



Case Report

Aneurysmal Subdural Hemorrhage Due To Pericallosal Artery Aneurysms

Dilaver KAYA¹, Gulcin BENBİR¹, Koray OZDUMAN², İmre USSELİ², M. Necmettin PAMİR²

¹Acibadem University, Neurology, Istanbul, Türkiye ²Acibadem University, Neurosurgery, Istanbul, Türkiye

Abstract

Acute subdural haematoma (SDH) in association with aneurysmal subarachnoid hemorrhage (SAH) from a pericallosal artery aneurysm is extremely rare. Although rare, failure to diagnose such an uncommon aneurysm can lead to fatal errors in surgical planning for SDH. A 73-years old woman was brought to the emergency department complaining of acute onset severe headache and depressed level of consciousness. There was no history of trauma. On neurological examination, the patient was unconscious, unresponsive to painful stimuli. Cranial computed tomography (CT) demonstrated a right holo-hemispheric SDH, relatively little SAH and transtentorial herniation. Suspicion led to the demonstration of two aneurysms in the anterior cerebral artery (ACA) using quick CT-angiography. The patient was taken for emergency surgery for successful distal ACA aneurysm clipping as well as SDH evacuation. The patient had an uneventful postoperative course with good recovery. We conclude that a careful examination of basal radiological investigations is of vital importance to decrease the operative risk of mortality and morbidity.

Keywords: Acute subdural haematoma, subarachnoid hemorrhage, pericallosal artery aneurysm, CT-angiography

Perikallosal Arter Anevrizmalarına Bağlı Gelişen Anevrizmal Subdural Hematom

Özet

Perikallosal arter anevrizmasına bağlı olarak anevrizmal subaraknoid kanama (SAK) ve subdural hematom (SDH) gelişmesi oldukça nadir görülen bir durumdur. Nadir görülüyor olsa da, SDH'nin cerrahi tedavi planı sırasında, eşlik eden anevrizmanın fark edilmemiş olması, ölümcül bir hataya neden olabilir. Travma öyküsü olmayan, 73 yaşındaki kadın hasta, şiddetli baş ağrısı ve bilincinin giderek kapanması nedeni ile acil servise başvurmuştu. Nörolojik muayenede bilinç kapalı ve ağırlı uyaranlara yanıt yoktu. Kraniyal bilgisayarlı tomografide (BT) de sağda hemisferik SDH, görece daha zor fark edilen hafif düzeyde SAK ve transtentoryal herniasyon olduğu görüldü. Anevrizma şüphesi nedeni ile yapılan hızlı BT anjiyografide anterior serebral arterde (ACA) 2 tane anevrizma saptandı. Acilen ameliyata alınan hastanın anevrizması klipslendi ve SDH boşaltıldı. Operasyon sonrası sorun olmadı ve hastanın kliniği hızla düzeldi. Bu yazıda, ameliyata bağlı mortalite ve morbiditenin azaltılmasında, bazal radyolojik tetkiklerin dikkatli değerlendirilmesinin önemi vurgulanmak istenmiştir.

Anahtar Kelimeler: Akut subdural hematom, subaraknoid kanama, perikallosal arter anevrizması, BT- anjiyografi

INTRODUCTION

Acute subdural hematomas (SDH) are typically caused by traumatic disruption of superficial cerebral veins. SDH rarely occurs as a consequence of spontaneous aneurysmal rupture. SDH with aneurysmal rupture is reported with aneurysms at various locations. Distal anterior cerebral artery (ACA) aneurysms are rare and association with acute SDH is extremely seldom reported^(2,10). Here we report a case with acute SDH due to subarachnoid hemorrhage (SAH) and rupture of aneurysms in the pericallosal artery on illustrative computed tomography (CT) images. Unless the basal radiological investigations are examined carefully due to rapid evaluation of a clinically-worsening patient, the misdiagnosis of SDH and SAH will result in a detrimental outcome as different treatment strategies should be performed in the presence of an aneurysm.

CASE PRESENTATION

A 73-year old woman was brought to our emergency department complaining of acute onset severe headache and a depressed level of consciousness. The symptoms started suddenly one hour ago and showed a rapid deterioration. The general physical examination was normal. On neurological examination, the patient was unconscious, and unresponsive to painful stimuli. Glasgow coma scale was 5/15 with a verbal response of 1 point, eye response of 1 point, and motor response of 3 points. The pupils were asymmetric, 1 mm on right side and 4 mm on left side, both reactive to light. Deep tendon reflexes were absent and plantar responses were bilaterally unresponsive. NIHSS score was 19 points. There was no history of trauma. The past medical history of the patient was unremarkable. The relatives denied any

drug or substance use. The family history was also negligible.

The prompt neuroimaging studies were performed in this patient and cranial CT (16-slice row CT scanner, Siemens Sensation 16) showed right frontotemporoparietal and interhemispheric subdural haematoma up to 2 cms over hemispheric convexity and 1 cm in interhemispheric fissure in thickness with transtentorial herniation and moderate mass effect of displacement to the left side (Figures 1). Upon these findings, cerebral CT-angiography was performed, which demonstrated two nodular aneurysms in pericallosal region of ACA, a proximal 0.8x0.7 mm aneurysm and a second 0.6x0.4 mm aneurysm located one cm distal to the first one (Figures 2). Hyperdense signal changes around these aneurysmatic dilatations were compatible with subarachnoid haemorrhage.

The patient was taken to emergency surgery. After performing a large frontotemporoparietal craniotomy, SDH formed by fresh clots was evacuated. The active bleeding was observed from the distally located aneurysm in ACA, and some intracerebral haemorrhage was observed within frontal lobe. The haematoma was evacuated and both aneurysms were clipped. Control CT and CT-angiography performed on the first post-operative day showed that the brain has decompressed, no shift was present, and no complications were observed.

The patient progressively recovered her consciousness, localized the painful stimuli in all extremities. Pupils were symmetrical and reactive. Ten days following the surgery, she was able to follow all commands and give appropriate verbal responses. Nineteen days after surgery, she was mobilized and a rehabilitation program was scheduled.

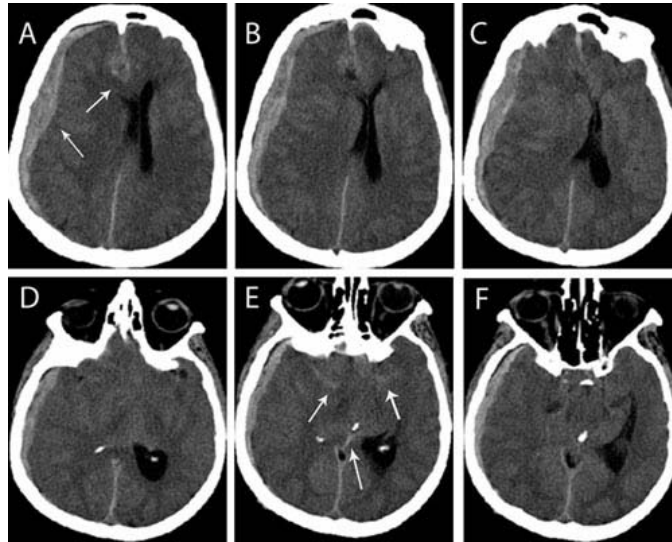


Figure 1: Axial non contrast CT images show A-F: right frontotemporoparietal subdural haematoma with transtentorial herniation and moderate mass effect of displacement to the left side. A,B: right frontal hyperdense lesion on the ACA territory. E,F: right parietal subdural haematoma with SAH in the basal cisterns.

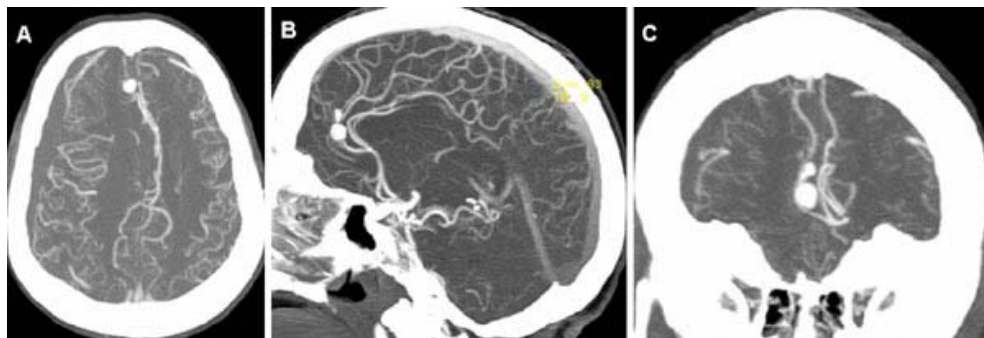


Figure 2: Maximum-intensity projection images of subject on CT-angiography show;. A: axial, B: sagittal, C: coronal images demonstrating two nodular aneurysms in pericallosal region of anterior cerebral artery, a proximal 0.8x0.7 mm aneurysm and a second 0.6x0.4 mm aneurysm located 1 cm distal to the first one.

DISCUSSION

Spontaneous aneurysm rupture rarely results in acute subdural hemorrhage (SDH). In clinical series this rate of subdural hematoma associated with aneurysmal rupture is reported between 1.3% and 1.9%^(2,4,8,11). Aneurysmal SAH

from a pericallosal artery aneurysm is extremely rare.

Rupture of aneurysms located in the subarachnoid space naturally results in hematoma collection in the subarachnoid space. Different hypotheses were proposed for the occurrence of subdural hemorrhage after aneurysm rupture: 1- successive small

hemorrhages from an aneurysm can induce adhesions in the subarachnoid space and a final rupture can therefore occur into the subdural space; 2- the systolic pressure emanating from a ruptured aneurysm can result in a focal rupture of the adjacent arachnoid membrane, consequently allowing egress of both cerebrospinal fluid and blood into the subdural space; and 3- a massive haemorrhage ruptures the cortex and lacerates the arachnoid membrane^(1,5). Clinical reports indicate that acute aneurysmal subdural hemorrhage has no predilection for any aneurysmal location.

Whatever the mechanism may be, such aneurysmal SDH's may occur in the presence or absence of CT demonstrable blood in the subarachnoid space⁽¹⁾. Rupture of an aneurysm adhered to either the dura or falx may cause pure SDH⁽⁹⁾. Absence of subarachnoid blood may completely obscure the original etiology in an aneurysmal SDH. In a patient with rapidly deteriorating neurological status and a demonstrated acute subdural hemorrhage, the therapy is aimed at rapid surgical evacuation. The surgical plan as well as patient positioning will be directed at the safest and fastest approach for removal of the subdural clot. The presence of an unexpected aneurysm may result in rebleeding during the procedure and result in quick and massive arterial blood loss. If the surgeon is not prepared for proximal control of the aneurysm, this may lead to increased surgical morbidity or even mortality during the procedure. This illustrative case is therefore important in expressing the importance of clinical suspicion. What led us to decide for a CT angiography was both the absence of a trauma history and the presence of great amount of blood in the interhemispheric fissure, which would be unexpected in a hemispheric traumatic SDH. A quick and noninvasive procedure such as the CT angiography, which has a sensitivity of 92.3 to 100%, can readily demonstrate the cause of the subdural hematoma and give

the surgeon the chance for planning ahead of the procedure^(3,7).

One can certainly argue that the evacuation of the subdural hematoma can be planned and that the aneurysm may be addressed surgically or endovascularly in a successive session. However, SAH into subdural space stops by tamponade of the subdural hematoma and successive clot formation and surgical evacuation of this hematoma is highly likely to result in a rebleed form the aneurysm, as was in our case.

Although our patient was an elderly lady she had a good recovery and a good clinical outcome and she was able to return to her active life. Inamasu et al. reported that patients with a good outcome had a better SAH grade on admission, smaller midline shift, and smaller SDH volume on the initial CT scan, and they had been treated by both SDH evacuation and clipping of the aneurysm⁽²⁾. A favorable outcome upon urgent decompressive craniectomy and hematoma evacuation with immediate aneurysm clipping was also shown by Marbacher et al⁽⁶⁾. It is not known whether the hemorrhage into the subdural space may have a more favorable outcome than a bleed into the subarachnoid space, as all of the hematoma can be surgically removed. Further evidence and analysis is needed to indicate if aneurysmal pure subdural hemorrhage is a disease entity with a more favorable outcome than aneurysmal subarachnoid hemorrhage.

Correspondence to:

Dilaver Kaya

E-mail: dilaverka@yahoo.com

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