Spinal metastases surgery

- Level IIb Metastases in cN0 Oral Squamous Cell Carcinoma: Multicenter Retrospective Study
- Outcomes after total en bloc spondylectomy at a mean follow-up of 11 years
- Multiple cardiac complications due to sepsis and cardiac metastasis of a sarcomatoid urothelial cell carcinoma of the urinary bladder: A case report
- Influence of Wearing Corsets During Radiation Therapy in Patients With Thoracic or Lumbar Spinal Bone Metastases
- Isolated Intramedullary Spinal Cord Metastasis from Nasopharyngeal Carcinoma: A Case Report and Systematic Review
- AO Spine Clinical Practice Recommendations: Reducing the Surgical Footprint of Surgery for Spinal Metastases
- Long term outcomes following upfront stereotactic body radiotherapy alone for spinal metastases
- Oncology Biomarkers, Clinical Characteristics, and Survival Outcomes in Colorectal Cancer Patients with Spinal Metastases Undergoing Spinal Surgery: Insights from a Retrospective Cohort Study

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Vertebral Resection Techniques: En Bloc Spondylectomy vs. Posterior Vertebral Column Resection vs. Separation Surgery

Definitions

En Bloc Spondylectomy (EBS): Surgical removal of an entire vertebra in one piece (en bloc), including vertebral body, pedicles, and posterior elements, to achieve oncologic margins. Used primarily for primary or isolated metastatic spine tumors.

Posterior Vertebral Column Resection (pVCR): Piecemeal removal of vertebral segments via a posterior-only approach. Main goal is spinal deformity correction (e.g. kyphosis, scoliosis).

Separation Surgery: A palliative procedure for metastatic epidural spinal cord compression. The goal is **circumferential decompression of the spinal cord** and **creation of a safe margin** between tumor and dura to allow high-dose **stereotactic radiosurgery (SRS)**. It does **not aim to remove the entire tumor**.

Comparison Table

Feature	En Bloc Spondylectomy	Posterior Vertebral Column Resection	Separation Surgery
Main Goal	Oncologic resection with margins	Correction of severe deformity	Cord decompression for radiotherapy

Feature	En Bloc Spondylectomy	Posterior Vertebral Column Resection	Separation Surgery
Type of Resection	One-piece (en bloc)	Fragmented (piecemeal)	Limited debulking with circumferential decompression
Tumor Removal	Complete, with wide margins	Not applicable	Partial (only decompression)
Indications	Primary or solitary metastatic tumors	Severe kyphosis or scoliosis	Metastatic epidural spinal cord compression
Surgical Approach	Anterior, posterior, or combined	Posterior-only	Posterior-only
Oncologic Intent	Curative	No	Palliative + adjunct to SRS
Radiation Planning	Not typically required	Not applicable	Integral to high-dose SRS planning

Key Distinctions

- **EBS** seeks curative tumor resection in one piece.
- **pVCR** corrects spinal deformities with complete vertebral removal, often piecemeal.
- **Separation Surgery** is a *palliative* oncologic procedure focused on **spinal cord decompression**, facilitating high-dose **radiosurgery** by separating tumor and dura.

Conclusion

These three procedures, though all involving vertebral resection or manipulation, serve **very different purposes**:

- **Curative (EBS)**
- **Deformity correction (pVCR)**
- **Palliative decompression (Separation Surgery)**

Understanding the goal behind each is key to choosing the appropriate technique in spinal surgery.

The analyses performed in a study demonstrated key factors affecting intraoperative blood loss and showed that a simple preoperative checklist including these factors can be used to identify patients undergoing surgery for metastatic spine tumors who are at risk for increased intraoperative blood loss [1)].

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see also Vertebral metastases surgery.

Although the spinal metastases treatment paradigms have changed and separation surgery followed by stereotactic radiosurgery is considered the best strategy, there are still cases in which spinal metastases surgery by 360° decompression with stabilization is indicated.

En Bloc Spondylectomy

En Bloc Spondylectomy

Techniques of decompression without stabilization have resulted in a worse outcome, and this has misled many in the past to believe that radiotherapy is the preferred option to surgery [2) 3) 4) 5)]

If the patient and the presenting pathology are feasible for surgery, 1 of the major criteria is the expected life expectancy of the patient. Generally, if the expected survival is > 3 months, patients are eligible for surgery [6)].

Of course, the predicted survival is not the only criterion with which to decide whether the patient is a surgical candidate. The wishes of the patient, comorbidity, and local characteristics are of course of equal importance.

In general, a search for other metastases is performed. The patient is assessed by an oncologist and a survival rate is estimated. This estimation is not very accurate [7) 8)].

A randomized, controlled trial proved the effectiveness of surgery in spinal metastatic disease with regard to the improvement of neurologic function. It did not contribute to a longer survival, but to an improvement in the quality of remaining life. One of the most important selection criteria for surgery is life expectancy. Estimation of the life expectancy includes numerous factors such as nature and extension of the primary tumor, clinical performance of the patient, presence of metastases, etc. [9)].

At first, surgery was proven to fail in the management of spinal metastases and, compared with radiation therapy, surgery had more complications, whereas neurologic recovery and survival rates did not improve. At that time, surgery was abandoned for the treatment of spinal metastases. It should be stated that surgery was in fact laminectomy [10)].

Percutaneous fixation with cement-augmented pedicle screws in patients with pathological spine fractures provides an improvement in mechanical back pain, with a low incidence of failure, and in some patients, spontaneous facet fusion was observed. Further research is necessary with regard to both short-term benefits and long-term outcomes [11)].

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