Heading Injury Precipitating Subdural Hematoma Associated with Arachnoid Cysts
—Two Case Reports—

Akihito KAWANISHI, Masaki NAKAYAMA, and Koki KADOTA
Department of Neurosurgery, Kagoshima University School of Medicine, Kagoshima

Abstract
A 14-year-old boy and a 11-year-old boy presented with subdural hematomas as complications of preexisting arachnoid cysts in the middle cranial fossa, manifesting as symptoms of raised intracranial pressure. Both had a history of heading the ball in a soccer game about 7 weeks and 2 days before the symptom occurred. There was no other head trauma, so these cases could be described as “heading injury.” Arachnoid cysts in the middle cranial fossa are often associated with subdural hematomas. We emphasize that mild trauma such as heading of the ball in a soccer game may cause subdural hematomas in patients with arachnoid cysts.

Key words: arachnoid cyst, heading, subdural hematoma

Introduction
Chronic subdural hematoma occurs in about 20% of patients with arachnoid cysts, and about 28% of those with arachnoid cysts arising in the middle cranial fossa. The mechanism by which chronic subdural hematomas are associated with arachnoid cysts is unclear. However, hypotheses can be categorized into two groups. The first group proposes that minor head injury is responsible for damaging the veins around the arachnoid cyst or the veins spanning the sylvian fissure that are distended by the cyst, thus resulting in subdural hematoma. The other group proposes that the arachnoid cyst is ruptured as a result of head injury and forms a subdural hygroma, which is then transformed into a hematoma. All hypotheses agree that the precipitating factor is head injury.

We treated two young patients with arachnoid cyst in the middle cranial fossa who developed chronic subdural hematoma, both apparently as a result of playing soccer and heading the ball.

Case Reports
Case 1: A 14-year-old boy presented with persistent severe headache and nausea. Computed tomography (CT) detected an arachnoid cyst in the left middle cranial fossa 2 months before admission (Fig. 1). He had headed a ball during soccer game on April 3, 1996 and just afterwards had complained of headache. The symptoms had worsened over several days. He was admitted to our hospital on May 21, 1996.

Clinical examination on admission was unremarkable and no neurological deficit was detected. Skull radiography revealed mild enlargement of the left middle cranial fossa. CT demonstrated an arachnoid cyst in the left middle cranial fossa associated with subdural hematoma.
associated with a subdural hematoma and midline shift (Fig. 2). Emergency opening of two burr holes was performed and the subdural hematoma was irrigated. The symptoms resolved immediately after surgery. Postsurgical metrizamide CT cisternography demonstrated no communication between the cyst and the subarachnoid space.

Left frontotemporal craniotomy was performed one month after irrigation. The arachnoid cyst had replaced the tip of the left temporal lobe and widened the left sylvian fissure. The cyst was filled with slightly xanthochromic fluid. Both the outer and inner membranes were resected, and communication opened between the cyst cavity and the chiasmatic cistern. Follow-up CT one year after surgery revealed a marked reduction of the cyst size and no recurrence of subdural hematoma.

Case 2: An 11-year-old boy had suffered persistent severe headache and vomiting since he headed a ball while playing soccer 2 days earlier. T₂-weighted magnetic resonance imaging had found an arachnoid cyst in the left middle cranial fossa before admission (Fig. 3). On admission, he had neither neurological deficits nor laboratory abnormalities. CT revealed an arachnoid cyst associated with both intracystic and subdural hematomas (Fig. 4).

After opening two burr holes, the subdural hematoma was irrigated. His symptoms resolved immediately after surgery. No cerebrospinal fluid analysis or further examination of the arachnoid cyst was performed. His family requested follow up without direct surgery for the arachnoid cyst because the small cyst was associated with no clinical symptom. No recurrence of the subdural hematoma has occurred one year after irrigation.

Discussion

Head injury as the precipitating factor for subdural hematomas has been described in 38 cases, including present cases. One patient was under one year, three were aged 10 years or less, 19 were in their teens, 11 in their 20s, and one patient each in their 30s and subsequent decades.²⁴⁻¹⁵ There were 30 males and eight females, with the condition occurring predominantly in teenage males. The onset of symptoms occurred after playing sports in five cases, volleyball in one, rugby in one, and soccer in three, motor vehicle accidents in four, collisions with walls and other obstacles in four, falls from motorcycles and bicycles in seven, and falls from horseback and fences in two. There was no history of injury in nine cases, and no records on injury were available in seven. Detailed information on the severity of trauma was available for 22 patients. Slight symptoms at the time of injury manifested in 20 cases, without disturbance of consciousness or focal signs. A 30-second episode of transient amnesia was reported in one patient after falling off a horse.¹¹ Another patient suffered a forehead contusion as a rear-seat passenger in a motor vehicle accident. Disturbance of consciousness for 30 minutes
and anisocoria were observed. In our cases, the presence of an arachnoid cyst had been previously identified by neuroimaging, and the onset of symptoms were seen after heading the ball in a soccer game. Therefore, these cases could be described by the term "heading injury." The period between injury and the onset of symptoms was 0–1 week in two cases, 1–4 weeks in four, 1–6 months in 16, 6–12 months in two, and more than one year in one case. The initial symptoms of hematoma were headache, nausea, and vomiting in 36 cases, diplopia in four, convulsions in two, sensory disturbance in two, hemiplegia in one, and visual impairment in one, and no symptoms at all in two.

The surgical treatment for arachnoid cyst complicated by chronic subdural hematoma was as follows: 20 patients were initially treated by removal of the hematoma and cyst at craniotomy, irrigation alone was performed in 11 patients, and irrigation followed by cyst removal at craniotomy was performed in seven patients. The subdural hematomas in our patients were irrigated through two burr holes as emergency procedures because headache and vomiting were severe. Metrizamide CT cisternography demonstrated that the arachnoid cyst did not communicate with the subarachnoid space in the first patient, so the wide resection of the cyst wall was performed under the left frontotemporal craniotomy. Consent could not be obtained for further examinations in the second patient, so postoperative follow-up was continued in the outpatient clinic following resolution of the symptoms after burr hole irrigation. No recurrence has yet been detected.

Arachnoid cysts should be treated surgically, if there is a risk of intracystic hemorrhage or subdural hemorrage. However, no treatment is frequently given if there is neither symptoms nor evidence of raised intracranial pressure. However, there is a need for caution because a minor trauma such as that caused by heading a soccer ball may precipitate the onset of subdural hematoma.

References


Address reprint requests to: A. Kawanishi, M.D., Department of Neurosurgery, Kagoshima University School of Medicine, 8–35–1 Sakuragaoka, Kagoshima 890-8520, Japan.