CASE REPORT

Cerebral venous sinus thrombosis following cervical disc arthroplasty

Cerebral venous sinus thrombosis is a rare condition, which is difficult to diagnose. It has not previously been reported following surgery to the cervical spine. We report such a case in a 45-year-old man after cervical disc replacement. A high index of suspicion, with early imaging of the brain and prompt treatment, can produce a favourable outcome, albeit not in this case.

Cerebral venous sinus thrombosis is rare and has no pathognomonic signs or symptoms. A high index of suspicion is needed to diagnose it, so that it can be treated appropriately. Risk factors include the oral contraceptive pill, pregnancy, intracranial ear or sinus infection, cancer and haematological conditions. Dural puncture may also be a risk factor.1 We report a case of cerebral venous sinus thrombosis, following cervical disc replacement in a healthy man with no known risk factors for thrombosis. The diagnosis was made by a CT brain scan with contrast, which demonstrated an extensive venous sinus thrombosis. He was treated with intravenous heparin but died soon afterwards.

Case report

A 45-year-old man presented with an eight-month history of left C6 brachialgia. MRI of the cervical spine confirmed the presence of foraminal stenosis at C5-6 (Figs 1 and 2). He underwent a block of the left C6 nerve root which provided him with complete resolution of his brachialgia for ten days. Thereafter, his symptoms returned. He subsequently underwent anterior cervical decompression with a C5-6 disc replacement (Prodisc-C, Synthes International Ltd., Welwyn Garden City, United Kingdom). There were no intra-operative complications and the replacement appeared stable and in a good position radiologically (Fig. 3).

Post-operatively he had resolution of the pain in his left arm but had reduced power in all the muscle groups of the right lower limb (power 2/5 on the Medical Research Council (MRC) scale).2 The plantar response was equivocal. In the upper limbs, function of the right shoulder and flexion of the elbow were normal, but there was no power (MRC grade 0) of
extension of the elbow and no function in the right hand. Examination of the cranial nerve was normal. A post-operative MR scan of the cervical spine to look for evidence of injury to the cervical cord, which was difficult to interpret because of metallic artefact, did not show any abnormalities. As the patient’s neurological symptoms were below the level of the disc replacement and there was no cranial nerve dysfunction, the initial diagnosis was of oedema of the cervical cord although there was no evidence of this on the MR scan because of metallic artefact from the disc replacement. The patient was treated with oral steroids. Within 12 hours there were signs of neurological recovery, with improved power in his right hand (MRC grade 2) and in his right lower limb (MRC grade 3) by the second post-operative day.

On the eighth post-operative day he had a grand mal seizure, after which his Glasgow Coma Scale (GCS) recovered to 14 (E4, V4, M6). He had a right-sided facial weakness and a dense right-sided hemiparesis. CT imaging showed a large haemorrhage of the left parieto-occipital region (Fig. 4), patchy density in the superior sagittal sinus and changes suggestive of a superior sagittal sinus thrombosis. A CT brain scan with contrast showed extensive thrombosis involving the superior and inferior sagittal sinuses and the straight and sigmoid sinuses, particularly on the left (Fig. 5). It also showed the empty δ sign, indicating sagittal sinus thrombosis (Fig. 6). His GCS fell to 7. After consultation with neurosurgeons and neurologists he was treated with intravenous heparin, but his condition rapidly declined, and he died shortly afterwards.

Clotting studies and a thrombophilia screen which were sent prior to starting intravenous heparin were all normal. A post mortem examination confirmed an extensive cerebral venous sinus thrombosis with established infarction involving much of the left parietal, occipital and temporal lobes, with fresh haemorrhage into the parietal and temporal lobes. There were no abnormalities of the internal jugular veins.

**Discussion**

Dural venous sinus thrombosis is an uncommon condition, which, if extensive, may lead to fulminating neurological dysfunction and death. The main cerebral venous sinuses which are affected are the superior sagittal (72%) and the
Insidious, most patients presenting with symptoms that could have increased his risk of developing a pre-existing cerebral venous sinus thrombosis, no known risk factors for the development of this condition and normal haematological parameters. Although embolism from the carotid artery is a known complication of cervical spine surgery, this case shows that post-operative neurological deficit secondary to venous thrombosis must also be considered. There must be a low threshold for imaging the brain in such cases, as cerebral venous sinus thrombosis can have a varied presentation. As CT scans are normal in 10% to 20% of patients with proven cerebral venous sinus thrombosis,9 CT or MR scanning with contrast is recommended.11-13 In this case, such a scan performed sooner would have led to earlier diagnosis and treatment.

Intravenous heparin should be the first-line treatment, even in the presence of haemorrhagic infarction, provided there are no general contra-indications to its use.5,6,9 If the patient deteriorates despite adequate heparinisation, or presents moribund with coma, selective catheter-guided local thrombolysis may be an option1,6 in spite of the increased haemorrhagic risk. Patients in stupor or coma may need sedation, artificial ventilation and intracranial pressure monitoring. External ventricular drainage and craniectomy, although controversial, may be occasionally life-saving.13

This is the first reported case of cerebral venous sinus thrombosis following surgery of the cervical spine. This condition should be considered in a patient following such surgery who develops a progressive neurological deficit. Imaging of the brain and prompt treatment may produce a favourable outcome,9 although not in this particular case.

No benefits in any form have been received or will be received from a commercial party related directly or indirectly to the subject of this article.

References