Oncological and survival outcomes following transoral robotic surgery versus transoral laser microsurgery for the treatment of oropharyngeal squamous cell carcinoma: a systematic review of case series

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Declaration

I certify that this work contains no material which has been accepted for the award of any other degree or diploma in my name in any university or other tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made in the text. In addition, I certify that no part of this work will, in the future, be used in a submission in my name for any other degree or diploma in any university or other tertiary institution without the prior approval of the University of Adelaide and where applicable, any partner institution responsible for the joint award of this degree.

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Executive summary

Background

Transoral laser microsurgery (TLM) and transoral robotic surgery (TORS) are two principal minimally invasive transoral surgical techniques for the treatment of patients with oropharyngeal squamous cell carcinoma (OPSCC). Currently this increasingly common disease is more often caused by exposure to the human papilloma virus (HPV) rather than tobacco or alcohol. This condition affects younger patients who have a much better prognosis. These minimally invasive techniques have superseded traditional open surgical techniques in the management of head and neck cancer, and also provide a genuine alternative to radiotherapy for definitive treatment. While both TLM and TORS have been shown in case series to have good oncological outcomes, the key differences between both approaches warrant a detailed comparison.

Objectives

The objective of this systematic review was to synthesize the best available evidence regarding the oncological and survival outcomes (as measured by DC, DFS, DSS and OS) of TORS versus TLM for the treatment of oropharyngeal squamous cell carcinoma in adults.

Inclusion criteria

The patient populations studied were male and female adults who had undergone transoral endoscopic surgery with TORS or TLM for the treatment of primary squamous cell carcinoma arising from the oropharyngeal mucosa. The tumor could be of any T-stage and HPV status, but surgical treatment had to have been aimed at curative intent rather than palliation.

Methods

A comprehensive search strategy was employed to find both published and unpublished studies that evaluated local, regional and distant control, tumor margins, and disease free, disease specific and overall survival outcomes. Databases that were searched included PubMed, CINAHL, Embase, Web

of Knowledge and Scopus. Grey Literature was searched through the Cochrane Register of Controlled Trials (CENTRAL), Scirus, MedNar and ProQuest.

Results

Seventeen cases series were included in this review, of which 11 studies had TLM as the intervention of interest and six studies examined TORS. There were a total of 1,257 patients included in this review with ages ranging between 27 and 92 with 65% of patients being male and 35% female. Follow-up periods ranged from one to 132 months and outcomes were measured at one, two, three and five years. Differences in oncological outcomes between TLM and TORS could not be elucidated generally, and with respect to particular patient sub-groups, such as patients with a positive HPV status or patients with different tumor T-stages.

Conclusions

Both TORS and TLM can achieve complete tumor resection. Significant heterogeneity of extracted data and inclusion of studies with low levels of evidence eliminated valid comparison of oncological and survival outcomes between TORS and TLM, therefore there was no means to show superiority of one approach over the other. Operator and institution experience, as well as factors relating to cost and availability, will likely dictate which surgical platform is used. With ever expanding minimally invasive surgical technology and ongoing development of competing surgical platforms, the imperative will lie with leading surgeons around the globe to construct and execute well-designed trials.