#117 James Cochran Advisor(s): Ofer Azoulay

Assessing outcomes of virtual surgical planning in oncological craniofacial reconstruction using free flaps: a scoping review

Introduction: Heterogeneity and lack of consensus on how to assess outcomes of the use of virtual surgical planning (VSP) is a major barrier to its validation through comparative studies and incorporation as a standard surgical planning practice in the field of head and neck surgery. This scoping review was conducted with the objective to categorize and evaluate the approaches used for outcome assessment in the use of VSP compared to conventional surgical planning for oncological craniofacial reconstruction using free-flaps.
Methods: A scoping review was conducted following PRISMA-ScR guidelines. A systematic search of the literature was conducted of electronic media published between 1 April 2010 and 1 April 2020. Pre-specified inclusion and exclusion criteria were applied to the search list, yielding 82 studies. These articles were assessed for content, including focus of reconstruction, methods for assessing outcomes, and statistical significance of findings.
Results: Five categories of assessing outcomes were identified: accuracy, efficiency, clinical outcomes, cost analysis, and surgeon satisfaction. The most common parameter for assessing accuracy was identified as gonion angle positional deviation, evaluated by mean change from pre-operative VSP to post-operative imaging. Parameters used to assess efficiency were mean ischemia time and mean operating time. Lowered mean ischemia time and reduced total operating time most frequently correlated with a statistically significant outcome (p<.05).
Conclusions: Efficiency measurements are consistently being used to compare outcomes of VSP and conventional surgery. Parameters to assess accuracy are also common and in the majority of evaluated cases, lead to statistically significant findings of improved reconstructive accuracy with a VSP approach. Published standardized guidelines for assessing accuracy outcomes of a VSP approach have been proposed. Future validation studies involving these guidelines are needed.

Additional contributors to this project:
Prayag Patel, MD PGY-5
Robert Gurevich