Value of fluorescence endoscopy for the early diagnosis of laryngeal cancer and its precursor lesions

Kraft M, Betz CS, Leunig A, Arens C

CRD summary
This review concluded that fluorescence endoscopy was highly effective in the early diagnosis of laryngeal cancer and its precursor lesions. Limitations in the review methodology, in particular the possibility of missing studies, lack of both quality assessment and details of included studies, and limited statistical analysis. The conclusions are unlikely to be reliable.

Authors' objectives
To determine the accuracy of fluorescence endoscopy for early detection and delineation of laryngeal cancer and its precursor lesions.

Searching
MEDLINE and Cochrane Central Register of Controlled Trials (CENTRAL) were searched from 1966 to 2009. Search terms were reported. Reference lists of retrieved studies were screened. The review was restricted to published studies. It was unclear whether any language restrictions were applied; it appeared that articles in Russian and Polish were excluded.

Study selection
Studies that compared in vivo fluorescence imaging findings (index test) to definitive histopathology (reference standard) for the diagnosis of neoplastic lesions of the larynx were eligible for inclusion. It appeared that studies had to report 2x2 tables of test performance; where these were not reported in the publication authors were contacted for further information.

Included studies assessed autofluorescence, induced fluorescence and white light endoscopy (micro- and indirect laryngoscopy). Imaging was either endoscopy or spectroscopy.

The authors did not state how studies were selected for inclusion.

Assessment of study quality
The authors did not report a formal quality assessment.

Data extraction
Data were extracted to populate 2x2 tables of test performance. Malignant (carcinoma in situ, invasive cancer) and premalignant lesions (moderate and severe dysplasia) were considered to be positive and benign lesions were considered to be negative. These data were used to calculate sensitivity, specificity, accuracy and positive and negative predictive values.

The authors did not state how many reviewers performed the data extraction. Where necessary, authors were contacted for additional information.

Methods of synthesis
Summary estimates of sensitivity and specificity were calculated. Details on the methods used were not reported but appeared to be based on simple summing of data from the 2x2 tables (equivalent to fixed-effect meta-analysis). Data were pooled separately for different fluorescence imaging techniques, procedure type (autofluorescence, induced fluorescence and white light endoscopy), method of evaluation (endoscopy versus spectroscopy) and application of aminolevulinic acid (topical versus systemic).

Results of the review
Sixteen studies (1,332 patients, 1,997 lesions) were included in the review.
Autofluorescence had a sensitivity of 91% and a specificity of 84% for detection of precancerous and cancerous lesions. White light endoscopy had a sensitivity of 73% and a specificity of 79%. Induced fluorescence had a sensitivity of 95% and a specificity of 62%. Spectroscopic assessment was reported to be superior to endoscopic evaluation. There were no significant differences in accuracy according to procedure type (direct versus indirect) or method of aminolevulinic acid administration (topical versus systemic).

**Authors' conclusions**
Fluorescence endoscopy was highly effective in the early diagnosis of laryngeal cancer and its precursor lesions.

**CRD commentary**
The review addressed a clear question and inclusion criteria were defined in terms of index test, reference standard and target condition; details were lacking for population and outcomes. The literature search involved only two databases (one of which was more appropriate for intervention reviews), was restricted to published studies and had an end date of 2009 (month not specified), which was at least 18 months before the review was published. Studies published more recently than 2009 would not have been identified and there was a possibility of publication bias. Details on the review process were not reported and so it was not possible to determine whether appropriate steps were taken to minimise bias and errors. No formal quality assessment was performed and so the risk of bias in the included studies was unclear. No details other than results were reported for the included studies, so it was not possible to determine the generalisability of the review findings. Details on methods used to pool data were lacking; it appeared that simple summing of 2x2 tables was used and there was a risk of biased summary estimates with this method. No measures of the variability of the summary estimates and heterogeneity across studies were reported, which made it difficult to interpret the summary estimates.

This review suffered from several limitations and so the authors' conclusions are unlikely to be reliable.

**Implications of the review for practice and research**
**Practice:** The authors stated that autofluorescence and induced fluorescence could be applied equally in the primary detection of laryngeal cancer and its precursor lesions, providing a better evaluation of their horizontal extension and delineation. But, they were not yet qualified to substitute for histological work-up.

**Research:** The authors did not state any implications for research.

**Funding**
Not stated.

**Bibliographic details**

**PubMedID**
21674669

**DOI**
10.1002/hed.21565

**Original Paper URL**

**Indexing Status**
Subject indexing assigned by NLM

**MeSH**
Aminolevulinic Acid; Carcinoma, Squamous Cell; Early Detection of Cancer /methods; Endoscopy /methods; Fluorescence; Head and Neck Neoplasms; Humans; Laryngeal Neoplasms /diagnosis; Laryngoscopy /methods; Photosensitizing Agents; Precancerous Conditions /diagnosis; Sensitivity and Specificity
AccessionNumber
12011004121

Date bibliographic record published
07/09/2011

Date abstract record published
27/03/2012

Record Status
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.