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ASO AUTHOR REFLECTIONS

ASO Author Reflections: Margin Analysis in Head and Neck Cancer—State of the Art and Future Directions

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PAST

The status of the surgical margin has been demonstrated to be the most important prognostic factor for patients undergoing surgical resection of head and neck squamous cell carcinoma (HNSCC) with clear or negative margins correlating with improved treatment outcomes and overall survival.[1] Despite the significance of definitive tumor extirpation and obtaining negative surgical margins, a high degree of variability exists when defining what specifically constitutes a negative versus "close" margin, the amount of tissue resection required to achieve adequate margin clearance between various head and neck subsites, significance of the deep margin, and whether to perform histopathologic analysis of tissue from the primary tumor specimen or surgically resected wound bed.[2] Although high rates of concordance between intraoperative frozen-section analysis and final histopathologic results exist, adjuvant treatment recommendations may be handicapped by tissue sampling bias and interpretive errors. Because the surgical margin is under surgeon control, particular attention to techniques which optimize definitive resection and negative margins are of critical importance.[3]

PRESENT

A multitude of techniques and various technologies designed to enhance margin analysis intra- and postoperatively have arisen in recent years. Specifically, the use of a specimen-driven margin sampling approach (e.g., sampling from the resected tumor specimen), complete circumferential peripheral and deep margin assessment (CCPMA), and face-to-face handoffs between surgeons and pathologists appear to be associated with lower rates of margin positivity. More recently, the utilization of advanced imaging techniques, including high-resolution microendoscopy (HRME), near-infrared (NIR) fluorescence imaging, and numerous spectroscopic advances have enhanced the ability to detect residual tumor in the intraoperative setting, thus leading to improved negative margin rates. Next-generation techniques, specifically molecular margin analysis, are a promising alternative to traditional margin assessment. Genetic and epigenetic alterations have been demonstrated as predictors of survival and assessment of such changes may guide decisions regarding adjuvant therapy in the future.[4,5]

FUTURE

While improvements in traditional margin analysis techniques and standardization in margin definitions and sampling are needed, next-generation technologies offering rapid intraoperative assessment of margin status remain promising. To date, a limited number of clinical studies have been performed; prospective studies are warranted to define more accurately the utility of these techniques. While largely in its infancy, molecular margin analysis may allow for improved prognostication of tumor behavior, particularly in the postoperative setting.[5] Unfortunately, these techniques are currently limited by financial

constraints and generalizability of such approaches. Significant improvements in cost, timing, and quality are required before widespread clinical implementation. Nonetheless, a combination of techniques will likely improve the ability to accurately assess surgical margins in the intra- and postoperative settings while simultaneously informing the need for adjuvant therapies to improve outcomes in head and neck oncology.

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