Treatment of early-stage glottic cancer: meta-analysis comparison of laser excision versus radiotherapy

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CRD summary
This review concluded that transoral laser surgery and radiation therapy showed similar oncologic control, although there was a trend towards greater overall survival with transoral laser surgery. There was no clear advantage with radiation therapy for post-treatment voice quality. Given several limitations with the review process and the included studies, the authors’ conclusions should be interpreted with caution.

Authors’ objectives
To compare the effectiveness of external radiation with transoral laser surgical excision for the treatment of early stage glottic cancer.

Searching
MEDLINE, EMBASE, Cochrane Central Register of Controlled Trials (CENTRAL), CINAHL and Web of Science were searched for relevant articles. No search dates or terms were reported. Reference lists of retrieved articles were searched manually. Unpublished data were located through BIOSIS Previews, ClinicalTrials.gov and Conference Papers Index.

Study selection
Studies that compared the effects of external radiation with transoral laser surgical excision on oncologic outcomes in patients with early stage glottis cancer were eligible for inclusion. The secondary outcome of interest was post-treatment voice quality.

Included studies reported the following outcomes: local control, number of total laryngectomies required for salvage, overall survival and post-treatment voice quality.

Two reviewers independently screened studies for inclusion. Disagreements were resolved through consensus.

Assessment of study quality
The authors did not state that they assessed study validity.

Data extraction
Dichotomous outcome data were extracted to calculate odds ratios (ORs) and continuous data were extracted to calculate mean differences. The 95% confidence intervals (CIs) were extracted.

The authors did not state how many reviewers extracted data.

Methods of synthesis
A random-effects model was used to combine odds ratios and weighted or standardised mean differences (WMDs or SMDs) and 95% CIs. Single-arm studies were included in meta-analysis as a composite score. Sensitivity analyses were conducted; these included head-to-head studies only or single-arm composite score only.

Statistical heterogeneity was assessed using the $X^2$ test and $I^2$ statistics.

Results of the review
Twenty-seven retrospective studies were included in the review. Overall n was reported in the text as 7,676 (2,571 transoral laser and 5,105 radiation therapy); overall n calculated from the tables was 7,391. Six studies were direct head-
to-head comparisons and 21 were single-arm consecutive case series (from numbers provided in the tables; 22 single-arm studies were reported in the text). Sample sizes ranged from 31 to 902 participants. Where reported, median follow-up duration ranged from 31 months to 9.9 years.

There were no statistically significant differences in local control between treatment types (OR 0.81, 95% CI 0.51 to 1.30; 27 studies). Sensitivity analyses that included head-to-head studies only did not significantly alter the results.

There were no statistically significant differences between treatments in laryngectomy-free survival (OR 0.73, 95% CI 0.39 to 1.35; four head-to-head studies), but single-arm composite score showed benefits for overall survival with transoral laser surgery (OR 1.48, 95% CI 1.19 to 1.85). There was no evidence of statistical heterogeneity.

The nine studies that assessed voice quality showed varied results for objective voice outcomes. Results were reported in the review.

Authors' conclusions
The evidence suggested similar oncologic control with transoral laser surgery compared with radiation therapy, although there was a trend towards greater overall survival. There was no clear advantage using radiation therapy for post-treatment voice quality.

CRD commentary
The review question was clear, but the supporting inclusion criteria were not explicitly stated and had to be derived from the review objectives. A comprehensive search of the literature was undertaken and this included attempts to locate unpublished data. No search dates were reported and it was unclear whether language restrictions were applied, so there was a possibility that potentially relevant papers may have been missed. The authors did not perform a formal validity assessment, but limitations with the study designs used and their retrospective nature were noted by the authors. The authors screened studies for inclusion in duplicate, but the process was not reported for data extraction and so reviewer error and bias could not be ruled out. The authors acknowledged clinical and methodological heterogeneity among studies, but as few details were reported on these characteristics it was difficult to determine whether pooling of the results was appropriate. The authors acknowledged that the quality of included studies was limited, head-to-head studies had small sample sizes and were of short follow-up duration. The authors also stated that duration of patient enrolment was often fairly long and spanned a time period in which significant technology changes and treatment regimens may have taken place. Given the limitations with the review process and the included studies, the authors' conclusions should be interpreted with caution.

Implications of the review for practice and research
Practice: The authors stated that clinical significance of the voice quality assessment was questionable as objective measures were used that may not have reflected subjective assessment.

Research: The authors stated that they were undertaking a formal cost-utility analysis to help clarify any treatment advantages and cost savings associated with a shorter treatment course.

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This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.