Case Report

Chronic encapsulated intracerebral hematoma: Three case reports and a literature review

Akira Nishiyama, Hiroyuki Toi, Hiroki Takai, Satoshi Hirai, Kimihiko Yokosuka, Nobuhisa Matsushita, Kazuhiro Hirano, Shunji Matsubara, Hirotake Nishimura, Masaaki Uno

Departments of Neurosurgery and Pathology, Kawasaki Medical School, Kurashiki, Okayama, Japan

E-mail: Akira Nishiyama - akira-nishiyama@live.jp; Hiroyuki Toi - ht11251974@yahoo.co.jp; Hiroki Takai - greenhousesouvaizasasc@hotmail.com; Satoshi Hirai - k0110176med@yahoo.co.jp; Kimihiko Yokosuka - hiko@med.kawasaki-m.ac.jp; Nobuhisa Matsushita - nobuhisama@gmail.com; Kazuhiro Hirano - hirano1h@med.kawasaki-m.ac.jp; Shunji Matsubara - matsubara@med.kawasaki-m.ac.jp; Hirotake Nishimura - piko@med.kawasaki-m.ac.jp; Masaaki Uno - mono@med.kawasaki-m.ac.jp

*Corresponding author

Received: 31 January 14 Accepted: 01 March 14 Published: 06 June 14

This article may be cited as:
Nishiyama A, Toi H, Takai H, Hirai S, Yokosuka K, Matsushita N, et al. Chronic encapsulated intracerebral hematoma: Three case reports and a literature review. Surg Neurol Int 2014;5:88.

Copyright: © 2014 Nishiyama A. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Abstract

Background: Chronic encapsulated intracerebral hematoma (CEIH) is one type of intracerebral hematoma that sometimes grows progressively while forming a capsule and presenting with neurological deficits. Although many cases of CEIH have been reported, correct preoperative diagnosis is very difficult. Only around 20% of cases are diagnosed preoperatively.

Case Description: We encountered three cases of CEIH in which causes were unidentified and difficult to diagnose. All three cases were treated surgically. In the first case, a 59-year-old male was diagnosed preoperatively with metastatic brain tumor. In the second case, a 62-year-old female was diagnosed preoperatively with glioblastoma. The third case involved a 58-year-old female diagnosed preoperatively with CEIH.

Conclusion: We should keep in mind that CEIH is a differential diagnosis for intracerebral space-occupying lesions. This report describes these three cases and discusses imaging findings and characteristics of CEIH.

Key words: Chronic encapsulated intracerebral hematoma, diagnosis, neuroimaging

INTRODUCTION

Chronic encapsulated intracerebral hematoma (CEIH) is a rare entity that was first reported in 1981. This type of hematoma expands slowly and behaves as a space-occupying lesion. Surgical resection is effective to improve the neurological symptoms and good prognosis is expected, but the lesion can be difficult to diagnose. We describe three cases of CEIH and review the associated literature, with special emphasis on the clinical and neuroimaging features relevant to diagnosis.

CASE REPORT

Case 1
A 59-year-old male presented with a 1-month history of progressive weakness in the left upper extremity. Neurological examination revealed monoparesis of the left upper limb, and muscle power assessment showed grade 3/5. Plain computed tomography (CT) showed a faint hyperdense mass in the right frontal lobe [Figure 1a]. Fluid-attenuated inversion recovery (FLAIR) imaging revealed the lesion as a low-intensity mass
accompanied by extensive perifocal edema [Figure 1b]. Gadolinium-enhanced T1-weighted magnetic resonance imaging (MRI) showed faint enhancement [Figure 1c]. The preoperative differential diagnosis included metastatic brain tumor. Left frontal craniotomy was performed, and the mass lesion was revealed to be entirely located within the brain parenchyma. The hard mass lesion with yellowish membrane was removed en bloc through a transcortical approach [Figure 2]. The mass lesion contained old clots and muddy hematoma, and histological examination confirmed the diagnosis of CEIH [Figure 3]. Postoperatively, motor paresis promptly improved. MRI showed the disappearance of CEIH and cerebral edema, and no recurrence [Figure 1d and e]. The patient currently has no neurological deficits and is back at work.

Case 2
A 62-year-old female presented with a 2-month history of speech disorder. Neurological examination on admission revealed motor aphasia. Plain CT showed a faint hyperdense mass lesion in the left frontal lobe [Figure 4a]. T2-weighted MRI revealed the lesion as an isointense region with high-intensity rims and peripheral edema [Figure 4b], and gadolinium-enhanced T1-weighted MRI showed ring enhancement [Figure 4c]. Preoperative differential diagnoses included glioblastoma, metastatic brain tumor, and brain abscess. Left frontal craniotomy was performed, and the mass lesion was reached through the cortex. The mass had a thick capsule and clear border with the surrounding brain tissue, and contained old clots and muddy hematoma. No abnormal vessels were observed in the vicinity of the lesion. Histological examination revealed the capsule contained macrophages with hemosiderin, and granulation tissue. No evidence of vascular malformation or brain tumor was present. The lesion was finally diagnosed as CEIH. The postoperative course was uneventful, and motor aphasia resolved completely. MRI showed disappearance of the mass lesion and cerebral edema, and there has been no recurrence after 2 years of follow-up [Figure 4d].

Case 3
A 58-year-old female presented with a 3-week history of progressive confusion, disorientation, apathy, and left hemiparesis (muscle power assessment showed grade 4/5). CT demonstrated a faint hyperdense mass in the right frontal lobe [Figure 5a]. FLAIR revealed the lesion as mixed-intense and hyperintense mass with...
perifocal edema [Figure 5b]. T2*-weighted gradient echo imaging revealed the lesion as a high-intensity mass with low-intensity rims suggestive of hemosiderin deposition [Figure 5c]. Gadolinium-enhanced T1-weighted MRI showed ring enhancement [Figure 5d]. FLAIR revealed the lesion as mixed-intense and hyperintense mass, with the lateral part of the lesion becoming hyperintense 2 weeks after initial MRI [Figure 5e]. Preoperative differential diagnoses included CEIH. Right frontal craniotomy was performed, and a thin yellowish capsule was identified. After separation from the surrounding structures, the mass was completely removed. Contents of the capsule comprised clots in various stages of hematoma formation. Histological examination showed no abnormal vessel malformation and confirmed the diagnosis of CEIH. The postoperative course was uneventful and symptoms gradually improved. Follow-up MRI showed no recurrence of the lesion at the 1-year follow-up [Figure 5f, g].

DISCUSSION

CEIH is a special type of intracerebral hematoma, first described by Hirsh in 1981[12] and characterized by the presence of a fibrotic capsule that histologically resembles the outer capsule of chronic subdural hematoma. CEIH sometimes grows progressively while forming the capsule and in such cases may present with neurological deficits. The mechanism of growth is thought to involve repeated bleeding from the new blood vessels in the capsule. To date, 54 other cases have been reported in the literature.[1-44] Table 1 depicts background characteristics and details of the patients. CEIH is a disease affecting all ages; the youngest reported patient was 2 months old and the oldest was 80 years old. The mean age is 44 years. Men may be affected more often than women, with 37 male patients and 20 female patients reported. Compared with intracerebral hematoma, which shows a sudden onset, CEIH often begins with progressive neurological deficits due to mass effects. However, one-third of patients present with sudden onset in the form of seizures. Preoperative diagnosis is very difficult, and only around 20% of cases are diagnosed preoperatively. The most common preoperative diagnostic error is brain tumor (glioblastoma, metastatic brain tumor), due to the perifocal edema observed on imaging and gradually
Table 1: Patient characteristics and symptoms

| Variable                        | n=57 (%) |
|---------------------------------|----------|
| Male                            | 37 (64.0) |
| Age (mean) (range)              | 44 years (0.2-80 years) |
| Onset type                      |          |
| Sudden onset                    | 19 (33.3) |
| Gradual onset                   | 37 (64.9) |
| Pre-operative diagnosis         | n=28     |
| Brain tumor                     | 17 (53.6) |
| CEIH                            | 6 (21.4)  |
| Vascular malformation           | 3 (12.5)  |
| Old hematoma                    | 2 (7.0)   |
| Cranietomy                      | 55 (96.4) |
| Outcome                         |          |
| Good                            | 42 (73.6) |
| PND                             | 8 (14.0)  |
| Deceased                        | 2 (3.5)   |
| No detail                       | 5         |

CEIH: Chronic encapsulated intracerebral hematoma, PND: Persistent neurological deficit

Among the reported cases, we classified them into 3 types: gradients, CT and MRI features, and neurological deficit. All but two cases of CEIH reported to date have been resected surgically, achieving good results. We recommend early surgical intervention and total removal of CEIH. Because of the tough membrane, separating the hematoma from normal brain tissue is very easy compared with cavernous angioma. We suggest total removal of the capsule to prevent recurrence of CEIH.

Although CEIH is a condition that is hard to diagnose preoperatively, good outcomes are provided by appropriate surgical treatment. CEIH should therefore be kept in mind as a differential diagnosis for intracerebral space-occupying lesions.

REFERENCES

1. Aoki N, Mizuguchi K. Chronic encapsulated intracerebellar hematoma in infancy: Case report. Neurosurgery 1984;14:594-7.
2. Cakir E, Kuzeyli K, Usul H, Sayin OC, Kararslan G, Peksoyu B. Ruptured chronic encapsulated intracerebral hematoma in infancy: Review of the literature with a case report. Childs Nerv Syst 2006;22:436-9.
3. Chan ST, Tse CH. Chronic encapsulated intracerebral hematoma in a young Chinese adult: Case report. Neurosurgery 1987;20:639-41.
4. Chen NF, WangYC, Shen CC, Jan YJ, Chen WH, Leu CH. Calcification and ossification of chronic encapsulated intracerebral haematoma: Case report. J Clin Neurosci 2004;11:527-30.
5. d’Avella D, Germano A, Romano A, Cardia E, Tomasello F. Chronic encapsulated intracerebral hematoma: Contribution of thallium-201 single photon emission computed tomography in preoperative diagnosis: Case report. Neurosurgery 1997;41:677-80.
6. Fuji T, Takada Y, Ohno K, Hokari M, Ara T. Slowly progressive expanding hematoma in the basal ganglia: A report of 3 cases and a literature review. Brain Nerve 2012;64:295-302.
7. Fiumara E, Gambacorta M, D’Angelo V, Ferrara M, Corona C. Chronic encapsulated intracerebral haematoma: Pathogenetic and diagnostic considerations. J Neurol Neurosurg Psychiatry 1989;52:1296-9.
8. Ganapathy K. Chronic encapsulated intracerebral hematoma. Neurol India 2011;59:504-5.
9. Gökçil Z, Odabaşı Z, Atilla S, Kütükçi Y, Ural O, Yardım M. Radiological follow-up in encapsulated intracerebral hematoma mimicking intratumoral bleeding. Acta Neurochir Belg 1998;98:27-31.
10. Greiner-Perth R, Neubauer U, Schenke H. Chronic encapsulated intracerebral hematoma—a well-defined disease. Report on two cases and review of the literature. Neurosurg Rev 1997;20:231-8.
11. Greiner-Perth R, Neubauer U, Schenke H. Chronic encapsulated intracerebral haematoma. Acta Neurochir (Wien) 1996;138:1364-5.
12. Hirsh LE, Spector HB, Bogdanoff BM. Chronic encapsulated intracerebral hematoma. Neurosurgery 1981;9:169-72.
13. Hsieh CT, Chang CF. Encapsulated chronic intracerebral hematoma mimicking neoplasia. Acta Neuroi Taiwain 2009;18:227-8.
14. Ilkko E, Pyhtinen J, Reponen J. Chronic encapsulated intracerebral haematoma. Neuroradiology 1996;38:551-4.
15. Kasuya J, Hashimoto Y, Terasaki T, Miura M, Miyayama H, Uchino MZ. Chronic encapsulated intracerebral hematoma in thalamus with incongruous right homonymous hemianopia: A case report. Rinsho Shinkeigaku 1998;38:29-33.
16. Kuma T, Kaya T, Sakurai Y, Ogawara K, Niizuma H, Wada T, et al. Encapsulated chronic intracerebral hematoma caused by venous angioma of the basal ganglia: A case report. No Shinkei Geka 1999;18:735-9.
17. Kurita H, Ichi S, Shiokawa Y. Chronic encapsulated intracerebral haematoma in a patient with medically intractable epilepsy. Br J Neurosurg 1998;12:51-3.
18. Lee CC, Pan DH, Ho DM, Wu HM, Chung WY, Liu KD, et al. Chronic encapsulated expanding hematoma after gamma knife stereotactic radiosurgery for cerebral arteriovenous malformation. Clin Neurol Neurosurg 2011;113:668-71.
suggest that diagnoses are well discussed. Pathophysiology would await further cases.

Clinical and radiological presentations and differential diagnoses are well documented. The surrounding edema might indicate inflammation from some unidentified associated pathogen, but this is speculation. Even if true, it awaits further cases.

C. David Hunt

Marquette General Neurosurgery; Brooklyn, NY, USA
E-mail: davidhunt@mac.com