

RESEARCH SUMMARY

Performance measurement of oral cancer and pre-cancer screening studies

Meta-analysis of measures of performance reported in oral cancer and precancer screening studies.

D. R. Moles, M. C. Downer and P. M. Speight *Br Dent J* 2002; 192: 340-344

Objective

To elicit a range of values for sensitivity, specificity and other measures of performance in screening for oral cancer and precancer.

Method

A literature search which included three databases was conducted. Strict inclusion criteria were applied. Values for sensitivity (Sn) and specificity (Sp), from seven investigations, were expressed as a receiver operator characteristic (ROC) curve. Meta-analysis of the combined results was used to produce a summary operator characteristic (SROC) curve.

Results

The pooled weighted value of Sn from the seven studies was 0.796. From the SROC, the corresponding value of Sp at this level of Sn was 0.977 (95% CI 0.941, 0.991). When Sp was held at 0.977, the corresponding value of Sn from the SROC was 0.796 (95% CI 0.594, 0.912).

Conclusions

The reports selected for eventual inclusion revealed a high level of heterogeneity with respect to the location of investigations, prevalence of lesions, the personnel used and other factors. The meta-analysis indicated that overall the studies had high discriminatory ability. The estimates of Sn and Sp, and values obtained for other measures of screening performance, were considered suitable for input to a simulation model in assessing the likely cost-utility of a variety of screening scenarios in further planned research.

IN BRIEF

- In order to gain an idea of the kind of results that screening and pilot programmes for oral cancer and precancer are producing, a review of these studies and a meta-analysis of their findings was undertaken.
- The studies analysed were conducted in varied circumstances regarding screening strategy used, populations involved, prevalence of disease in those populations, personnel undertaking screening, and their experience and training.
- In order to derive average numerical values for screening performance, a meta-analysis of the probabilities of screeners correctly identifying those with and without relevant target lesions, not known to have been used previously in the field of oral health was adopted.
- Despite the heterogeneity among studies, the ability of the screeners to discriminate between those with relevant lesions and those without appeared to be good in most instances. However, among patients referred for secondary care the uptake of available services was shown to vary enormously.

COMMENT

In this issue Moles *et al* report on a meta-analysis to measure the performance of various published studies on screening for oral cancer or precancer. Their search yielded 60 articles on this subject in peer-reviewed journals. Based on stated inclusion and exclusion criteria, the authors initially selected seven screening studies for this meta-analysis and added a further six while examining the yield and compliance for screening. Their analysis is based on reported studies from the UK, Japan, India and Sri Lanka and the screening modality varied from invitational, opportunistic to house-house case-finding.

The fact of the matter is that screening for any disease is not conclusive. It provides only preliminary information about the diagnosis, sometimes under field situations, and the purpose of this scheme of inspection is to report the findings as accurately as possible to allow a re-examination of positive detections at a local treatment facility. Several variables including examiner training, calibration, incidence of the target disease and the presence of untreated other oral mucosal disease in the population could influence the outcome.

The effectiveness of a screening test is based mostly on the estimates of sensitivity and specificity. However, sensitivity and specificity are conceptually related; if the test conditions remain constant, an increase in sensitivity will result in a reduction in specificity, and the corollary is also true. The derived sensitivity values ranged from 0.60 to 0.95 and the specificity figures were between 0.94 and 0.99 for most studies conducted around the world. These data suggest there is striking uniformity of results that describe these programme measures.

The Summary Receiver Operator Characteristic Curve (SROC) plotted using a meta-analytical technique yielded a pooled sensitivity of 0.796 and a corresponding specificity at 0.977 suggesting the studies had high discriminatory ability to pick up the target disease. These results are comparable with reported results from many cancer screening studies involving other body sites such as colon, breast and cervix. This timely meta-analysis by Moles *et al.* highlights the true efficacy of screening for oral cancer/precancer which has the great theoretical potential for the control of this disease.

Professor Saman Warnakulasuriya,
Professor of Oral Medicine & Experimental Oral Pathology,
Guy's, King's & St Thomas' Dental Institute,
King's College, London