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Case Report

An Organized Chronic Subdural Hematoma with Partial Calcification in a Child

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The authors present a case in which an organized chronic subdural hematoma(CSDH) was incidentally found in a 9-year-old boy with no significant medical history after a pedestrian traffic accident. Preoperative magnetic resonance(MR) imaging showed calcification on the inner membrane and an irregular heterogeneous structure in the hematoma cavity. The findings from the preoperative brain computed tomogram(CT) and MR image were very useful for making the preoperative diagnosis and surgical decision. In choosing the proper surgical strategy for removing the organized CSDH, it was thought that burr hole trephination would present unnecessary difficulties. Thus, craniotomy was selected and the organized CSDH was successfully removed with no complications.

KEY WORDS : Chronic subdural hematoma · Craniotomy · Magnetic resonance imaging.

Introduction

Organized chronic subdural hematoma(CSDH) is a rare affliction in children. Calcified CSDH was first described at autopsy in 1884, and the incidence of organized or calcified CSDH is only 0.5~2%[2]. Craniotomy procedures are effective in the removal of organized CSDH[4]. Those children with an organized CSDH usually have a history of Subduro-peritoneal (SP) or Ventriculo-peritoneal(VP) shunt for CSDH in infancy. Other well-known predisposing factors include shunt procedures following hydrocephalus, premature delivery, meningitis, encephalitis, and seizure[4]. Nevertheless, this case report describes a male child with no predisposing factor yet a partially calcified, organized CSDH which was effectively treated by craniotomy.

Case Report

A 9-year-old boy was immediately referred to our department due to complaints of persistent headaches following a pedestrian traffic accident. At birth, he was delivered without any trauma and had a completely normal medical history. Upon examination, some bruising was observed in the left parietal region of his head. On neurological examination, he was irritable, but exhibited no focal neurologic deficit. Plain skull films revealed abnormal calcification adjacent to the inner table of the skull in the left fronto-parietal region.

Computed tomography(CT) and magnetic resonance(MR) imaging demonstrated an extra-axial lesion on the left cerebral convexity, reflecting a hematoma. The CT scan showed heterogeneous density in the hematoma cavity, compared to gray matter. It also showed several foci of calcification randomly

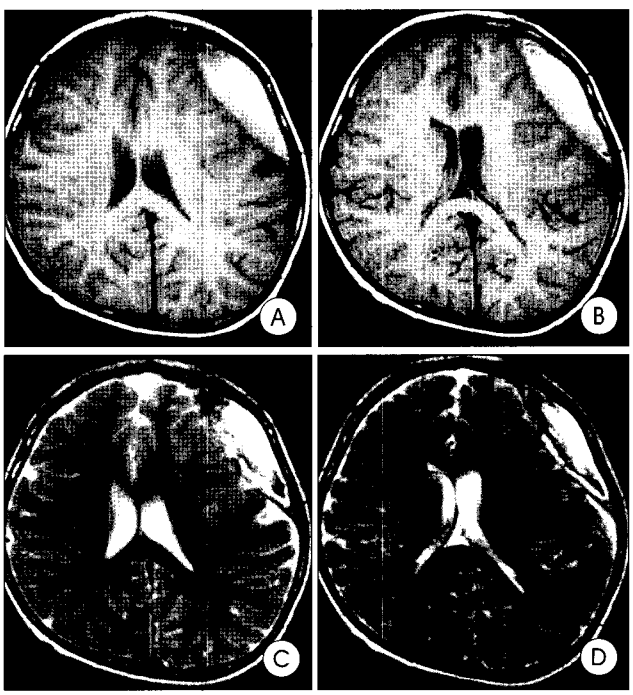

Fig. 1. A, B, C, D Axial T1-weight & T2-weight magnetic resonance images demonstrate heterogeneous hematoma with calcifications over the left cerebral convexity.

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Fig. 2. Intraoperative photograph showing organized hematoma, including black & solid portion and necrotic fluids after opening of the dura. These findings suggest repeated hemorrhages.

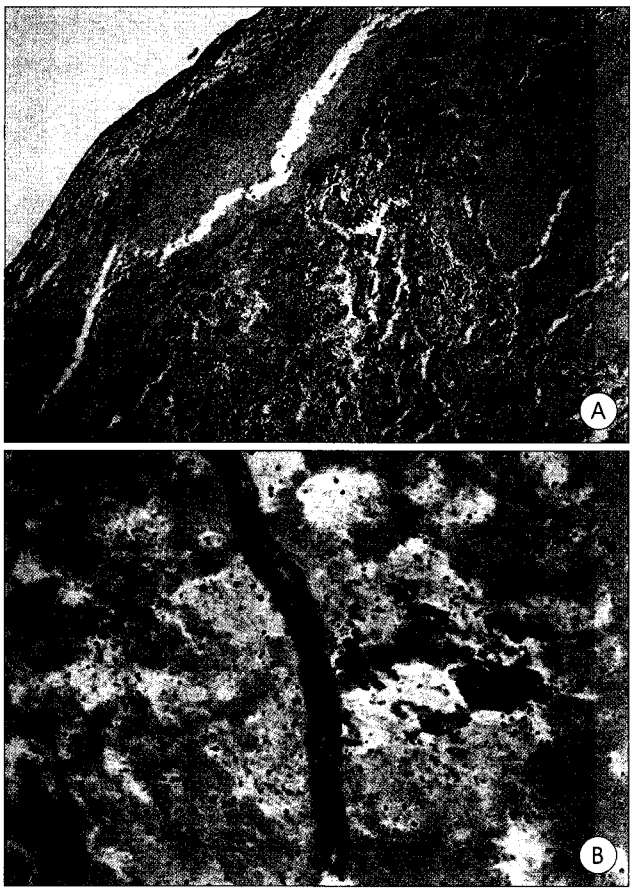

Fig. 3. (A) Photomicrographs of surgical specimen shows hematoma with fibrin clot, degenerative red blood cells, and hemosiderin laden macrophage (H&E, X 100) (B) An area of hematoma shows neurotrophilic infiltration & calcification (H&E, X 200).

distributed in the hematoma. T2-weighted MR image demonstrated calcification on the inner membrane as a low intensity and irregular heterogeneous structure in the hematoma cavity (Fig. 1). T1-weighted MR image revealed that these hematoma suggested recurrent bleeding events (old, subacute, acute). Adjacent dura matter was thickened and displaced by the hematoma.

The patient underwent a left frontotemporoparietal craniotomy for removal of the hematoma. The dura mater was thick and adhered tightly to the outer margin of the organized hematoma. Incision of the outer margin revealed the contents of the hematoma, which included liquefied hematoma with an appearance similar to crankcase oil, a solid component of a bright yellowish color, and xanthochromic necrotic fluid. These findings suggest repeated hemorrhages and chronicity. The lesion was gross-totally removed. No other pathological findings, including vascular malformations, were noted in the hematoma cavity or in the exposed brain surface of the operation field (Fig 2). Postoperative histological examination showed fibrin clots, hemosiderin laden macrophage, and calcification (Fig 3), characteristic findings of an organized hematoma.

Immediately following the craniotomy, the irritability that was present before the procedure was gone. The patient's postoperative experience was uneventful and he was discharged after one week with no neurological deficit. Six months following discharge, the patient had had no other problems.

Discussion

The pathogenesis of the formation and development of CSDH is still a matter of discussion. Pathophysiologic processes, such as inflammatory reaction, formation of neomembranes, and liquefaction of blood have been implicated[1]. The CSDH may completely organize, but follow-up data on the causes have not been sufficient. Several etiologies for CSDH in infants and children have been suggested, such as birth injury, vitamin K deficiency, infantile acute subdural hematoma, child abuse, coagulopathy, SP or VP shunt, and seizure[4]. These situations may contribute to generating calcified or organized CSDH. In this case however, no specific past illness, trauma or condition existed.

The CSDH can be evacuated via small twist drill or burr holes, with or without the placement of a subdural drain. The craniotomy is generally accepted as the optimum approach when CSDH reaccumulates, there is solid hematoma, the brain fails to expand, or there is marked cerebral swelling subjacent to the hematoma[4].

Shigeki, et al.[4] reported that removal of an organized CSDH with calcification usually failed with a burr hole procedure, and good results can be achieved by means of craniotomy. They also proposed that preoperative CT and MR image findings are very important in determining the proper surgical

method. The CT scan in this case showed calcification on the subdural neomembranes and heterogeneous density in the hematoma. The MR image demonstrated a heterogeneous web- or net-like appearance in the hematoma cavity (Fig. 1). Thus, the authors considered craniotomy to be the optimum removal method for this case.

Endoscopic removal of organized CSDH has recently been developed with good results[3]. However, although it provides easy access to virtually the entire hematoma cavity under local anesthesia using a key-hole concept, the endoscopic approach has not been studied enough and reports concerning it are still insufficient to be definitive. For it to be a viable alternative procedure to craniotomy, this less invasive method requires a double blind controlled study prospectively.

Calcification may be responsible for chronicity of the hematoma. It is essential that the hematoma exist for at least 3years before calcification begins to occur[4]. Although calcification is a manifestation of prolonged existence of the hematoma, it may also depend on many factors in addition to chronicity. Poor circulation, vascular thrombosis and parathyroid disorder are well known causes of calcification[4,5], but the exact mechanism of calcification is still unclear.

Conclusion

This case report involves a male child who underwent a craniotomy for the removal of an organized CSDH with partial calcification. CT and MR imaging were very useful for preoperatively determining the proper surgical method of removal. They demonstrated calcification on the subdural neomembrane and a heterogeneous appearance in the hematoma cavity. Therefore, the organized CSDH was successfully removed by means of an open cranial procedure. From our experience, craniotomy is recommended as the best surgical procedure for removal of an organized CSDH.

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