# Cervical spinal metastases

## Differential diagnosis

Although T2-hyperintense signal abnormality of the spinal cord can have myriad etiologies, neuroimaging can provide specific diagnoses or considerably narrow the differential diagnosis in many cases. Intradural-extramedullary lesions compressing the spinal cord have a limited differential diagnosis and are usually benign; meningiomas and schwannomas are most common. Extradural lesions can often be specifically diagnosed. Disk herniations are the most commonly encountered mass of the epidural space. Cervical spondylotic myelopathy can cause a characteristic pattern of enhancement, which may be mistaken for an intrinsic myelopathy. A do-not-miss diagnosis of the extradural compartment is idiopathic spinal cord herniation, the appearance of which can overlap with arachnoid cysts and webs. Regarding intrinsic causes of myelopathy, the lesions of multiple sclerosis are characteristically short segment but can be confluent when multiple. Postcontrast MRI can be particularly helpful, including when attempting to differentiate the long-segment myelopathy of neurosarcoidosis and aquaporin-4 (AQP4)-IgG-seropositive neuromyelitis optica spectrum disorder (NMOSD) and when characterizing spinal cord tumors such as primary neoplasms and metastases. Spinal dural arteriovenous fistula is another do-not-miss diagnosis, with characteristic MRI features both precontrast and postcontrast. Tract-specific white matter involvement can be a clue for diseases such as subacute combined degeneration, paraneoplastic myelopathy, and radiation myelitis, whereas gray matter-specific involvement can suggest conditions such as cord infarct, viral myelitis, or myelin oligodendrocyte glycoprotein (MOG)-IgG associated disorder [1)].

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Metastases rarely occurred in cervical spine, whereas meningiomas were most likely to occur in thoracic spine. MRIs can help diagnose metastases and spinal benign lesions, whereas they failed to distinguish astrocytomas and lymphomas [2)].

## Treatment

The treatment of cervical spinal metastases represents a controversial issue regarding the type, extent, and invasiveness of interventions. In the lumbar and thoracic spine, kyphoplasty- and vertebroplasty have been established as minimally invasive procedures for patients with vertebral metastases and without neurological deficit. These procedures show good results with respect to pain reduction and low complication rates. However, limited data are available for kypho- and vertebroplasties for cervical spinal metastases.

## Case series

### 2017

Vazifehdan et al. performed this study to evaluate the survival and outcome, and the surgical risk and

complications.

They retrospectively studied 24 patients [14 men and 10 women; mean age, 71 years (range 54-89 years)], with cervical spine metastases, who underwent palliative surgical treatment, from December 2010 to December 2016. Mean follow-up was 14 months (range 1-42 months). Tey evaluated the survival and the outcome of the patients with respect to pain relief and neurological status, and the surgical risk and complications.

At the last follow-up, three patients were alive with disease, and 21 patients were dead with disease. Overall median survival was 14.8 months (range 1-47 months). A posterior approach was performed in 15 patients, an anterior approach with corpectomy and fusion in eight patients, and a two-stage combined approach in one patient. Overall, 21 patients experienced complete or almost complete, two patients mild, and one patient no pain relief; seven patients experienced complete neurological improvement, two patients moderate, while four patients remained stable. Overall, five patients experienced six complications including residual pain, sagittal malalignment with instability, and wound dehiscence; in five complications, a reoperation was necessary.

Palliative surgical treatment is usually performed in patients with metastatic bone disease of the cervical spine. Appropriate selection of the surgical technique is mandatory. However, the survival of the patients is dismal, and complications should be expected [3)].

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Stangenberg et al. present a case series of 14 patients who were treated for osteolytic metastases of the cervical spine using vertebroplasty alone or in addition to another surgical procedure involving the cervical spine in a palliative setting to reduce pain and restore stability.

Fourteen patients consisting of 8 males and 6 females, with a mean age of 64.7 years (range 44-85 years), were treated with vertebroplasty at the authors' clinic between January 2015 and November 2016. In total, 25 vertebrae were treated with vertebroplasty: 10 C-2, 5 C-3, 2 C-4, 2 C-5, 3 C-6, and 3 C-7. Two patients had an additional posterior stabilization and 5 patients an additional anterior stabilization. In 13 cases, the surgical approach was a modified Smith-Robinson approach; in 1 case, the cement was injected into the corpus axis from posteriorly. Patients with osteolytic defects of the posterior wall of the vertebral body did not undergo surgery, nor did patients with neurological deficits. Preoperatively, on the 2nd day after surgery, and at the follow-up, neck pain was rated using the visual analog scale (VAS). RESULTS Twelve patients were examined at follow-up (mean 9 months). Neck pain was rated as a mean of 6.0 (range 3-8) preoperatively, 2.9 on Day 2 after surgery (range 0-5), and 0.5 at the follow-up (range 0-4), according to the VAS. The mean Neck Disability Index at follow-up was 3.6% (range 0%-18%).

Anterior vertebroplasty of the cervical spine via an anterolateral approach represents a safe and minimally invasive procedure with a low complication rate and appears suitable for reducing pain and restoring stability in cases of cervical spinal metastases. Vertebroplasties can be combined with other anterior and posterior operations of the cervical spine and, in the axis vertebra, can be performed transpedicularly from posteriorly. Thus, in cases in which the posterior wall of the vertebral body is intact, vertebroplasty represents a less invasive alternative to vertebral replacement in oncological surgery. Prospective randomized trials with a longer follow-up period and a larger patient cohort are needed to confirm the encouraging results of this case series [4)].

# Case reports

A 59-year-old female was performed a left mastectomy with axillary lymph node dissection. Final diagnosis of the surgical specimen was left breast cancer pT2N1M0, Stage ⅡB, Luminal type. She was treated with adjuvant endocrine therapy, however, chest wall recurrence was identified at 1 year and 3 months after surgery, and curative resection of this tumor and radiotherapy were performed. Nine months later, she was admitted to the hospital for cervical pain and dyspnea, and magnetic resonance imaging showed bone metastases in cervical vertebra which compressed spinal cord. Although cervical fusion therapy was performed, she died 39 days later. metastases spinal cord compression in breast cancer patients may result in irreversible spinal cord injury if treatment is delayed. Rapid diagnosis and systemic treatment for oncologic emergency are significant [5].

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Adachi et al. described an extremely rare case of a precocious solitary cervical metastases from an endometrial cancer presenting as cervical radicular pain. In our review of published reports, we found that solitary spinal metastases are significantly associated with longer overall survival than are multiple lesions. Resection of the spinal lesion with rigid spinal reconstruction followed by radical hysterectomy may be beneficial in such patients [6].

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a patient without a prior known diagnosis of RCC may present with an intramedullary C1-C2 metastases. In such cases, global staging is critical to determine whether primary lesion resection versus excision of metastases (e.g., in this case, the C1-C2 intramedullary tumor) are warranted [7].

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a 73-year-old woman, presented with the symptom of numbness in her limbs. As she had difficulty moving her limbs (ie, quadriplegia), she was carried to an emergency room. A metastatic cervical spine tumor from the uterine cervical cancer was revealed by a computed tomography scan, and the patient was then transferred to our hospital's neurosurgery department for treatment. We performed a resection of the cervical spine tumor and fixation of the spinal bone. Because the patient's performance status was 4 and she remained bedridden 24 h/day, we could not perform systemic chemotherapy. We thus provided palliative care, including palliative radiotherapy, pain control, and rehabilitation to improve her limbs' functioning. The patient died of the uterine cancer within approx. 6 months after the initiation of treatment. There is no established treatment for small-cell carcinoma as a gynecological lesion. For patients with progressive uterine cancer, the optimal treatments, including palliative care, must be determined [8].

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Diehn FE, Krecke KN. Neuroimaging of Spinal Cord and Cauda Equina Disorders. Continuum (Minneap Minn). 2021 Feb 1;27(1):225-263. doi: 10.1212/CON.0000000000000926. PMID: 33522744.
2)
Asiltürk M, Abdallah A, Sofuoglu EÖ. Radiologic-Histopathologic Correlation of Adult Spinal Tumors: A Retrospective Study. Asian J Neurosurg. 2020 May 29;15(2):354-362. doi: 10.4103/ajns.AJNS_366_19. PMID: 32656132; PMCID: PMC7335153.
3)
Vazifehdan F, Karantzoulis VG, Igoumenou VG. Surgical treatment for metastases of the cervical spine. Eur J Orthop Surg Traumatol. 2017 Aug;27(6):763-775. doi: 10.1007/s00590-017-2002-0. Epub

2017 Jun 21. PubMed PMID: 28638950.
4)
Stangenberg M, Viezens L, Eicker SO, Mohme M, Mende KC, Dreimann M. Cervical vertebroplasty for osteolytic metastases as a minimally invasive therapeutic option in oncological surgery: outcome in 14 cases. Neurosurg Focus. 2017 Aug;43(2):E3. doi: 10.3171/2017.5.FOCUS17175. PubMed PMID: 28760030.
5)
Kawano Y, Goto W, Kashiwagi S, Asano Y, Kouhashi R, Ishihara S, Tauchi Y, Morisaki T, Noda S, Takashima T, Onoda N, Hirakawa K, Ohira M. [A Case of Cervical metastases from Breast Cancer]. Gan To Kagaku Ryoho. 2020 Dec;47(13):1807-1809. Japanese. PMID: 33468836.
6)
Adachi H, Hanakita J, Takahashi T, Kawaoka T, Ohtake Y, Shimizu K, Sagae Y. Precocious Solitary Cervical metastases from Endometrial Cancer Presenting as Cervical Radicular Pain. World Neurosurg. 2018 Oct;118:162-167. doi: 10.1016/j.wneu.2018.07.042. Epub 2018 Jul 18. PMID: 30030186.
7)
Ponzo G, Umana GE, Giuffrida M, Furnari M, Nicoletti GF, Scalia G. Intramedullary craniovertebral junction metastases leading to the diagnosis of underlying renal cell carcinoma. Surg Neurol Int. 2020 Jun 13;11:152. doi: 10.25259/SNI_259_2020. PMID: 32637205; PMCID: PMC7332509.
8)
Oishi T, Nishida M, Takebayashi K, Nasu K, Narahara H. Small-Cell Carcinoma of the Uterine Cervix Discovered With Quadriplegia Caused by Cervical Spine metastases. Clin Med Insights Case Rep. 2020 May 7;13:1179547620920170. doi: 10.1177/1179547620920170. PMID: 32523390; PMCID: PMC7236087.