Image-guidance technology and the surgical resection of spinal column tumors

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Abstract

Precision imaging is paramount to achieving success in surgical resection of many spinal tumors, whether the goal involves guiding a surgical cure for primary tumors or improving neurological decompression for metastatic lesions. Pre-operatively, image visualization is intimately involved with defining a clear target and surgical planning. Intra-operatively, image-guidance technology allows for surgeons to maximize the probability for gross total resection of spinal cord tumors and minimize damage to adjacent structures. Through this review, it is evident that spinal surgery has undergone significant advancements with the continued technological progression of different modalities of imaging guided technologies. Sophisticated imaging techniques compliment the surgeon’s knowledge by providing an intraoperative reference to spinal column anatomy. This review discusses research efforts focusing on immersive imaging guided interactions with subject specific medical images that could enhance a surgeon’s ability to plan and perform complex spinal oncology procedures with safety and efficiency.