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Successful treatment of a spontaneous cervical cerebrospinal fluid leak with a CT guided epidural blood patch

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Sirs: Spontaneous intracranial hypotension due to spinal cerebrospinal fluid leakage is an uncommon but increasingly recognized cause of postural headaches [1]. The diagnosis of intracranial hypotension is confirmed by low pressure on lumbar puncture. Radionuclid cisternography, CT myelography and spinal MRI can be done to diagnose and localise the CSF leak [2–6]. Conservative treatment consists of bed rest and oral hydration. In case of a failure the standard approach is to apply an epidural blood patch in the vicinity of the leak [1, 7]. This manoeuvre has been reported to be effective in about 90% of cases with severe headache after diagnostic lumbar puncture [8, 9]. Persistent leaks are thereafter commonly approached with a neurosurgical intervention [10].

Two days before admission a 54 year old previously healthy woman developed severe postural headaches which were completely absent when she was lying flat. Nausea and vomiting occurred each time she tried to stand up. There was no history of a trauma.

The neurological examination showed no abnormalities.

Cerebrospinal fluid (CSF) was obtained via a lumbar puncture with a 25 G gauge size Quincke needle when the patient lay on her left side. The cutting tip of the needle pointed upwards. The CSF had a normal cell count and protein. The opening pressure could not be obtained because no drainage occurred when the patient lay on her side.

Magnetic Resonance Imaging (MRI) of the head and cervicothoracic junction showed diffuse meningeal contrast enhancement but no other pathological changes.

Radionuclid cisternography revealed a CSF leak at the cervicothoracic junction, early appearance of the tracer in the bladder and no activity over the cerebral convexity (Fig. 1).

Computer tomographic (CT) myelography showed a CSF leak at the ventral side of the dura in the region of the cervicothoracic junction. Contrast medium extended in the ventral epidural space from C6 to T2. There was no contrast enhancement in the dorsal part of the epidural space although the patient was examined when in supine position (Fig. 2).

After the diagnosis had been established bed rest was tried for 5 days but failed. Subsequently, an in-

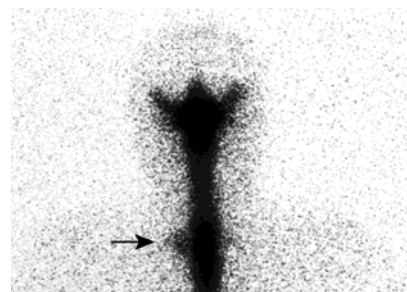


Fig. 1 Anterior-posterior projection of radionuclid cisternography 24 hours after injection of the tracer. Diffusion of tracer extends into the extra-arachnoid space in the region of the cervicothoracic junction (arrow). There is no activity over the cortex.



Fig. 2 CT myelography at the level of C7 reveals a leakage of contrast medium in the ventral epidural space (arrows).

vasive approach to the dorsal epidural space was undertaken which involved the application of a patch of eight ml blood between C7 and Th1 from a dorsomedial direction. The procedure was done with a Tuohy needle and the loss of resistance technique. The patient was in a sitting position when the needle was inserted and was brought to a prone position before the blood was injected. Thereafter the patient remained in this position for another two hours and was discharged two days later while continuing bed rest. After a further two days the symptoms had not improved. A second invasive paramedian approach to the lateral epidural space was undertaken. It involved a CT guided puncture of the lateral epidural space between C7 and Th1. As before the procedure was done with a Tuohy needle and the loss of resistance technique in the sitting position. Then the patient was brought to a prone position and a small amount of contrast medium was injected before CT was performed (Fig. 3). It confirmed that the needle was correctly located in the vicinity of the CSF leak that had been diagnosed

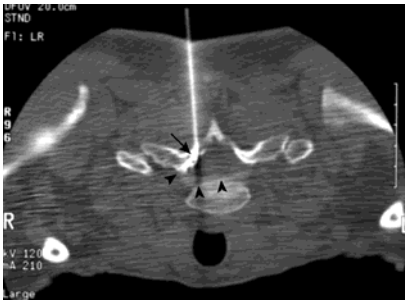


Fig. 3 CT guided puncture. The needle is placed in the lateral epidural space (long arrow). Injected contrast medium flows to the ventral side of dura (arrowheads).

previously. Subsequently 5 ml of blood were injected. Within a few hours the postural headache remitted and four weeks after discharge a follow-up examination confirmed that it remained consistently absent.

The patient presented with a history of acute postural headache, nausea and vomiting, which were not associated with other symptoms. This is typical of a low CSF pressure syndrome. The diagnosis of the disorder is based on a CSF pressure of 6 cm H₂O or less [11].

Cranial and cervical MRI showed diffuse meningeal enhancement but was otherwise normal. It excluded the existence of a subdural hematoma which can be associated with a low pressure syndrome [12, 13]. Radionuclid cisternography and a CT myelography showed the typical findings of a CSF leak at the cervicothoracic junction.

The application of an epidural blood patch has been described as an effective treatment for a cerebrospinal fluid leak. The injected blood increases the epidural pressure and compresses the leak, a subsequent inflammatory reaction results in scar tissue and permanent closure [8]. It has been shown that the epidural blood can extend over a region of up to 14 spinal segments, but the largest amount of blood remains close to the site of injection [14, 15]. This means that

higher thoracic or cervical CSF leaks cannot be treated appropriately with lumbar blood patches. We initially chose to treat our patient with a dorsomedially administered blood patch at the level of C7 close to the leak. This first approach was ineffective probably because the leakage was at the ventral side of the dura although the patient was in a prone position. Subsequently the lateral epidural space at C7 was chosen as injection site. This required CT guidance, it effectively relieved the symptoms. Hence the patient did not have to undergo neurosurgical treatment as has been recommended for persistent leakages [10].

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