

# Intraoperative supratentorial epidural haematoma during removal of a huge posterior fossa dermoid cyst

## *Śródoperacyjny nadnamiotowy krwiak nadtwardówkowy podczas usuwania dużej torbieli skórzastej w tylnym dole czaszki*

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Neurologia i Neurochirurgia Polska 2010; 44, 6: 609–613

### Abstract

Epidural haematomas may occur following cranial operations, and most of them are located near the craniotomy or burr-hole areas. There are very few cases of supratentorial epidural haematoma following the resection of giant tumours located in the posterior fossa. In this case report, we present a patient who developed an acute left temporoparietal epidural haematoma in the perioperative period during the excision of a huge dermoid cyst in the posterior fossa.

**Key words:** dermoid, epidural haematoma, posterior fossa, magnetic resonance imaging.

### Introduction

During posterior fossa surgery, brain collapse may emerge consequently to the sudden decrease in prolonged elevated intracranial pressure following cerebrospinal fluid (CSF) decompression. In particular, during the removal of midline tumours obstructing the aqueduct, drainage of CSF circulation provides spontaneous CSF decompression. In this way, decreased cortical support

### Streszczenie

Krwiaki nadtwardówkowe mogą powstawać w następstwie operacji w obrębie czaszki; większość z nich jest umiejscowiona w pobliżu kraniotomii lub otworów trepanacyjnych. Opisano jedynie nieliczne przypadki nadnamiotowych krwiaków nadtwardówkowych powstających w następstwie wycięcia dużych guzów zlokalizowanych w tylnym dole czaszki. W niniejszym artykule przedstawiono przypadek pacjentki, u której do powstania ostrego krwiaka nadtwardówkowego okolicy skroniowo-ciemieniowej lewej doszło podczas wycinania dużej torbieli skórzastej położonej w tylnym dole czaszki.

**Słowa kluczowe:** torbiel skórzasta, krwiak nadtwardówkowy, tylna jama czaszki, obrazowanie za pomocą rezonansu magnetycznego.

and laceration in meningeal vessels may result in subdural or epidural haemorrhages. In hydrocephalus, these massive epidural haematomas are probably caused by dura-skull detachment when the brain volume is strikingly reduced by an operation. In the English literature, there are very few cases of supratentorial epidural haematoma following the resection of giant tumours located in the posterior fossa [1,2]. In this case report, we present a patient who developed an acute left temporopa-

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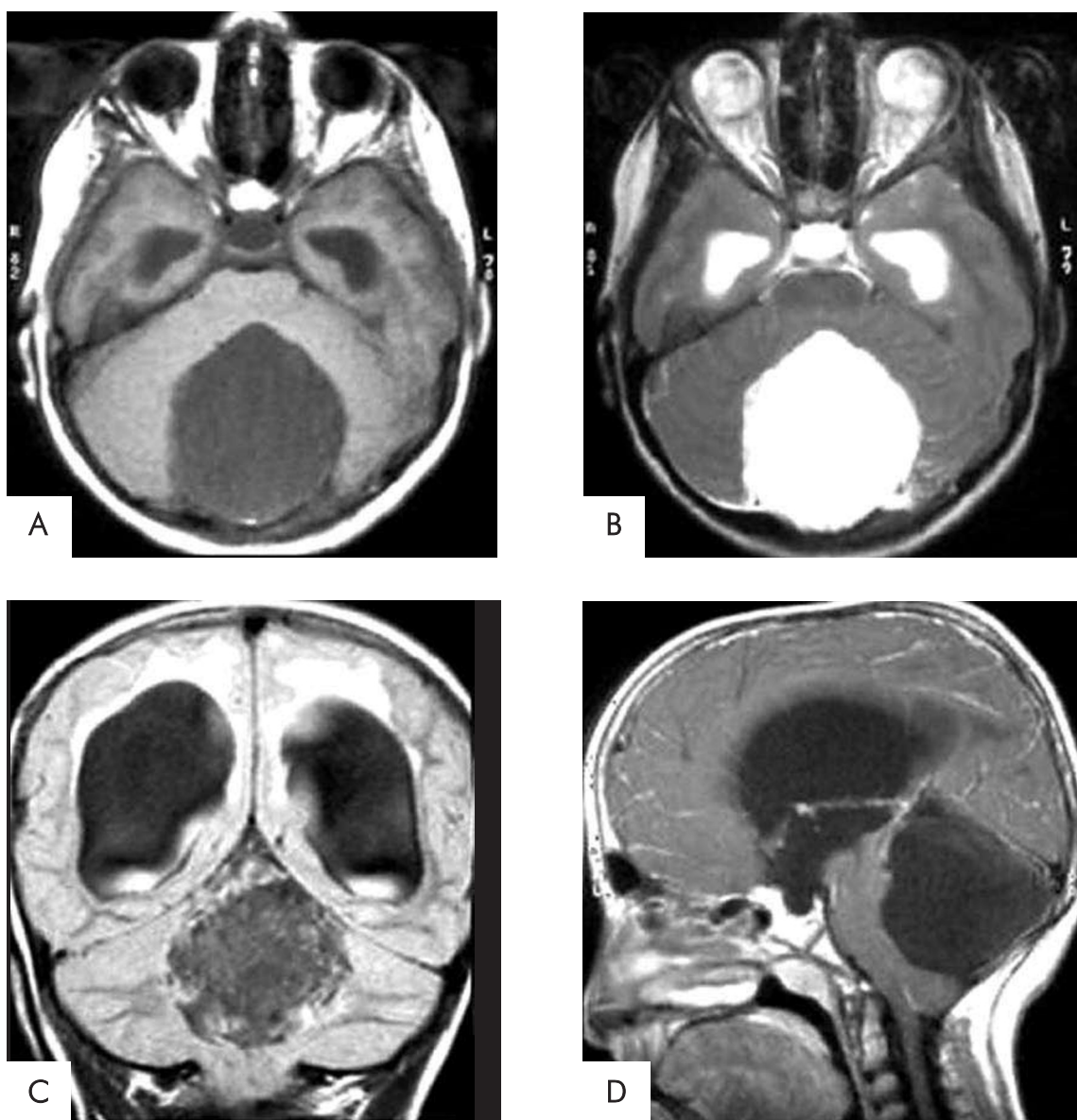
Received: 17.03.2010; accepted: 6.08.2010

rietal epidural haematoma in the perioperative period during the excision of a huge dermoid cyst in the posterior fossa.

### Case report

A 9-year-old girl with a 6-month history of headache had been administered symptomatic treatment in a medical facility. Upon exacerbation of the severity of her headache and the appearance of vomiting, she was brought

to the emergency unit. On neurological examination, she had bilateral papilloedema and cerebellar ataxia. Computed tomography (CT) of the brain revealed a mass in the midline at the posterior fossa, about  $6 \times 6$  cm in size, without contrast enhancement. Cranial magnetic resonance imaging (MRI) showed a lesion concordant with a dermoid/epidermoid tumour at the location of the fourth ventricle, obliterating the aqueduct, with no pathological contrast enhancement (Figs. 1 A-D). No coagulopathy was detected in haematological studies.



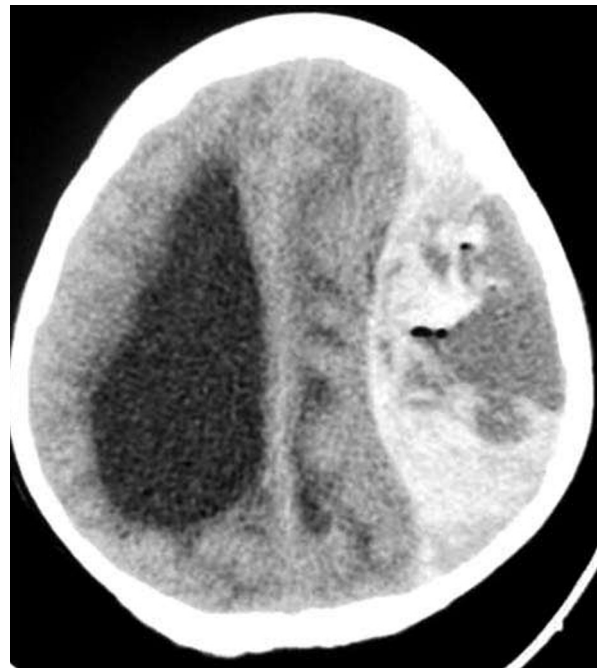
**Fig. 1.** A and B) Cystic lesion,  $6 \times 6$  cm in size, hypointense in T1-weighted MR images and hyperintense in T2-weighted MR images is seen in the location of the fourth ventricle. The fourth ventricle could not be recognized in this radiological assessment. This condition might be attributed either to probable fourth ventricle compression or to filling of the tumour. C) In the FLAIR sequence, the lesion showed heterogeneous hypointensity when compared to CSF. This finding suggests dermoid-epidermoid tumour. There was no contrast enhancement. D) The lesion obliterated the aqueduct. Therefore, the lateral and third ventricles were seen as dilated



**Fig. 2.** Gross specimen of the tumour with long hair strands

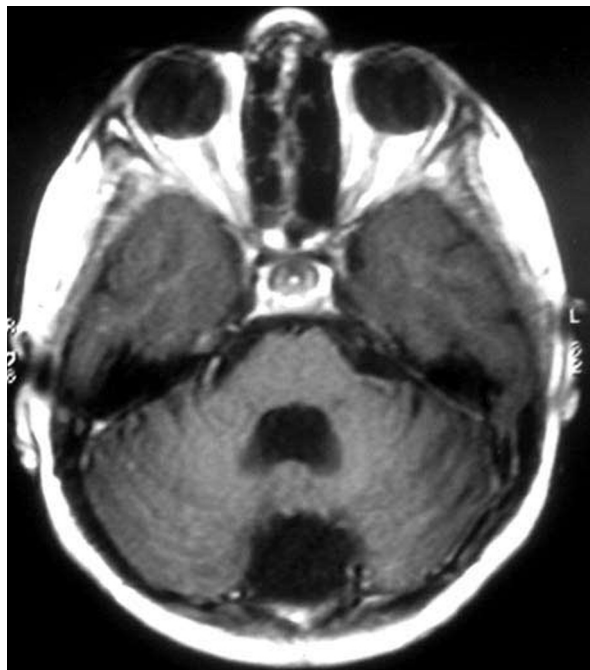
The operation was performed in the Concorde position within the head-pin fixation device. External ventricular drainage was placed and the drainage set was kept closed throughout the operation. Following median suboccipital craniotomy, the dura was opened in a Y shape manner and the capsulated tumour was seen. After opening the capsule, a gross mass with soft viscosity, easily aspirated, dirty white in colour, and containing strands of hair about 20 cm in length was found. The content of the cyst was totally removed (Fig. 2). When the patient recovered from anaesthesia, the left pupil was significantly more dilated than the right one and it showed no reaction to light.

A CT of the head was performed immediately and showed acute left temporoparietal epidural haematoma about 5.5 cm in thickness, causing a shift from left to right and pushing the left cerebral hemisphere (Fig. 3). The patient was reoperated on and the epidural haematoma was drained via a wide left temporoparietal craniotomy. On operative exploration, it was found that the pin fixation device had not passed through the inner layer of the ipsilateral bone. There was abundant haemorrhage from the venous lacuna draining towards the superior sagittal sinus at the midline. After Surgicel had been applied to this bleeding area, bleeding control was performed by hanging the dura mater from the bone. In the postoperative period, the patient was conscious, oriented, cooperative, and had a 3/5 right hemiparesis. The patient was followed up at the intensive care unit and on the sixth postoperative day, she had to undergo a follow-up CT of the brain due to the appearance of fever. It was found that the shift effect on the brain had disappeared. There were only postoperative changes



**Fig. 3.** Brain CT without contrast shows an epidural haematoma in the left temporoparietal region, which is 5.5 cm in diameter and has heterogeneous hyperdense characteristics. The hypodense areas in the haematoma might suggest active bleeding. The left lateral ventricle was compressed

in the posterior fossa secondary to the operation. Following brain CT, lumbar puncture was performed, which revealed CSF findings consistent with meningitis – the therapy with antibiotics was re-arranged. The patient's right hemiparesis decreased and the patient was discharged after completion of the treatment for meningitis. Histopathological examination reported a cerebellar dermoid cyst. Neurological examination performed one month later was



**Fig. 4.** MRI with the gadolinium injection performed 3 months postoperatively revealed a cavitary area, 2 × 2 cm, at the location of the primary tumour

normal. Follow-up MRI with gadolinium injection performed at 3 months postoperatively did not reveal any gross lesion (Fig. 4).

## Discussion

Epidural haematoma may occur following cranial operations, and most of them are located near the craniotomy or burr-hole areas. An epidural haematoma far from the surgical area is rare and to the best of our knowledge only a few cases have been reported in the literature. These haematomas may be ipsilateral, contralateral or bilateral, including multiple locations. Most of the cases in the literature occur in patients with CSF drainage for hydrocephalus [1,2]. These reported haematomas developed at the 12<sup>th</sup> postoperative hour or later, while there have been no cases of epidural haematoma developing during the operation. As observed during the operation, the pin fixation tips passing through the inner layer of the bone had not caused haemorrhage.

Furthermore, as reported in the literature, it was observed that there was no haemorrhage from the meningeal arteries. Instead, an abundant haemorrhage from the venous lacuna draining into the superior sagittal sinus was noted. We think that the reason of the

patient's survival inspite of this severe epidural haematoma, was thought to gain of the potential space at the posterior fossa created by removal of the giant tumour.

Dermoid cysts emerge due to the defective development in craniospinal axis and are rare benign lesions. They are thought to develop at the third to fifth week of gestation as a result of defective neural tube closure. They are located mostly at the posterior fossa intracranially and are seen 4-10 times less frequently than epidermoid cysts [3,4]. Logue and Till classified posterior fossa dermoids into four groups according to the extradural or intradural location and the degree of dermal sinus development [5]: (1) extradural dermoid tumour + complete sinus; (2) intradural dermoid tumour + no dermal sinus tract; (3) intradural dermoid tumour + incomplete dermal sinus; and (4) intradural dermoid tumour + complete dermal sinus.

According to this classification, our case was concordant with a grade 2 dermoid tumour.

In the differential diagnosis between dermoid cysts and intra-axial cystic lesions, MRI sequences such as FLAIR and diffusion-weighted imaging (DWI) are used [3,4,6,7]. Dermoids generally have heterogeneous density on CT scans. On MRI examination, they are seen as hyperintense on T1-weighted sequences. However, lesions containing dense hair are seen as hypointense. In T2-weighted sequences, they are observed as hypo/iso or hyperintense lesions. In the present case, long hair was observed in the cyst cavity during the operation. The ideal choice in surgery of dermoid cysts is draining the cyst content by microsurgery and radical resection of the capsule. Capsule excision is rather difficult, since it is tightly adhered to neurovascular structures and sometimes this cannot be accomplished [3,6-10]. Besides, total capsule excision has a high morbidity and mortality. In the present case, the tumour capsule was extremely adherent to the brain stem, and hence total capsule excision was avoided.

There are few reported cases of development of an epidural haematoma in the supratentorial region following surgery for posterior fossa tumours. In the literature, there are postoperative epidural or subdural haematoma cases caused by external ventricular drainage. However, the epidural haematoma in the left temporoparietal region developing in our case is particularly different, since it occurred during the operation and was not related to the ventricular drainage. The acute epidural haematoma had a venous origin and developed from the venous lacuna draining the superior sagittal sinus. The herniation occurred during the operation, and

was detected at an early period while the patient was still on the operating table. In this case, we think that the main factor triggering the development of a perioperative epidural haematoma was spontaneous CSF drainage occurring during gross total excision of the infratentorial giant tumour mass. We believe that the patient did not die despite the severe acute epidural haematoma because the brain stem at the posterior fossa provided a space for translocation after removal of the tumour.

## Acknowledgement

This case was presented in abstract form at the 1<sup>st</sup> Middle East Neurosurgical Symposium, Istanbul, Turkey.

## Disclosure

The authors report no conflict of interest.

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