

Letter to the Editor

Oncological Principles for Excision of Primary Spinal Tumors

Enneking examined the mechanism of local spread of primary bone and soft tissue tumors of the extremities and proposed the concept of compartmentalization and anatomic barrier. Based on this concept, he classified the surgical margins of tumor excisions into intracapsular, marginal, wide, and radical. A radical margin means that the lesion and the compartment (s) which it involved have been removed en bloc. A wide surgical margin means that the lesion has been removed en bloc and that the plan of dissection has been peripheral to the reactive zone and no natural barriers are between the lesion and the margin. A marginal margin means that the lesion has been removed en bloc and the plane of dissection has been extracapsular, either between the pseudocapsule and the reactive zone or within the reactive zone. Intracapsular margin means that the lesion has been removed from within the pseudocapsule and that gross tumor is seen at the wound margins, and left in the wound are portions of the lesions [1].

The vertebra is a closed ring that encloses the spinal cord. Often, at the time of presentation, the tumor has already extended to encircle the nervous tissue, so excision of the tumor without violation of the capsule is impossible; in other word intracapsular margin is inevitable. For this, piecemeal excision of spinal tumors was a common practice [2-6]. With improvement of patient's survival, it was clear that piecemeal excisions could not accepted to be the standard operation for excision of all spinal tumors. Roy-Camille et al described total spondylectomy by piecemeal excision of the neural arch followed by en bloc corpectomy using Gigli saw [7]. Tomita et al take it more forward by minimizing the intracapsular dissections during excision of spinal tumors by limiting the cuts to the vertebral ring to two points. In this way, the tumor vertebra is excised in two blocs. This was the concept for development of "total en bloc spondylectomy" operation utilizing the "Thread wire saw" (T-saw). Cuts are performed at the pedicle being the narrowest part of the ring. If the pedicle in one side is occupied by the tumor, the bone cut could be performed at the lamina. However, if both pedicles are occupied by tumor tissue, cutting at least through the tumor in one pedicle is mandatory [2-6].

Before 1997, there were no reports that have been described the surgical margins for excision operations of spinal malignancies. Efforts of the pioneers in spinal tumors helped to standardize the parameters for evaluation of surgical interventions in spinal tumor cases [6,8]. An experimental study on the local spread of metastatic vertebral tumors performed by Fujita et al concluded that each vertebra can be regarded as a compartment surrounded by several anatomical barriers like the anterior and posterior longitudinal ligaments [9]. Borianai et al insisted that the epidural space represents a compartment extending from the skull to the coccyx [8]. When applying the Enneking, Fujita and Boriani concepts for surgical margins for excision of spinal tumors, it is clear that radical resection is absolutely impossible for a spine tumor because of the extent of the epidural space. Boriani et al, considered that margins of excision of spinal tumors -in addition to wide, marginal, or intralesional- could be contaminated. They considered the margin contaminated if either a wide or marginal specimen was intralesional in some small area or broken with spilling of its content [10]. On the same direction towards differentiation between tumor contamination during piecemeal spinal tumor excision and tumor contamination during en bloc tumor excision, Fidler classified

tumor contamination during spinal tumor excisions into two grades; Grade I: means theoretical or minimal contamination during en bloc resection, for example, a small fissure occurred in the pseudocapsule, or the tumor was inadvertently penetrated but this was immediately recognized and there was no obvious tumor spill into the wound. Grade II: is contamination that was associated with an intentional combined extralesional/intralesional excision with part or all of the tumor being removed piecemeal but with meticulous removal of all the tumor spill [11]. Although en bloc excision of spinal tumors is technically demanding and associated with complications, understanding and following the oncologic principles, was associated with improved oncological results [12-14]. Further works should be directed towards pre-operative shrinking of the tumor so that tumor free margin could be achieved and to deal with any intra-operative tumor cell contamination by tumoricidal agents.

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