Primary clear-cell chondrosarcoma of the cervical spine

Case illustration

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The incidence of primary malignant bone tumors ranges from 0.85 to 2%. Approximately 10% of these lesions arise from the spine and sacrum. Clear-cell chondrosarcoma (CCC) is a histological subtype of chondrosarcoma first described by Unni and colleagues in 1976; it accounts for 2 to 5.4% of all chondrosarcomas. Vertebral involvement of CCC is rare.4

This 22-year-old woman was admitted for cervical pain after an ice-skating fall. She had no neurological deficit. Radiography and computerized tomography (CT) scanning revealed a compression fracture of an osteolytic C-7 vertebral body (VB) (Fig. 1). Magnetic resonance (MR) imaging showed a hypointense lesion on T1-weighted sequences, slightly hyperintense on T2-weighted images, and diffuse enhancement after Gd administration. Surgery was proposed to correct mechanical instability and for oncologic reasons. A subtotal C-7 corpectomy was performed, leaving just a thin rim of the right lateral cortical wall. Macroscopically, the tumor removal was at least marginal. Spinal reconstruction was achieved by placing an anterior plate system and an expandable titanium cage filled with allograft chips. Histological examination of a tissue specimen showed cells with irregular hyperchromatic nuclei and clear cytoplasm, encircled by an irregular network of fine osteoid trabeculae (Fig. 2). No evidence of metastatic disease was detected. The patient was referred for postoperative proton-beam radiotherapy (70–74 Gy) because of potential residual tumor. One-year follow-up radiography revealed good cervical alignment (Fig. 3), and cervical MR imaging documented no recurrence.

Histologically CCC is characterized by benign giant cells alongside tumor cells with clear or granular cytoplasm, mixed with conventional chondrosarcoma in 50% of the cases.3 The cells present with rounded and centrally located nuclei. In cases in which the spine is involved, bone formation and cartilaginous components are minimal or even absent.5

The best treatment for spinal chondrosarcoma is surgery.2 Although sarcomas are generally chemosensitive and radiosensitive, the chondrosarcoma subtype is extremely resistant to both.1 En bloc resection of low-grade chondrosarcomas has been shown to be associated with a longer survival rate than intraleisional resection, but en bloc resection of cervical tumors is only exceptionally feasible because of their proximity to the spinal cord, cervical nerve roots, and vertebral arteries.5

Although CCCs are considered low-grade malignant tumors, de-differentiation into a more aggressive neoplasm can occur. Distant metastases have been reported.3 Altogether, radical surgical removal, ideally with wide margins, and postoperative proton-beam radiotherapy could be an option for treatment of cervical CCC.

References


Fig. 1. Left: Plain lateral cervical radiograph showing a compression fracture of the superior C-7 endplate and an underlying osteolytic lesion of the C-7 VB. Right: Axial CT scan confirming the osteolytic C-7 VB lesion and an associated linear fracture, which affects the left half of the VB. 

Fig. 2. Photomicrograph showing clear, vacuolated tumor cells surrounded by an osteoid-rich matrix. Spicules of nonnontumoral, infiltrated bone are visible at the right of the image.

Fig. 3. One-year follow-up radiograph demonstrating cage and screw/plate reconstruction after the corpectomy.