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En Bloc Resection of Cervical Spine Tumors with Vertebral Artery Compromise

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Background: En bloc resection is the mainstay of treatment for resectable malignant vertebral tumors, offering optimal outcomes for disease control and survival. However, in the cervical region, this procedure is challenging due to the proximity of critical structures, especially the vertebral arteries (VAs). Preoperative vertebral angiography and an intra-operative arterial block test can help ensure contralateral VA patency, allowing for safe VA management and favorable outcomes with an acceptable complications risk.

Research Question: What are the long-term outcomes and risks of en bloc resection for malignant cervical spine tumors?

Design: Retrospective collection of pre- and post-operative data from two centers specializing in en bloc resection for cervical spine malignancies.

Methods: Data were retrospectively recorded on patients who underwent total en bloc resection of malignant cervical spine lesions between 2005 and 2021. Each patient received a preoperative vertebral angiogram and intraoperative arterial block testing to confirm bilateral VA patency, allowing for the sacrifice of the affected VA when necessary. Details on the lesion characteristics, surgical approach used, oncological treatment, post-operative complications, and overall disease progression (recurrence or remission) were documented. (Table 1)

Results: Eleven patients were operated on and followed for a median of 13 years (range: 4–19); Three patients were treated using a single anterior approach, while eight required a double approach. All patients achieved tumor-free margins, and all are currently disease-free. Four patients required reintervention due to disease recurrence (n = 3) or VA bleeding (n = 1). No patients have experienced long-term functional or neurological deficits from the procedure.

Discussion: Total en bloc resection of malignant cervical spine tumors, though technically challenging, is feasible and offers curative potential with minimal surgical risks.

Fig. 1

Tumor	Level	Age	Sex	WBB	Approach	VA Sacrifice	Complications	Follow-Up (Years)
Chordoma	C3	55	M	5-7 AB	Anterior	No	Farinx recurrence Dysphagia	15
Chondrosarcoma	C5-C6	32	M	1-6 AD	Double	Left	Local recurrence New surgery	15
Solitary met. Breast cancer	C6	50	F	5-7 BC	Anterior	No	No	14
Desmoid tumor	C6	52	F	5-7 BC	Anterior	No	Temporal radiculopathy (C6)	14
Ewing sarcoma	C3-C5	72	M	2-6 AC	Double	Left	Temporary hemiparesia	13
Chordoma	C7	65	F	6-9 AB	Double	Right	No	13
Chordoma	C4-C6	64	F	6-9 AB	Double	Right	VA bleeding New surgery	8
Osteosarcoma	C6	44	F	2-7 AC	Double	Left	Posterior wound infection Solitary lung met (surgery)	8
Chordoma	C6-T1	68	M	3-8 AD	Double	Left	Fracture left pedicle C7; RTx	9
Chordoma	C2-C3	55	M	8-5AC	Double	No	Pharynx wall necrosis post-RTx	4
Chondrosarcoma	C5-T2	34	F	5-12AD	Double	No	No	19

Abbreviations: WBB - Weinstein-Boriani-Biagnini classification; VA - vertebral artery; met. - metastasis. RTx – radiotherapy.

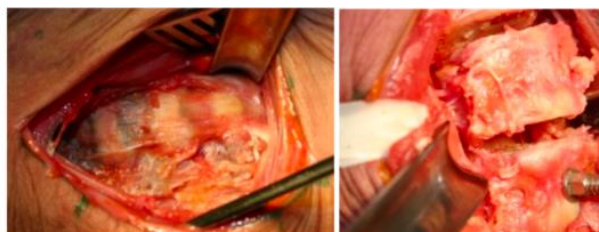
Fig. 2

Figure 1. Left: Single anterior surgical approach for malignant cervical vertebral lesion resection. Right: excision of superior and inferior intervertebral discs to allow complete en bloc resection.

Fig. 3

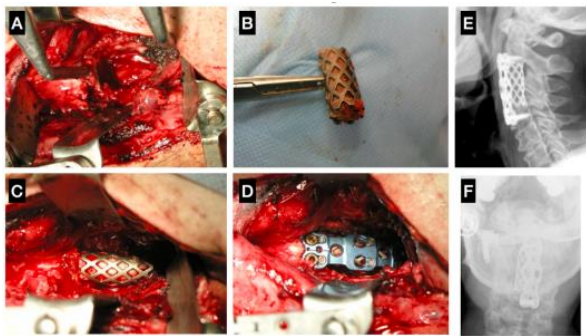


Figure 2: Reconstruction with mesh with tricortical graft and metal plate (A-D). Post-surgical radiographic outcomes (E-F).