

# Central venous catheter misplaced in the epidural space

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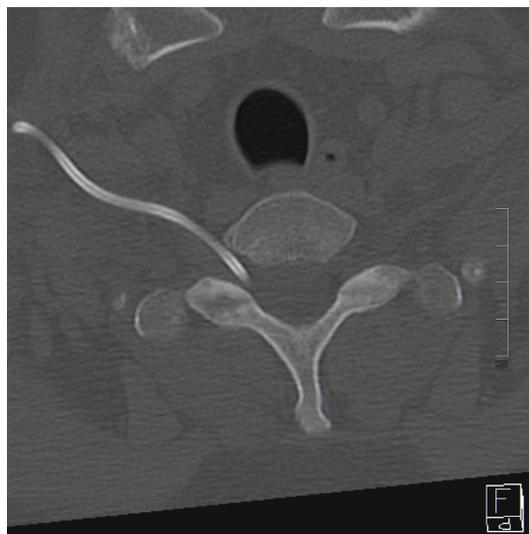
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## DESCRIPTION

A 56-year-old man with good performance status was diagnosed with plurimetastatic colon adenocarcinoma 1 year before. He is currently under second-line chemotherapy with 5-FU+oxaliplatin (FOLFOX) and bevacizumab. Due to a catheter-related thrombosis, the subclavian vein central venous catheter (CVC) was replaced 2 months before, under X-ray guidance and with evaluation of blood withdrawal through the CVC after placement. A posterioranterior (PA) chest X-ray documented the catheter tip in the midline overlying the T1 vertebra. Four every-2 weeks, cycles of FOLFOX/bevacizumab were administered through the CVC. One week after the last cycle, the patient presented with a 1-day history of vomiting, back pain, lower extremity weakness and difficulty walking. The same day, sudden paraparesis established, without a sensory deficit, that evolved to paraplegia and urinary incontinence in less than 24 hours. Head CT scan was normal. Spinal CT scan showed a misplaced CVC with the tip in the posterior epidural space (figure 1). The patient died 6 days later due to brain stem toxicity. We believe that chemotherapy administration into the spinal canal caused spinal cord toxic myelopathy (figure 2).

CVCs are essential devices for patients with cancer. Unfortunately, CVCs are not devoid of risks, most commonly mechanical complications, deep vein thrombosis and infection.<sup>1</sup> We report



**Figure 1** Axial contrast-enhanced CT shows the central venous catheter misplaced entering the central canal through the right lateral foramen at the level of C7-Th1.



**Figure 2** Sagittal T2-weighted MRI demonstrates diffuse hyperintensity and swelling of the spinal cord.

an almost unique side effect of a CVC, the migration of the catheter tip placed into a subclavian vein into the upper thoracic epidural space, leading to fatal spinal cord toxicity. Since three previous cycles of FOLFOX/bevacizumab were administered without toxicity, we postulate that the migration of the catheter tip into the epidural space occurred after the last chemotherapy cycle. There are other reports of catheter tip migration,<sup>2</sup> but to our knowledge, only another one into the epidural space<sup>3</sup> and one in the vertebral vein,<sup>4</sup> in both cases after a jugular vein approach.

The anatomical complexity and anatomical variants of thoracic venous circulation are well known. Migration of this patient's catheter tip, placed in the right subclavian vein, through the right vertebral vein or azygos vein (which may have different anatomical origins), then through the vertebral venous plexus and eventually into the epidural space may explain what happened. On the chest X-ray, the catheter tip overlies T1 vertebra, not in the desired position in the lower superior vena cava, but does not imply wrong positioning. It

## Patient's perspective

As the patient's daughter, I understand that the fatal complication suffered by my father was very unusual, the reason why it is being shared with the medical community with my permission and agreement.



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## Learning points

- ▶ Central venous catheters (CVCs), critical devices for the systemic treatment of patients with cancer, are not devoid of risks, most commonly mechanical complications, CVC-associated deep vein thromboses and infection, but they can also be associated with other much rarer complications.
- ▶ The migration of the catheter tip placed into a subclavian vein into the upper thoracic epidural space is an almost unique side effect of a CVC, and in this particular case, the antineoplastic treatment administered into the spinal canal caused spinal cord damage, irreversible myelopathy and death.
- ▶ To minimise underdiagnosing the complications associated with CVC malposition or migration, we have since reinforced the requirement for a mandatory standing posterioranterior (PA) and lateral chest X-ray immediately after CVC placement as well as a repeat standing PA and lateral chest X-ray in case of difficulty in blood withdrawal from or fluid administration through a CVC. Further evaluation by CT or other diagnostic imaging may be needed after this initial evaluation of catheter tip location.

is also hard to understand how it was possible to administer four cycles of chemotherapy, diluted in more than 1000 cc of intravenous fluids, with a catheter in an epidural location. We doubt that if the subclavian vein puncture had been performed

under ultrasound control, this complication would have been prevented. After the occurrence of this unfortunate complication, the hospital CVC management procedures were modified to make it mandatory to obtain a PA and lateral chest X-ray immediately after its placement, as well as after the occurrence of any suggestion of CVC malfunctioning, such as difficulty in blood withdrawal from or fluid administration through the CVC. Further evaluation by chest CT or other diagnostic imaging may be required after this initial evaluation.

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