of an Unusual Case

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Leptomeningeal cysts of the brain that result from trauma are not common lesions, considering the few cases reported in the literature in comparison with the vast numbers of head trauma. This condition has been known and reported under a variety of headings for over 100 years.1

Recently, we came across a case in an infant. The reason for reporting it is the comparative rarity of the lesion but more especially its unusual features. It presented a combination of a cephalo-hydrocele and a large cerebral cyst connected together through a hiatus in the bone. This feature will be elaborated later.

Case Report

A 9-month-old female infant fell from a height of 2 metres striking the back of its head on the floor, 6 weeks prior to its admission. She was unconscious for 2 min. There were no open wounds in the scalp. A few hours following the accident, a swelling started to develop at the injured part; it gradually extended until most of the scalp was involved in 18 hrs.

Next morning this swelling started to subside until it disappeared within 2 days from the whole scalp with the exception of that part from which it had started initially. The swelling left behind was the size of a tangerine and it had changed very little since the accident.

Examination. There was a cystic, pulsatile swelling 8x10 cm. in the right occipital region. It was irreducible and became tense on crying. It had a wide pedicle which seemed to connect it to the intracranial contents through a defect in the bone. The edges of the bony defect were felt raised above the surface of the cranial bones. No abnormal neurological signs were present (Fig. 1).

Plain roentgenography revealed the presence of a fracture with the edges eroded and scalloped (Fig. 2). There was a large defect in the bone, oblong in shape, of about 2x10 cm. extending from the right occipital toward the right temporal region (Fig. 7).

The cyst was aspirated and it contained xanthochromic fluid which on analysis showed 42 mg. per cent of proteins. The cerebrospinal fluid obtained by lumbar puncture was clear and contained 25 mg. per cent of proteins.

Air was substituted for the fluid aspirated. Roentgenography revealed the presence of a multiloculated cyst (Fig. 3). The lateral brow-up position shows to what extent the cyst has involved the brain tissue. The finger-like shadow limits the anterior border of the cyst (Fig. 4).

Pneumoencephalography by the lumbar route was performed at the same time to determine the relationship of the cyst to the ventricular system. It revealed the multiloculated cyst separate from the ventricles (Fig. 5).

The frontal view shows the ventricles moderately dilated but placed symmetrically. The body of the lateral ventricle is drawn toward the defect proving that the large intracerebral part of the cyst is caused by destruction and replacement of brain tissue rather than by the effects of pressure on the brain by an extracerebral cyst (Figs. 6 and 7).

Operation. The extracranial part of the cyst had a wall consisting of tough fibrous tissue with a smooth shining inner surface. This was continuous with the intracranial part which seemed to replace most of the occipital lobe. Underneath this tough wall there was a very thin layer of degenerated, yellowish-colored brain tissue. This brain component of the wall of the cyst seemed to extend to the extracranial part of the cyst, not quite up to its dome but certainly for some distance outside the cranial cavity. The extracranial part of the cyst was removed flush with the isthmus. The wall of the cyst was strong enough to hold sutures and it was possible to make a watertight closure. The scalp was closed in two layers.

Postoperative course was uneventful and the patient was discharged 3 weeks after operation apparently normal. She was seen 9 months later and the condition was satisfactory.

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FIG. 2 (left). Plain roentgenogram showing the fractured decalcified bone.
FIG. 3 (right). Some fluid has been replaced by air. The fracture with scalloped edges is evident. There is a separated decalcified piece of bone in the centre.

Discussion

The condition most commonly known at present as leptomeningeal cysts of the brain has been known for over 100 years. These cysts may be of congenital origin or may be produced by inflammatory causes. This communication concerns only a third variety which is a sequel to head trauma. The first post-traumatic case was reported by John Howship in 1816. He noted a bony defect after a head trauma in a young child. Over the second half of the past century a number of papers appeared reporting single or a few cases containing some shrewd clinical and pathological observations. Those early authors concentrated on cephalohydrocele, which is one of the constant features of the affection. With the development of roentgenology in the diagnosis, the emphasis, at the turn of the century, shifted to the bony lesion.

Leptomeningeal cysts was the name given to this condition by Dyke in 1937, but this name was not accepted universally and different authors continued to report their cases under different terms.

In the more recent literature two notable contributions have appeared on this subject. The first one was by Taveras and Ransohoff, who reported 7 cases treated at the Neurological Institute of New York over a 20-year period. The second paper is a comprehensive review of the world literature since the first case described by Howship in 1816 until the present time. It is by Lunde and Erickson who reported 5 cases under the term of “Growing Skull Fractures of Child-

FIG. 4 (left). Some of the fluid has been replaced by air. Lateral brow-up position shows a multiloculated cyst. The depth of the intracerebral part is shown by the finger-like shadow.
FIG. 5 (right). Encephalogram with air in the cyst. Lateral brow-down position shows the cyst separate from ventricles.
hood.” It is to be noted that recently there has been a tendency toward revival of the old notion of regarding the bony lesion as the most important feature of the affection. Pia used the same term in describing 9 cases in 1954.

In their important paper, Lende and Erickson came to the conclusion that the condition is a syndrome characterized by 4 features. 1) Skull fracture of infancy and early childhood. 2) Dural tear at the time of fracture. 3) Brain injury beneath the fracture. 4) Subsequent enlargement of the fracture to form a cranial defect.

The outstanding feature of the syndrome, namely, the bony defect, was attributed by Taveras and Ransohoff to the constant impact of the wall of the cyst against the edges of the fractured bone by pulsations of the brain. They considered the dural tear as the single most important factor in the pathogenesis of these lesions. Lende and Erickson agreed on regarding the dural tear as a most important factor in promoting erosion of bone but referred also to local brain injury, which need not be expanding, the pulsations of the brain and the physical nature of the infant’s skull as important contributing factors.

The study of the present case will reveal that immediately after the accident, there was widespread swelling all over the scalp. In 2 days this swelling subsided except for that part of the head struck at the time of the accident. The residual swelling was the size of a tangerine and remained practically unchanged until the patient was seen 6 weeks later.

It is evident that at the time of injury the dura mater as well as the arachnoid was torn. The cerebrospinal fluid had found its way to the potential subgaleal layer. According to the principle of the insulation of the nervous system propounded many years ago by Trotter, the extravasation of cerebrospinal fluid became limited to the immediate vicinity of the injury to form a spurious cyst. The wall of this extracerebral cyst was formed of a tough fibrous membrane with a glistening inner surface. At operation it was difficult to define the limits of the torn dura mater. This cyst was connected in a hour-glass fashion, through the defect in the bone, with a large intracerebral cyst which had replaced most of the occipital lobe.

The impression gained was that there must have been a previous encephalomalacia caused by interference with the blood supply of a considerable part of the occipital lobe of the brain. The yellow discoloration, the soft degenerated brain tissue in the wall of the cyst and the detection of hemosiderin on microscopic examination, all lend support to this view.

An obvious question poses itself for answering. If head trauma to children, which results in skull fracture, tear of the dura mater and arachnoid, and injury to the underlying brain are the only requirements for the development of this condition, how can we explain its rarity when its alleged

Fig. 6 (left). Encephalogram with air in the cyst. Lateral brow-down position shows the extent to which the occipital lobe has been replaced by cyst. Remaining part of occipital lobe is outlined by subdural air under tentorium.

Fig. 7 (right). Encephalogram with air in the cyst. Frontal view shows extent of bony defect. The body of the right lateral ventricle is drawn toward the defect.
causes are so common? We feel that some other, comparatively scarce, factors must be present for the condition to develop. We venture to suggest that other possible contributory factors are de-

vitalization of the bone caused by direct trauma or by separation of the dura mater and pericrani-

um and debilitating general condition unfavorable for recovery.

It is felt also from observation on this case that the designation of “leptomeningeal cyst” is mis-

leading. Certainly, there was nothing in our case to suggest a cyst of leptomeningeal origin. It was a

ccephalohydreole continuous with an intracerebral cyst.

The present case combines two features which make it still rarer. The cephahlohydreole was per-

manent and, in contradistinction to the cases of this sort reported in the literature, it was not com-

municating with the ventricles.2, 20, 28

Summary

A case of “leptomeningeal cyst” is reported. The observation on this case reveals that the propriety of this term is questionable. This case has presented some unusual features which will make it rare amongst an already uncommon condition. The literature is reviewed briefly and sug-

gestions are put forward to explain its rarity in comparison with the prevalence of head trauma.

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