Systematic review of the current evidence in the use of postoperative radiotherapy for oral squamous cell carcinoma

Brown JS, Shaw RJ, Bekiroglu F, Rogers SN

CRD summary
The review found that there was insufficient evidence to show whether postoperative radiotherapy for treating oral squamous cell carcinoma was of overall benefit. Based on the weak evidence available, surgery with postoperative radiotherapy was associated with relatively poor overall survival compared to surgery. The review had some methodological weaknesses but these cautious conclusions appear justified.

Authors' objectives
To evaluate the role of postoperative radiotherapy for treating oral squamous cell carcinoma.

Searching
EMBASE and PubMed were searched. References of retrieved articles were checked. Search terms were reported.

Study selection
Eligible studies compared survival rates for oral squamous cell carcinoma treated by surgery alone with rates associated with surgery plus postoperative radiotherapy or chemoradiotherapy. Studies were required to report the initial stage of disease, specify whether radiotherapy was used and report extractable data specific to the oral cavity. Outcomes of interest were overall survival, recurrence (local, regional or total), surgical margins, salvage rates, risk factors for recurrence, neck management and second primaries. Outcomes were defined in detail in the review. The reviewers excluded studies that reported data in a way that did not allow comparison with other studies.

Nearly half (48%) of the participants in the review received surgery alone and the rest received both surgery and radiotherapy. Some studies compared surgery alone versus surgery with postoperative radiotherapy; others investigated only one of the interventions and did not report any comparative data. In most studies, previous or historical data was used for controls. The included studies were published between 1990 and 2010.

The authors did not state how many reviewers performed study selection.

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

Data extraction
Data on event rates in each group were presented in tables.

The authors did not state how many reviewers performed data extraction.

Methods of synthesis
Study data were combined by calculating an event rate from the sum of events divided by the sum of participants in each group for each outcome. Data were presented in tables by disease stage (I-II, III-IV, all) stratified by study design (type of intervention or comparison). The effect of margin status (clear or close) was examined in a subgroup analysis. Sensitivity analysis was conducted by excluding an outlying study from analysis.

Results of the review
Twenty-five studies were included in the study data tables. A total of 7,786 participants (range 29 to 1,539) was stated in the text and a total of 8,005 participants was reported in tables. One study was a randomised controlled trial (122 participants) and 24 were retrospective cohort studies. The status of a further 24 studies (not included in data tables) was unclear.

There was little difference in local recurrence rates between surgery alone and surgery plus radiotherapy for stage I-II.
disease (11% versus 13%), stage III-IV disease (19% versus 16%) or any stage disease (15% versus 19%). Local recurrence rates were similar (both 12%; five studies) in participants with any stage disease and clear margins. Rates were lower in the surgery-only group (10% versus 20%; two studies) in participants with close margins.

Regional recurrence rates were higher after surgery alone than after surgery plus radiotherapy for participants with stage I-II disease (14% versus 6%) but were similar for stage II-IV disease (12% versus 11%) and for any stage disease (11% versus 10%).

Salvage rates were higher after surgery alone than after surgery plus radiotherapy for participants with any stage disease (57% versus 25%). Overall survival was higher after surgery alone than after surgery plus radiotherapy for participants with stage I-II disease (77% versus 65%), stage III-IV disease (74% versus 62%) and any stage disease (77% versus 62%).

Other outcomes were reported in the review.

**Authors’ conclusions**
There was insufficient evidence to show whether postoperative radiotherapy for treating oral squamous cell carcinoma was of overall benefit. Based on the weak evidence available, surgery with postoperative radiotherapy was associated with relatively poor overall survival compared to surgery.

**CRD commentary**
The objectives of the review were clear. The search was rather narrow, as only two databases were searched. It was unclear whether the search was restricted by language or publication status but if so the review may have been at risk of language and publication biases. No search dates were reported. It was unclear whether steps were taken to minimise risks of reviewer bias and error during study selection and data extraction. It was unclear whether there were additional studies that met eligibility criteria but did not report data suitable for tabulation. It did not appear that study validity was assessed. These factors made it difficult to determine the reliability of the review findings.

Pooling of data by simple addition was not a reliable way of calculating overall incidence rates as it did not take account of differences between the studies (such as sample size) or within-study variability in the data. As noted by the authors, few studies compared participant risk factors and it was highly likely that the preoperative radiotherapy groups had a higher level of risk than those who only had surgery. The authors acknowledged that the level of evidence was low but that randomised controlled trials might not be feasible in this clinical area.

The review had several methodological weaknesses (such as a limited search, poor reporting of methods and failure to assess study quality) and well-controlled evidence was lacking but the authors’ cautious conclusions appear justified.

**Implications of the review for practice and research**

**Practice:** The authors did not state any implications for practice.

**Research:** The authors stated that there was a need for randomised controlled trials or high quality data from retrospective audits to evaluate postoperative radiotherapy for treating oral squamous cell carcinoma and that current protocols should be reassessed. They also stated that studies should investigate in what circumstances compromised margins were an indication for radiotherapy and that research into genotypes may facilitate tailoring of treatment to the individual.

**Funding**
Not stated.

**Bibliographic details**

**PubMedID**
22196145
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.