surgical drainage. Any delay between the onset of symptoms and orbital decompression can have a marked effect on functional recovery. It has been stated that if decompression is carried out within 2 h of the onset of symptoms it is likely to be successful in avoiding permanent damage [9].

Emergency lateral canthotomy with inferior cantholysis has been recommended as first-line treatment to reduce intraorbital and intraocular pressure while waiting for a CT scan and definitive surgery. It is a safe and often effective procedure to be performed even without any anaesthesia on a patient entering the emergency room with clinical suspicion of a retrobulbar haemorrhage [10]. Our patient was agitated, vomiting and ready to go to the operating theatre with a CT scan showing a major localized haemorrhage needing to be evacuated. Therefore no time was lost with a lateral canthotomy.

Clinical diagnosis is based on a painful proptosis with or without visual deficit or loss of pupil reflex and nausea and vomiting. These symptoms are partially generated due to the rising intraocular pressure, which is 'acute glaucoma' due to the impossibility that liquid can leave the front chamber of the eye. An emergency multi-slice CT scan is a fundamental diagnostic aid.

The fundamental error that could have occurred in this case would have been to non-specifically treat pain with opioids and nausea and vomiting by central acting drugs such as serotonin antagonists, droperidol or dexamethasone. Symptoms would have been attenuated but the patient might have definitely have lost his vision on this eye.

In conclusion, retrobulbar haematoma is a rare but severe complication of surgery for orbital fractures, with potentially devastating consequences such as loss of vision. Being aware of this potential complication and a rapid CT scan may prevent grave sequelae as well as the search of surgical complications in the immediate postoperative period.

O. M. Theusinger, D. R. Spahn
Institute of Anaesthesiology
University Hospital and University of Zurich
Zurich, Switzerland

K. Chaloupka
Clinic of Ophthalmology
University Hospital and University of Zurich
Zurich, Switzerland

References

1. Bailey WK, Kuo PC, Evans LS. Diagnosis and treatment of retrobulbar hemorrhage. *J Oral Maxillofac Surg* 1993; **51**: 780–782.
2. Zachariades N, Papavassiliou D, Christopoulos P. Blindness after facial trauma. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 1996; **81**: 34–37.
3. Girard LJ. Subperiosteal orbital hemorrhage from retrobulbar injection resulting in blindness. *Arch Ophthalmol* 1997; **115**: 1085–1086.
4. Hass AN, Penne RB, Stefanyszyn MA, Flanagan JC. Incidence of postblepharoplasty orbital hemorrhage and associated visual loss. *Ophthal Plast Reconstr Surg* 2004; **20**: 426–432.
5. Girotto JA, Gamble WB, Robertson B *et al*. Blindness after reduction of facial fractures. *Plast Reconstr Surg* 1998; **102**: 1821–1834.
6. Korinth MC, Ince A, Banghard W, Huffmann BC, Gilsbach JM. Pterional orbita decompression in orbital hemorrhage and trauma. *J Trauma* 2002; **53**: 73–78.
7. Ord RA. Post-operative retrobulbar haemorrhage and blindness complicating trauma surgery. *Br J Oral Surg* 1981; **19**: 202–207.
8. Winterton JV, Patel K, Mizen KD. Review of management options for a retrobulbar hemorrhage. *J Oral Maxillofac Surg* 2007; **65**: 296–299.
9. Hislop WS, Dutton GN. Retrobulbar haemorrhage: can blindness be prevented? *Injury* 1994; **25**: 663–665.
10. Goodall KL, Brahma A, Bates A, Leatherbarrow B. Lateral canthotomy and inferior cantholysis: an effective method of urgent orbital decompression for sight threatening acute retrobulbar haemorrhage. *Injury* 1999; **30**: 485–490.

Is *post partum* headache after epidural anaesthesia always innocent?

doi:10.1017/S0265021508003980

EDITOR:
Parturients with headache, who have received regional anaesthesia for labour, are usually treated for post-dural puncture headache (PDPH) [1–3]. Dural sinus thrombosis (DST) is a rare but potentially fatal condition, which may be encountered during pregnancy or puerperium and may be associated with obesity, hypercoagulable states, usage of some drugs, central nervous system infections, neighbouring infections or cancers. The similarity of symptoms between DST and PDPH makes diagnosis difficult. DST has a wide spectrum of

Correspondence to: Ozlem Selvi Can, Department of Anesthesiology, Ankara University School of Medicine, Ibn-i Sina Hospital, 06100, Samanpazari, Ankara, Turkey. E-mail: ozlemscan@gmail.com; Tel: +90 505 456 8780; Fax: +90 312 311 5057

Accepted for publication 5 March 2008 EJA 4981
First published online 3 April 2008

non-specific symptoms with headache often being the dominant symptom. We present a case of a parturient with headache after a history of a dural tap. The rationale for reporting this case is that DST is unusual but potentially fatal and there is little experience with the challenging situation whereby DST can be present either in isolation or concomitant with PDPH. It may therefore be mistreated as PDPH. This case should serve to highlight both the potential problems with diagnosis and the options for treatment and may pave the way for more detailed studies.

Case report

A 35-yr-old gravida 3 para 2 woman was admitted to hospital in active labour at 38 weeks gestation. She had previously undergone two caesarean sections under general anaesthesia and had no history of neurologic, haemotologic or other disorders and was taking no medication. There was no problem with her physical examination and laboratory findings. A 17-G Tuohy needle was introduced at the L_{4-5} level to perform epidural analgesia. Accidental dural puncture occurred and the needle was re-introduced at the L_{3-4} level without any problem. Epidural analgesia was performed and the intraoperative course was uneventful. The catheter was removed 24 h after the operation. The patient was discharged at 48 h. On the fourth postoperative day, the patient was re-admitted to the hospital with nausea, vomiting and a bi-frontal headache that was extending to the back of the neck and was aggravated by sitting. When questioned she reported a moderate-degree headache at the time of discharge but she had not mentioned this at the time. Because of the history of a dural tap and the pattern of the headache, a diagnosis of PDPH was made. Bed rest, increased oral fluid intake and analgesia were recommended. On the sixth postoperative day, she was admitted once again with a severe headache, and an epidural blood patch (EBP) was performed. Immediately after performing the blood patch the patient's headache diminished. The following day, the patient was brought to the hospital with loss of consciousness and was assessed by a neurosurgeon. She was lethargic and dysarthric. There was no papilloedema or other neurological deficit. Cranial computed tomography (CT) did not show any abnormality and therefore a magnetic resonance (MR) scan and MR venography were performed. The MR scan showed a possible superior sagittal sinus thrombosis. MR venography confirmed that the thrombosis was situated within the superior sagittal, the left transverse and the sigmoid sinuses (Fig. 1). The patient was admitted and

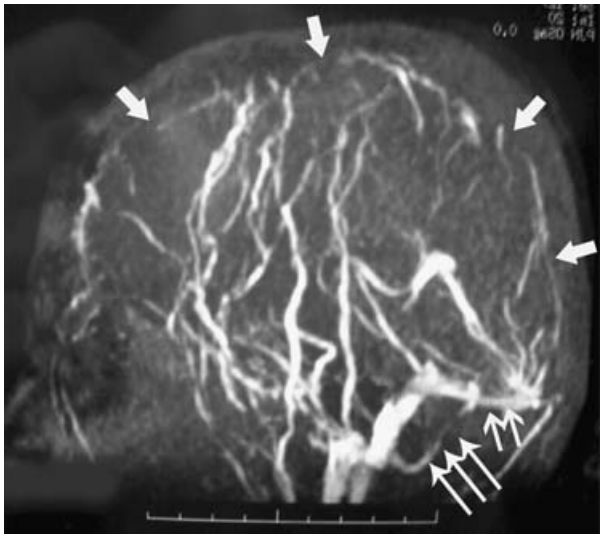

Figure 1.
Sagittal T1-weighted MR venography demonstrating the lack of normal blood flow in the superior sagittal (single arrows), the left transverse (double arrow) and the sigmoid (triple arrow) sinuses.

prescribed an antiepileptic drug plus heparin. Heparin was administered for 6 days and thereafter coumadin treatment was initiated. Except for a small decrease in protein C level (59%; normal range 70–140%) and an increase in D-dimer level (574 $\mu g\,L^{-1}$; normal range 50–250 $\mu g\,L^{-1}$), laboratory findings were normal. The patient's headache resolved completely on the 6th day of receiving anticoagulation (*post partum* day 13), and the patient was discharged. Over a 2-month follow-up period, no neurologic sequelae were found, and a subsequent MR venography revealed recanalization of the thrombosed vessels.

Discussion

PDPH is characterized by frontal or occipital headache aggravated by sitting and is often associated with nausea and vomiting. It usually starts within 48 h of dural puncture and is attributed to the leakage of cerebrospinal fluid (CSF) through the dural rent. In most cases it can be successfully treated conservatively and generally limits itself to a few days although in some cases an EBP is needed [4].

DST has a variety of clinical symptoms and signs that range from solely a headache to severe coma [1–3,5,6]. The clinical presentation is closely associated with the location and extent of the thrombosis. During labour, maternal pushing and fluctuations of intracranial pressure may damage the vessel endothelium, thereby increasing the likelihood of a thrombotic event. Puerperal changes

leading to a hypercoagulable state also increases the risk of DST. Furthermore, a traumatic injury to the dura mater while performing regional anaesthesia may cause a CSF leak leading to intracranial hypotension. This can eventually result in venous dilatation and stasis, which increases the risk of DST [2,3]. Hereditary factors, such as protein C or S deficiency, may predispose to thrombosis development and may be responsible for its formation. The results of the International Study on Cerebral Vein and Dural Sinus Thrombosis (ISCVT), a multicentre prospective cohort of 624 patients, indicated that 44% of patients with cerebral vein thrombosis have more than one risk factor for intracranial thrombosis. Therefore, the identification of one risk factor should not prohibit the search for additional risk factors [7].

The patient presented here had the symptoms of positional headache, nausea and vomiting. Despite the history of a dural tap and the pattern of headache, the late onset of her symptoms made a diagnosis of PDPH less likely. When she was questioned in detail, however, it was discovered that she had been experiencing a moderate-degree headache at discharge; the intensity of her complaint has gradually increased over time. The clinical diagnosis of PDPH therefore seemed reasonable. Conservative treatment failed and a blood patch was performed resulting in partial pain relief.

Lockhart and Baysinger [3] summarized the results of 21 cases with DST based on a literature review. Most of the cases (16/21) were *post partum* patients and the remainder had undergone diagnostic procedures such as lumbar puncture or lumbar myelography. In most of the cases, headache had a variable severity at onset but the pattern of the pain changed to a non-positional, permanent manner over the course of time. It is possible that the headache that occurred in our case was initially PDPH but continuing CSF leakage and intracranial hypotension led to venous dilatation and stasis and this, combined with the patient's protein C deficiency and hypercoagulable state, resulted in DST. This could explain both why the headache gained intensity and a permanent pattern over time and why the pain relief after EBP was partial and thereafter gradually attenuated. Twenty-four hours after receiving the EBP, the patient lost consciousness at home, probably occurring in association with a seizure. Cranial CT is usually the first imaging technique used in such presentations, but it is helpful in only 25–30% of the cases [3,8]. In our case, the CT imaging was normal, and MR venography was the only investigation able to identify the thromboses. These findings were compatible with the clinical presentation. In the case of the occlusion of the sagittal sinus, occurrence of motor deficits and seizures are typical, while patients with left transverse sinus thrombosis usually have speech problems. D-dimer levels are usually increased and accordingly, a low value may help the physician to exclude diagnosis, although a negative value does not completely rule out thrombosis [8].

Any treatment modality selected must include the use of parenteral anticoagulants such as intravenous heparin or subcutaneous low-molecular-weight heparin. Heparin treatment should not be withdrawn until remission of the acute phase of the disease has occurred, i.e. normal consciousness, or until the severity of headache has begun to fall. Oral anticoagulation therapy may be ceased after 3 months in low-risk patients. If there are additional risk factors, it is reasonable to continue the treatment for 6 or 12 months.

PDPH and DST may both occur in the early *post partum* period, and the similarity of the symptoms can cause a delay in diagnosis, misdiagnosis or even mistreatment. The differential diagnosis of a *post partum* headache must include DST if features of the headache change and if EBP does not provide complete pain relief, particularly in the presence of additional risk factors and findings supporting the presence of intracranial pathology. It must be kept in mind that the CT scan is positive in only one-third of cases. Anticoagulant therapy must be commenced immediately after DST diagnosis has been confirmed.

O. S. Can, A. A. Yilmaz, E. Gurcan
N. Alkis, A. Uysalel
Department of Anaesthesiology and Reanimation
Ankara University School of Medicine
Samanpazari
Ankara, Turkey

References

1. Borum SE, Naul LG, McLeskey CH. Postpartum dural venous sinus thrombosis after postdural puncture headache and epidural blood patch. *Anesthesiology* 1997; **86**: 487–490.
2. Monsalve GA, Ortega R, Rueda-Acevedo M. Multiple dural sinus thrombosis: a differential diagnosis of a postpuncture headache in a puerperal patient. *Neurol India* 2006; **54**: 447–448.
3. Lockhart EM, Baysinger CL. Intracranial venous thrombosis in the parturient. *Anesthesiology* 2007; **107**: 652–658.
4. Vercauteren MP, Hoffmann VH, Mertens E, Sermeus L, Adriaensen HA. Seven-year review of requests for epidural blood patches for headache after dural puncture: referral patterns and the effectiveness of blood patches. *Eur J Anaesthesiol* 1999; **16**: 298–303.

https://doi.org/10.1017/S0265021508003980 Published online by Cambridge University Press

5. Acheson J, Malik A. Cerebral venous sinus thrombosis presenting in the puerperium. *Emerg Med J* 2006; **23**: e44.
6. Aidi S, Chaunu MP, Biousse V, Bousser MG. Changing pattern of headache pointing to cerebral venous thrombosis after lumbar puncture and intravenous high-dose corticosteroids. *Headache* 1999; **39**: 559–564.
7. Ferro JM, Canhão P, Stam J, Bousser MG, Barinagarrementeria F. ISCVT Group. Prognosis of cerebral vein and dural sinus thrombosis: results of the International Study on Cerebral Vein and Dural Sinus Thrombosis (ISCVT). *Stroke* 2004; **35**: 664–670.
8. Bousser MG, Ferro JM. Cerebral venous thrombosis: an update. *Lancet Neurol* 2007; **6**: 162–170.

https://doi.org/10.1017/S0265021508003980 Published online by Cambridge University Press