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PRACTICE GUIDELINE

Role of endolaryngeal surgery (with or without laser) compared with radiotherapy in the management of early (T1) glottic cancer: a clinical practice guideline

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ABSTRACT

Aims

To provide evidence-based practice guideline recommendations concerning the role of endolaryngeal surgery (with or without laser) compared with radiation therapy for patients with early (T1) glottic cancer, assessing survival, locoregional control, laryngeal preservation rates, and voice outcomes.

Methods

The MEDLINE, EMBASE, and Cochrane Library databases were searched to identify relevant studies from 1996 to 2011. Recommendations were formulated based on that evidence and on the expert opinion of Cancer Care Ontario's Head and Neck Cancer disease site group. The systematic review and practice guideline were externally reviewed by practitioners in Ontario, Canada.

Results

The available evidence was of a level insufficient to demonstrate a clear difference between treatment options when considering the likelihood of local control or overall survival. Although the evidence was mainly retrospective, there was a suggestion that, compared with surgery, radiotherapy might be associated with less measureable perturbation of voice without a significant difference in patient perception. The likelihood of laryngeal preservation may be higher when surgery can be offered as initial treatment.

Conclusions

For patients with early (T1) glottic cancer, the evidence is insufficient to demonstrate a difference between endolaryngeal surgery (with or without laser) and external-beam radiation therapy. The choice between treatment modalities has been based on patient and clinician preferences and general medical condition.

KEY WORDS

Endolaryngeal, glottic, radiotherapy, surgery, T1

1. INTRODUCTION

There is continuing debate about whether radiation therapy or surgery, with or without laser, is the superior treatment for early glottic cancer. The evidence to date has been insufficient to resolve the controversies, particularly because of the paucity of prospective randomized trials. Furthermore, opinions about optimal therapy have been demonstrated to vary across disciplines[1] and between countries[2].

The aim of the Head and Neck Cancer Disease Site Group (DSG) of Cancer Care Ontario's Program in Evidence-Based Care (PEBC) was to systematically review reported studies in the literature, to compare outcomes from those studies, and to provide guidance on the effectiveness of the two most common treatment options for early glottic cancer: endolaryngeal surgery and radiotherapy.

2. METHODS

This practice guideline was developed by the Head and Neck Cancer DSG using the methods of the practice guidelines development cycle[3]. This practice guideline is intended to promote evidence-based practice in Ontario, Canada. The PEBC is editorially independent of Cancer Care Ontario and the Ontario Ministry of Health and Long-Term Care.

2.1 Question

In patients with early (T1) glottic cancer, what is the role of endolaryngeal surgery (with or without laser) compared with radiation therapy, in terms of

survival, locoregional control, laryngeal preservation rates, and voice outcomes?

2.2 Target Population

The target population of this guideline is adult patients with previously untreated early (T1) glottic cancers.

2.3 Intended Users

This guideline is intended for use by clinicians and health care providers involved in the management or referral of adult patients with early (T1) glottic cancer.

2.4 Systematic Review

For this project, the core methodology used to develop the evidentiary base was the systematic review. The MEDLINE (OVID: 1996 through December, Week 4, 2010), Ovid MEDLINE In-Process and Other Non-Indexed Citations (January 10, 2011), EMBASE (OVID: 1996 through January, Week 1, 2011), and Cochrane Library (OVID: 4th Quarter 2010) databases were searched for relevant studies. In addition, proceedings of the meetings of the American Society of Clinical Oncology, the American Society for Therapeutic Radiology and Oncology, and the Canadian Association of Radiation Oncology were all searched for relevant abstracts for the years 2007 to 2010 (the most recently available). Reference lists of studies deemed eligible for inclusion in the systematic review were scanned for additional citations.

Evidence was selected and reviewed by two members of the PEBC Head and Neck Cancer DSG and by one methodologist. The body of evidence in this review is composed primarily of retrospective comparative and cross-sectional studies. That evidence forms the basis of the recommendation developed by the Head and Neck Cancer DSG.

2.5 Development of Recommendations

The Head and Neck Cancer DSG reviewed the evidence identified in the literature. Draft recommendations were developed based on that evidence and on the expert opinion of the Head and Neck Cancer DSG.

2.6 Internal Review

Before submission of the draft report for external review, the report was reviewed and approved by the PEBC Report Approval Panel, a panel that includes oncologists and whose members have clinical and methodologic expertise.

2.7 External Review

During the guideline development process, 6 targeted peer reviewers from Ontario and Alberta who are considered to be clinical or methodologic experts on the topic were identified by the working group. Several weeks before completion of the draft report, the nominees were contacted by e-mail and asked to serve as reviewers. Three nominees agreed, and the draft report and a questionnaire were sent by e-mail for their review. The questionnaire consisted of items evaluating the methods, results, and interpretive summary used to inform the draft recommendations and whether the draft recommendations should be approved as a guideline.

Feedback was also obtained through a brief online survey of health care professionals who are the intended users of the guideline. All head-and-neck cancer professionals from Ontario in the PEBC database were contacted by e-mail to inform them of the survey. Participants were asked to rate the overall quality of the guideline and to state whether they would use or recommend it. Written comments were invited.

3. RESULTS

The complete literature search identified 1045 studies, of which 146 were obtained for full-text review. The two systematic reviews, one with meta-analysis, and seventeen primary studies that met the inclusion criteria are included in the present review.

3.1 Recommendation

For patients with early (T1) glottic cancer, recommended treatment options include the equally effective choices of endolaryngeal surgery, with or without laser, and radiation therapy. The treatment modality selection should be based on patient and clinician preferences and general medical condition.

3.2 Qualifying Statement

Currently, no well-designed prospective randomized controlled trial has compared endolaryngeal surgery and radiation therapy. Thus, the present recommendation are based primarily on other comparative study designs.

Although not substantiated by the evidence, several factors are important to consider when deciding between surgery and radiotherapy for early glottic cancer. Location of disease is one factor. Anterior commissure involvement may be a factor that favours a recommendation of radiotherapy over surgery because of a common opinion that voice outcomes are particularly affected. Patients with tumours localized to the midportion of the vocal fold, and where endoscopic accessibility is uncompromised, may be considered ideal candidates for surgery. Other important practical considerations include the ability of the patient to tolerate a general anaesthetic, which is required for

surgery. In contrast, radiotherapy requires patient cooperation for daily treatment over 4–6 weeks. Partial laryngeal surgery, including revision endoscopic surgery, is possible for local recurrence after surgery. However, re-irradiation is not an option in cases of recurrence.

3.3 Key Evidence

High-quality evidence to explicitly inform the guideline question is lacking. Notwithstanding that lack, the present recommendation is based on the best available evidence and a consensus of expert clinical opinion of the Head and Neck Cancer DSG.

One meta-analysis, fifteen cohort studies, and two cross-sectional studies comparing endolaryngeal surgery (with or without laser) and radiation therapy in patients with early glottic cancer constituted the evidence base.

No statistically significant differences in overall survival or disease-free survival were detected. One retrospective cohort study[4] did report a significant ($p = 0.003$) 15-year cause-specific survival benefit in surgically treated patients (100%) compared with those treated with radiation therapy (91%). That result was not consistent: four other retrospective cohort studies[5–8] that also considered cause-specific mortality showed no significant differences. The meta-analysis[9] detected no statistically significant laryngectomy-free survival benefits for laser surgery compared with radiation therapy (odds ratio: 0.73; 95% confidence interval: 0.39 to 1.35).

The meta-analysis[9] also found no statistically significant difference in local control between radiation therapy and laser surgery (odds ratio: 0.66; 95% confidence interval: 0.41 to 1.05). Of eight retrospective cohort studies, one[10] reported a control rate that was better in surgically treated patients (89%) than in those treated with radiotherapy (75%) when only T1a patients were considered (marginally significant at $p = 0.05$). One retrospective cohort study[4] also reported a significant difference in recurrence rates favouring surgery. Thurnher *et al.*[4] found a recurrence rate of 30.5% in patients undergoing radiation therapy and 9.9% in patients treated with laser excision ($p = 0.001$). The remaining five studies reported no such significant differences in recurrence rates between treatment groups.

Laryngeal preservation rates were found to be better with surgery (with or without laser) than with radiation in five studies[4,8,10–12], and one study found a better preservation rate with radiation therapy (marginally significant at $p = 0.051$)[13].

In one retrospective cohort study, post-treatment voice and speech quality were assessed by clinician perceptual analysis[14], which found that the difference between surgical and radiation therapy patients did not reach statistical significance. In five studies that analyzed patient self-perception, three[15–17] found no statistically significant differences between treatment groups, one[18] found that radiation therapy patients scored significantly better, and one[19] reported that surgically treated patients scored better. In the meta-analysis[9], conflicting results were found. Significantly better maximum phonation time and fundamental frequency were detected in the radiation therapy patients, but the perturbation measures of jitter and shimmer were reported to significantly favour the patients undergoing transoral laser surgery.

4. DISCUSSION

Carcinoma of the glottis is usually diagnosed in the early phase, and both modalities of treatment have shown high cure rates. However, controversies in the treatment of early glottic cancer remain because of the lack of high-quality prospective analyses comparing endoscopic surgery with radiotherapy. No evidence favours one of those treatment modalities over the other when considering the likelihood of local control or overall survival. There is a suggestion that, compared with surgery, radiotherapy may be associated with less measureable perturbation of voice; however, no significant differences were seen in patient perception. The likelihood of laryngeal preservation may be higher when surgery can be offered as initial treatment, but that result may be attributable to selection bias for patients undergoing initial endolaryngeal surgery compared with primary radiation. Future research should focus on conducting randomized controlled trials or prospective comparative studies that focus on functional outcomes of patients with early glottic cancer and that include ample follow-up time.

5. REVIEW AND UPDATE

Practice guidelines developed by the PEBC are reviewed and updated as required. Please visit the Cancer Care Ontario website (http://www.cancercare.on.ca) for the full report and subsequent updates.

6. ACKNOWLEDGMENTS

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7. CONFLICT OF INTEREST DISCLOSURES

The authors declare that there are no financial conflicts of interest.

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