Turkish Neurosurgery 2007, Vol: 17, No: 4, 289-293

Chronic Subdural Hematoma After Endoscopic Third Ventriculostomy

Endoskopik Third Ventrikülostomi Sonrası Gelişen Kronik Subdural Hematom

Erdinç CİVELEK
Tufan CANSEVER
Aykut KARASU
Akın SABANCI
Altay SENCER
Talat KIRIŞ

Istanbul University Istanbul Faculty of Medicine, Neurosurgery Department, Istanbul, Turkey

ABSTRACT

Endoscopic third ventriculostomy (ETV) is an effective and rather safe treatment for noncommunicating hydrocephalus secondary to aqueductal stenosis and other obstructive pathologies. It has become a popular alternative to ventricular shunts for noncommunicating hydrocephalus. Although it is a safe procedure, several complications related to this procedure have been reported in the literature. We report a rare case of a large chronic subdural hematoma (ChSDH) after ETV in a patient with aqueductal stenosis. A 42-year-old female patient presented with acute symptoms of obstructive hydrocephalus, headaches and blurring of consciousness. A computerized tomogram (CT) of the patient's brain revealed marked triventricular supratentorial hydrocephalus and an external ventricular drainage (EVD) was performed first. After this procedure, magnetic resonance imaging (MRI) demonstrated hydrocephalus secondary to aqueductal stenosis. ETV was performed and the EVD removed uneventfully. The patient was discharged home after a few days without any complications. She then presented with headaches 4 weeks following ETV. A CT demonstrated chronic subdural hematoma on the contralateral side. This was treated with burr-hole evacuation. Postoperatively, her headaches improved. During the follow-up period, she remains symptom-free and has radiographic evidence of a patent ventriculostomy. This case confirms chronic subdural hematoma formation is a possible complication following endoscopic third ventriculostomy.

KEY WORDS: Aqueductal stenosis, Chronic subdural hematoma, Endoscopic third ventriculostomy

ÖZ

Endoskopik üçüncü ventrikülostomi (ETV), akuadukt stenozuna ve diğer tıkayıcı nedenlere bağlı nonkomünike hidrosefali de etkili ve de güvenli bir tedavi yöntemidir. ETV, nonkomünike hidrosefalide ventiküler şantlara alternatif olmuştur.Güvenli bir yöntem olmasına karşın literatürde çeşitli komplikasyonlar bildirilmiştir. Bu yazıda, akuadukt stenozlu hastaya uygulanan ETV sonrasında gelişen nadir bir kronik subdural hematom olgusu bildirilmiştir. 42 yaşında bayan hasta, baş ağrısı ve şuur bulanıklığı gibi akut hidrosefali şikayetleri ile başvurdu. Hastanın kranyal tomografisinde belirgin triventriküler hidrosefali görülmesi üzerine öncelikle eksternal ventriküler drenaj (EVD) işlemi uygulandı. Bu işlem sonrası çekilen Kranyal manyetik rezonans görüntülemede hidrosefalinin akuadukt stenozuna bağlı olduğunun görülmesi üzerine ETV işlemi uygulandı ve hasta birkaç gün içerisinde komplikasyonsuz olarak tabucu edildi. Hasta ETV işleminden 4 hafta sonra baş ağrısı şikayetiyle tekrar başvurdu ve kranyal tomografide diğer tarafda kronik subdural hematom görülmesi üzerine burrhole ile hematom sıvısı boşaltıldı. Ameliyat sonrasında hastanın baş ağrısı şikayeti düzeldi ve sonraki kontrollerde hastanın şikayetinin olmadığı görüldü. Bu olgu, ETV sonrasında kronik subdural hematom gelişme riskinin varlığını göstermiştir.

ANAHTAR SÖZCÜKLER: Akuadukt stenozu, Kronik subdural hematom, Endoskopik üçüncü ventrikülostomi

Received: 25.07.2007
Accepted: 06.10.2007

Correspondence address:
Erdinç CİVELEK
Istanbul University, Istanbul Faculty of Medicine, Department of Neurosurgery, Capa, 34390, Istanbul, Turkey
Phone: 90 212 631 1618
Mobile phone: 90 532 326 2494
Fax: 90 212 534 0252
E-mail: civsurgeon@yahoo.com

INTRODUCTION

Third ventriculostomy performed neuroendoscopically has become a common treatment for noncommunicating hydrocephalus, and has been reported to cause fewer complications than extracranial cerebrospinal fluid shunting (5,6,7,14,17). It has been successfully used in aqueductal stenosis, tectal plate tumors, posterior fossa tumors, and meningomyelocele-associated hydrocephalus (2,21). While complications after ETV are rare in experienced hands, they may be fatal. Possible complications are CSF leak, meningitis, postoperative memory deficit, hemiparesis, midbrain damage, hypothalamic dysfunction, massive subarachnoid bleeding, ventriculitis, and arrhythmia with cardiac arrest (2,3,15,16,19,21). A rare case of acute contralateral massive subdural collection that developed within hours after ETV has been reported (18). Subdural effusion or hematoma is not considered less frequent after neuroendoscopic third ventriculostomy, but only a few cases have been reported (11,13,20). Subdural hematoma formation is a well-known overdrainage phenomenon related to functioning ventricular shunts (4,9,18,22).

We summarize a case in which a 42-year-old woman who presented with severe headaches 4 weeks following an uneventful ETV was found to have chronic subdural hematoma on the contralateral side. This collection was evacuated. In the current article, we discuss our management and review the literature.

CASE REPORT

A 42-year-old woman presented with severe headaches, an acute agitated state, and confusion. Upon clinical examination, she was founded to have papiledema and to be slightly confused but cooperative with no other focal neurological deficits. A CT of the head showed obstructive hydrocephalus, with a ballooned third ventricle and a rather small fourth ventricle (Figure 1). She immediately underwent external ventricular drainage from the right side. The patient improved immediately after this procedure. The postoperative MRI showed the ventricular catheter in place, with drained but not very small ventricles, and aqueductal stenosis (Figure 2A,B). No subdural collection was present. We decided to remove the EVD and perform an ETV procedure. The drainage

Figure 1: CT of the head showed obstructive hydrocephalus, with a ballooned third ventricle and a rather small fourth ventricle.

first closed to enable a preliminary ballooning of the ventricles, in order to facilitate insertion of the endoscope. An uneventful ETV was performed through a left frontal burr hole, and the drainage was removed. The patient recovered uneventfully and left the hospital 5 days after the procedure. A routine postoperative MRI performed 10 days after ETV showed the drained and smaller ventricles with no subdural collection (Figure 3A,B). She presented with headaches 4 weeks after ETV. A CT demonstrated chronic subdural hematoma on the contralateral (right) side causing a marked mass effect (Figure 4). The patient was operated on, and the SDH was drained out through a frontal and parietal burr hole. This procedure resolved the problem, and the patient has remained perfectly well. Follow-up radiological examinations 4 weeks and 2 years later did not show reaccumulation of the fluid (Figure 5A,B).

DISCUSSION

A third ventriculostomy is an alternative procedure to treat noncommunicating hydrocephalus and avoid shunt-related complications. The recent advances in endoscopy have made third ventriculostomy a reliable alternative (8,10,12).

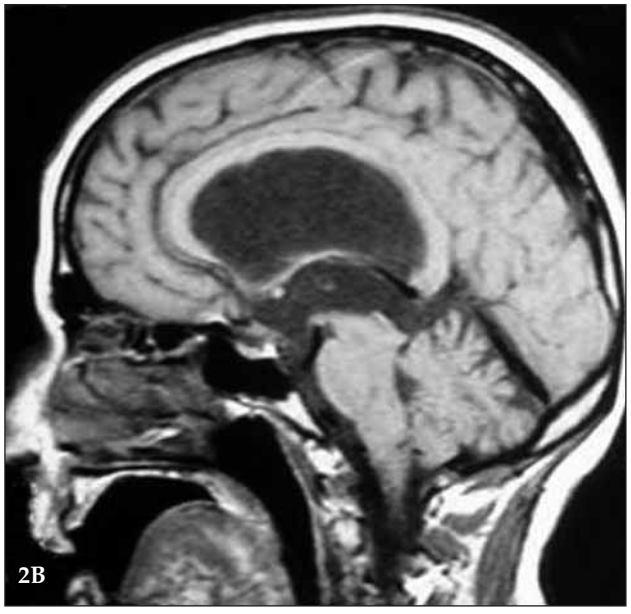

Figure 2A,B: The postoperative MRI showed the ventricular catheter in place, with drained but not very small ventricles, and aqueductal stenosis.

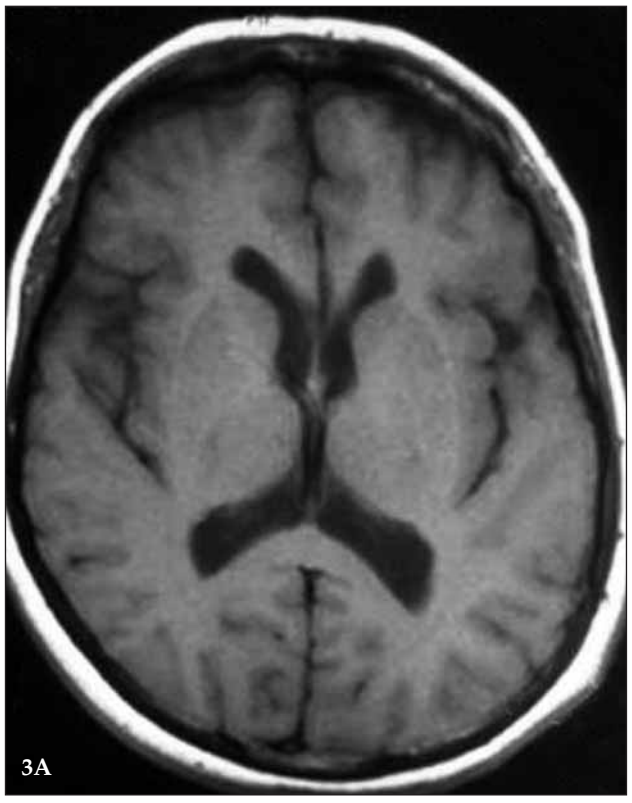

Figure 3A,B: Postoperative MRI performed 10 days after ETV showed the drained and smaller ventricles with no subdural collection.

Symptomatic aqueductal stenosis, which can present at any age, is generally a strong indication for a third ventriculostomy (14,17). Most of the patients with aqueductal stenosis can be managed successfully by ETV without shunting. In the current case, ETV relieved obstructive hydrocephalus successfully. Jones et al. showed the less success with ETV in patients less than 2 years of age (11). They recommended the evaluation of CSF circulation for the indication of ETV in young patients in which the major CSF pathway is immature. Although ETV is an

Figure 4: A CT demonstrated chronic subdural hematoma of the contralateral (right) side causing a marked mass effect.

effective and safe procedure, it is associated with its own complications such as basilar artery injury, intraventricular hemorrhage, third cranial nerve injury, and injury of hypothalamus and thalamus (1,8). Subdural hematoma is one of the rarely reported complications following ETV (1,12,14). In our case, the collection was contralateral, and therefore not directly connected with the surgical treatment. Although, the patient underwent external ventricular drainage from the right side, there was no subdural collection in early follow-up MRI. We believe other factors may play a role in the slow formation and development of chronic subdural hematoma.

The mechanism of chronic subdural hematoma formation within weeks after ETV, as appeared in our case, is not clear. One possible explanation for this is that abrupt drainage of CSF during ETV may create a large space between the dura and the brain. This space may gradually enable development of a subdural collection. The second hypothesis is that a decrease in ICP may change the regulation of CSF formation in patients suffering from chronic long-standing intracranial pressure. This regulation may be more vulnerable in a patient who has sustained several changes in ICP within a short time (1,12).

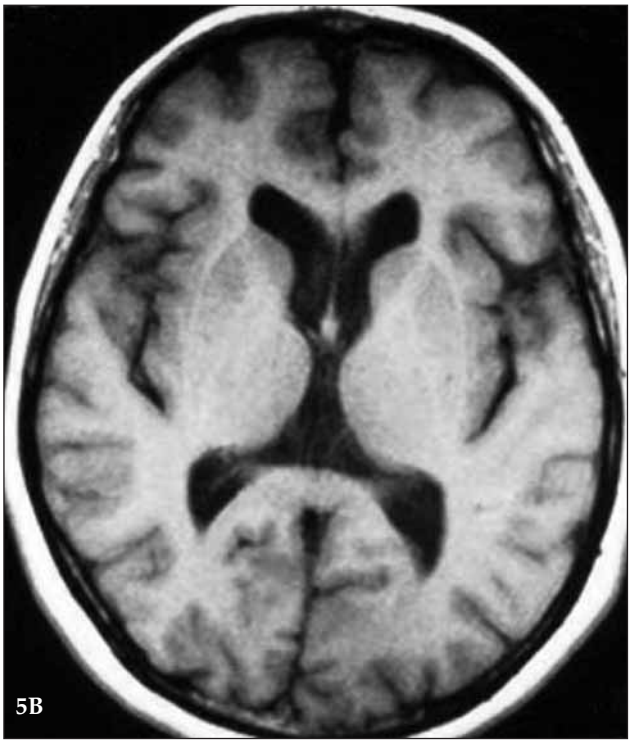

Figure 5A,B: Follow-up radiological examinations 4 weeks (**5A**) and 2 years later (**5B**) did not show reaccumulation of the fluid.

Finally, we believe that our present patient had the rare complication of chronic subdural hematoma formation, which was related to and probably a

complication of the ETV performed four weeks earlier. When ETV is used in the treatment of obstructive hydrocephalus, it must not be regarded as minimally invasive as there are potential complications associated with the procedure.

REFERENCES

1. Beni-Adani L, Siomin V, Segev Y, Beni S, Constantini S. Increasing chronic subdural hematoma after endoscopic III ventriculostomy. Child's Nerv Syst 2000; 16:402-5.
2. Brockmeyer D, Abtin K, Carey L, Walker ML. Endoscopic third ventriculostomy: an outcome analysis. Pediatr Neurosurg 1998; 28:236-40.
3. Cinalli G, Sainte-Rose C, Chumas P, Zerah M, Brunelle F, Lot G, Pierre-Kahn A, Renier D. Failure of third ventriculostomy in the treatment of aqueductal stenosis in children. J Neurosurg 1999; 90:448-54.
4. Faulhauer K, Schmitz P. Overdrainage phenomenon in shunt treated hydrocephalus. Acta Neurochirurgica 1978; 45:89-101.
5. Gangemi M, Maiuri F, Donati F, Sigona L, Iaconetta G, De Divitiis E. Neuroendoscopy: Personal experience, indications and limits. J Neurosurg Sci 1998; 42:1-10.
6. Grant JA, McLone DG. Third ventriculostomy: a review. Surg Neurol 1997; 47:210-12.
7. Hoffman HJ, Harwood-Nash D, Gilday DL. Percutaneous third ventriculostomy in the management of non-communicating hydrocephalus. Neurosurgery 1980; 7:313-21.
8. Hopf NJ, Grunert P, Fries G, Resch KD, Perneczky A. Endoscopic third ventriculostomy: outcome analysis of 100 consecutive procedures. Neurosurgery 1999; 44:795-806.
9. Hoppe-Hirsch E, Sainte-Rose C, Renier D, Hirsch JF. Pericerebral collections after shunting. Child's Nerv Syst 1987; 3:97-102.
10. Jones RF, Kwok BC, Stening WA, Vonau M. A practical alternative to extracranial shunts in non-communicating hydrocephalus. Acta Neurochir 1994; 61:79-83.
11. Jones RF, Kwok BC, Stening WA, Vonau M. The current status of endoscopic third ventriculostomy in the management of non-communicating hydrocephalus. Minim Invasive Neurosurg 1994; 37:28-36.
12. Kim B-S, Jallo GI, Kothbauer K, Abbott IR. Chronic subdural hematoma as a complication of endoscopic third ventriculostomy. Surg Neurol 2004; 62:64-8.
13. Kobayashi N, Kamikawa S, Miyake S, Yamamoto K, Kojima N, Tamaki N. Treatment of hydrocephalus without shunt placement: third ventriculostomy. Neurol Surg 1997; 25:35-40.
14. Maeda Y, Inamura T, Morioka T, Muratani H, Fukui M. Hemorrhagic subdural effusion complicating an endoscopic III ventriculostomy. Child's Nerv Syst 2000; 16:312-14.
15. McLaughlin MR, Wahlig JB, Kaufmann AM, Albright AL. Traumatic basilar aneurysm after endoscopic third ventriculostomy: case report. Neurosurgery 1997; 41:1400-3.
16. Mohanty A, Anandh B, Reddy MS, Sastry KV. Contralateral massive acute subdural collection after endoscopic third ventriculostomy- a case report. Minim Invasive Neurosurg 1997; 40:59-61.
17. Oka K, Yamamato M, Ikeda K, Tomonaga M. Flexible endoneurosurgical therapy for aqueductal stenosis. Neurosurgery 1993; 33:236-42.
18. Samuelson S, Long DM, Chou SN. Subdural hematoma as a complication of shunting procedures for normal pressure hydrocephalus. J Neurosurg 1972; 37:548-52.
19. Schroeder HWS, Warzok RW, Assaf JA. Fatal subarachnoid hemorrhage after endoscopic third ventriculostomy. J Neurosurg 1999; 90:153-5.
20. Sgaramella E, Castelli G, Sotgiu S. Chronic subdural collection after endoscopic third ventriculostomy. Acta Neurochir (Wien) 2004; 146:529-30.
21. Teo C, Jones R. Management of hydrocephalus by endoscopic third ventriculostomy in patients with myelomeningocele. Pediatr Neurosurg 1996; 25:57-63.
22. Walker ML, Fried A, Petronio J. Diagnosis and treatment of the slit ventricle syndrome. Neurosurg Clin North Am 1993; 4:707-14.