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Case Report

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Clinical and Radiological Effects of The Treatment Modalities in a Case of Arachnoid Cyst Rupture

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ABSTRACT

Traumatic rupture into the subdural space without evidence of hemorrhage of the arachnoid cysts that localized in middle cranial fossa is a rare anomaly. We described the clinical and radiologic findings of a case 24-year-old man who was presented with a ruptured arachnoid cyst of the middle cranial fossa , and produced a subdural hygroma with trauma. Although arachnoid cysts account for 1% of all intracranial space occupying lesions, the association between arachnoid cysts and subdural hygroma is rare and only 23 cases have been previously reported in the literature. There are two procedures used in the surgery, the first is cyst fenestration and the second is a cysto-peritoneal shunt. In this patient although we applied all the possible surgical choices and we couldn't achieve any slightest regression on radiological findings, the patient had full recovery clinically.

Key words: *Arachnoid cyst, subdural hygroma, membranectomy and fenestration, cysto-peritoneal shunt*

ÖZET

Araknoid Kist Rüptürü Olgusunda Uygulanan Tedavilerin Radyolojik ve Klinik Etkileri

Orta fossa araknoid kistlerin travma sonrası yırtılarak kanama olmaksızın subdural alana açılmaları oldukça nadir görülen bir anomalidir. Travma sonrası subdural higroma gelişen orta fossa araknoid kistli 24 yaşında erkek hastanın klinik ve radyolojik bulguları sunuldu. Araknoid kistler tüm kafa içi yer kaplayıcı lezyonların %1'ini oluşturmaktadır. Araknoid kist sonrası subdural higroma gelişimi oldukça nadir görülmektedir ve literatürde daha önce 23 vaka bildirilmiştir. Cerrahi işlem yapılırken iki yöntem kullanılmaktadır; kistin sisternalara fenestrasyonu ve kistoperitoneal şant takılması. Bu hastada her türlü cerrahi girişimi uygulamamıza rağmen, radyolojik olarak herhangi bir düzelme sağlanamamasına rağmen klinik bulgularında tamamen düzelme sağlandı.

Anahtar kelimeler: *Araknoid kist, subdural higroma, membranektomi ve fenestrasyon, kistoperitoneal şant*

Arachnoid cysts are developmental anomalies described as intraarachnoidal cerebrospinal fluid collections. Arachnoid cysts represent 1% of all traumatic intracranial mass lesions (1,2). Middle fossa arachnoid cysts are the most common of the arachnoid cysts, accounting for approximately 50% of adult cases, and 30% of pediatric cases and produce symptoms predominantly younger than 20 years male patients (3-8).

Although arachnoid cysts are generally asymptomatic, seizures, signs of increased intracranial pressure due to complications such as subdural hematoma, intracystic hemorrhages, acute cyst expansion and subdural hygroma. Neurological deficits, macrocrania in children and developmental retardation are the principal symptoms (1,2,3,9,10, 11,12,13,15). Spontaneous rupture into the subdural space without evidence of hemorrhage of the arachnoid cysts that localized in middle cranial fossa is much rare. We described a case with an ruptured arachnoid cyst of the middle cranial fossa thatproduced a subdural hygroma with trauma.

CASE REPORT

A 24-year-old man was admitted to the neurosurgical department of the initial hospital with sudden dizziness, nausea and vomiting since 3 days.

In physical examination there were no remarkable findings, as well as his laboratory data. There were no neurological abnormalities. Computed tomography (CT) showed a large left-sided middle cranial fossa arachnoid cyst (classified as Galassi type 2) (10,16) and large subdural fluid collection isodense with the arachnoid cyst and cerebrospinal fluid (CSF) in ventricles (Figure 1). There was compression on the left side structures and lateral ventricles, and made midline shift.

The patient underwent surgery and high-pressure gush of clear subdural CSF was released, a subdural drain which was removed after 3 days of the operation was inserted by two-left parietal burr-hole at the neurosurgical department of the initial hospital. In postoperative follow-up of the patient, there was no regression of the signs. The controlled CT imaging has been shown the brain tissue has not been expanded (Figure 2). Two weeks after the first operation the patient has been directed to us for further examinations and treatment.

At the time of admission to our clinic, the patient had a headache and sudden dizziness, nausea and vomiting were going on. Similar clinical and CT imaging findings have been detected as the first findings at the initial hospital. Magnetic Resonance Imaging (MRI) and Magnetic Resonance Angiography (MRA) were performed consecutively. MRI showed arachnoid cysts on the anterior of left temporal region that is isointence with CSF, anterior of left temporal lobe was hypoplasic on the left frontotemporoparietal localization; a mass was observed which showed no contrast on the application of paramagnetic contrast substance and isointence

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with CSF and was separated with a cyst membran from the arachnoid cyst. There was compression on the left side ventricles and made midline shift. This lesion described was similar to subdural hygroma and arachnoid cysts (Figure 3). MR arterial and venous imaging showed no pathological findings.

Figure 1: *CT that had been taken at the initial hospital showed a large subdural fluid collection isodense with the arachnoid cyst and CSF in ventricles. There was compression on the left side structures and lateral ventricles, and made midline shift.*

Figure 2: *The controlled CT imaging has been shown the brain tissue has not been expanded after two-left parietal burr-hole operation performed at the neurosurgical department of the initial hospital.*

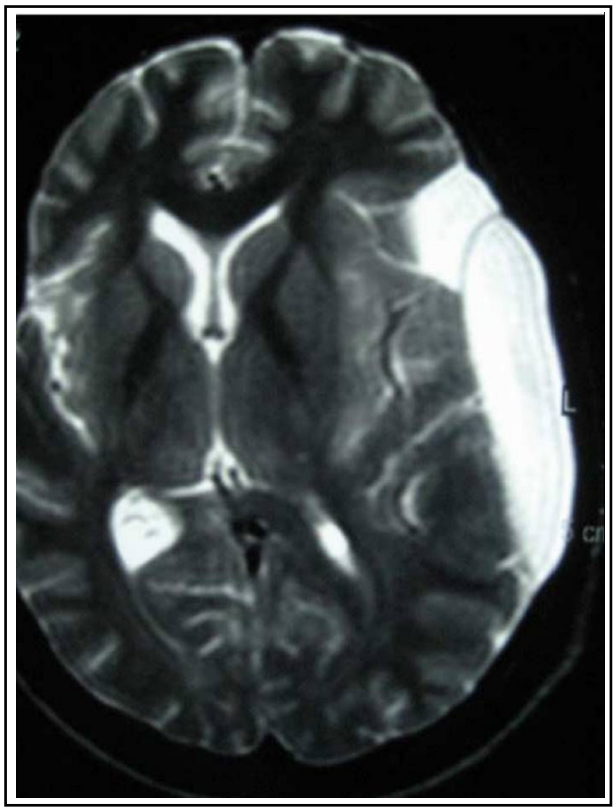

Figure 3: *MRI showed arachnoid cysts on the anterior of left temporal region that is isointence with CSF, anterior of left temporal lobe was hypoplasic, on the left frontotemporoparietal localization; a mass was observed which showed no contrast on the application of paramagnetic contrast substance and isointence with CSF.*

There was compression on the left side ventricles, and made midline shift. This lesion that was described was in harmony with subdural hygroma and arachnoid cysts.

The patient again underwent surgery and frontotemporal craniotomy was performed. The cyst of hygroma was released with membranectomy and the arachnoid cyst wall was fenestrated into the basal cisterns. Follow-up CT imaging demonstrated a mass effect with midline shift and no reduction in sizes of arachnoid cyst and subdural hygroma (Figure 4). 4mg dexamethasone was administered four times a day for two weeks as antiedema therapy and the patient was followed up for one month in our clinic. At the end of the follow-up period, there were no changes on his radiological and clinical symptoms. So we decided a new operation and a cysto-peritoneal shunt [Medtronic] with a CSF-flow control medium-pressure [40-80 mmHg] valve was inserted. Although mass effect with midline shift and no reduction in size of cyst and subdural effusion were found on post operative CT scans again (Figure 5); full clinical recovery has been reported after the last operation. No complications have been observed. The patient was called for evaluation 3 times in 3 months periods. The patient had no symptoms and was well but we couldn't observe any regression in radiological findings at follow-up period. The CT imaging demonstrated a mass effect with midline shift and no reduction in size of cyst and subdural effusion (Figure 6).

Figure 4: *The controlled CT imaging demonstrated a mass effect with midline shift and no reduction in sizes of arachnoid cyst and subdural hygroma after the operation of frontotemporal craniotomy with the cyst of hygroma was released with membranectomy and the arachnoid cyst wall was fenestrated into the basal cisterns.*

Figure 5: *After a cysto-peritoneal shunt was inserted, the mass effect with midline shift and no reduction in sizes of cyst and subdural effusion was found on post operative CT scans again.*

DISCUSSION

Arachnoid cysts are cerebrospinal fluid-filled collections that occur between two arachnoid layers. Although arachnoid cysts account for 1% of all intracranial space occupying lesions, the association between arachnoid cysts and subdural hygroma is rare and only 23 cases have been previously reported in the literature (3,10,16-18,20-25).

The association between arachnoid cysts and subdural hematomas was first noted in 1971 (26,27). Although no explanation for this predisposition has been proven, theories have been suggested (5,8). As arachnoid cysts are less compliant than normal brain tissue the amount of intracranial 'cushioning' during trauma is reduced with an increased likelihood of bridging veins to bleed. Alternatively, due to different composition of arachnoid cyst fluid compared to normal CSF, pressure may be transferred more readily and in magnified form which may lead to rupture of the bridging veins or of the vessels within the cyst wall (26). In our case, the arachnoid cyst on the anterior of left temporal region ruptured and caused subdural hygroma with the trauma.

Figure 6:*The last follow-up CT imaging demonstrated a mass effect with midline shift and no reduction in sizes of cyst and subdural effusion.*

Arachnoid cysts may rupture spontaneously or after head trauma. The rupture of an arachnoid cyst may produce the rapid onset of life-threatening symptoms. Therefore; a risk of spontaneous or traumatic rupture of arachnoid cyst should be kept in mind in all cases with arachnoid cysts, especially if there is suspicion of growth in size. If the cyst shows any growth, surgical intervention should be undertaken (17).

Surgery is generally recommended for symptomatic cysts causing seizures, hydrocephalus, raised intracranial pressure or focal deficits. Rapidly enlarging subdural hygroma and hematoma require surgical drainage (10,15,28).

Currently, there are two procedures used in the surgery; the first is cyst fenestration and the second is a cysto-peritoneal shunt. In patients without hemorrhage, either cysto-peritoneal shunting or cyst fenestration could be the choice. Yet in cases of intracystic or subdural hemorrhage, craniotomy with hematoma evacuation and cyst fenestration is superior to cysto-peritoneal shunting (10). In our cases, there was no hemorrhage; we performed the arachnoid cyst fenestration and cysto-

peritoneal shunt together for the recovery of the clinical symptoms.

CONCLUSION

We concluded that; if the intracranial pressure is high, cysto-peritoneal shunting is needed in addition to fenestration. In this patient we applied all the possible surgical choices and we couldn't achieve any regression on radiological findings, but the patient has full recovery clinically. In conclusion, despite applying all the surgical methods that has been described in literature till today and even though no regression on radiological findings can be achieved; patients may sometimes clinically get full recovery.

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