

Screening for Oral Cancer and Precancer

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INTRODUCTION

THERE ARE about 2000 newly diagnosed cases of oral cancer in England and Wales each year [1] and at least half the patients die from their disease. The overall incidence rates for all ages is 7.5 per 100 000 (crude rate) but increases to over 30 in the 64–79 age group. In the developed world oral cancer is the eighth most common cancer, representing 1–2% of total malignances and in some countries is more common than cervical cancer [2].

These figures, at first sight, do not appear to present a significant health problem in the UK compared, for example, with lung and breast cancer or coronary heart disease. However the quality of care for these patients, if expressed in terms of survival, has not improved over the past three decades and there is evidence that mortality and incidence are increasing [3–5]. Females have borne the greatest proportion of this increase with registrations for tongue cancer rising by 15% and all intra-oral sites by 30%. Deaths from oral cancer have risen by 25% since 1962, but by 40% in females. These increases are particularly prominent among younger age groups and appear to be related to increased smoking and alcohol consumption.

This apparent worsening position is despite the fact that early oral cancer is easy to detect and relatively simple to treat and is due almost entirely to a failure to diagnose early lesions in a significant number of patients. There are many reasons for this but they relate mainly to a lack of public awareness of the disease—patients are slow to seek treatment [6] and over 60% present with lesions over 2 cm in diameter when survival is known to be significantly reduced [7, 8]. An additional factor in the overall burden of this disease is that treatment, especially of advanced lesions, is associated with significant physical and psychological morbidity.

It is sometimes argued that oral cancer screening is not necessary because routine dental examinations should include a full oral mucosal examination. However, apart from the fact that more than 50% of the population over 45 do not attend a dentist [9] there is evidence that many cases are missed, even by dental practitioners [10–12]. This is probably because early lesions are not specifically looked for or may appear to be innocuous and are ignored. There is also a general lack of awareness of the signs of early or incipient malignant change, even among other health care workers [13]. These problems are compounded by the abolition of free dental check-ups which may reduce patient attendances, particularly among the elderly high-risk population. Against this background it would seem appropriate to consider the possibility of an organised programme for the early detection, prevention and treatment of oral cancer.

PRINCIPLES OF CANCER SCREENING

The organisation of a screening programme is based on the hypothesis that early detection of disease will allow effective

treatment to be instituted early in its course and will reduce the overall morbidity and mortality. In addition, if the cancer has a detectable precursor lesion or “detectable preclinical phase” [14] then it may also be a realistic objective to reduce the incidence of the invasive lesion. Thus screening for cervical precancer has resulted in a reduction of invasive lesions in the UK [15], Finland and Sweden [16] and breast cancer screening has resulted in reduced mortality [17].

In the evaluation of a screening programme the only true measure of success is a reduction in the number of people who die of disease among the population offered screening compared with a population who are not offered it [18]. In the case of a programme which also aims to detect pre-invasive disease, which may include screening for oral precancer, the incidence rate of invasive cancer is also a valid measure of outcome. Such measures may take years or even generations to become apparent and therefore most trials of screening programmes use surrogate measures which act as predictors of the changes in mortality expected by earlier diagnosis [19]. These include the measurement of prognostic variables in the screen detected lesions—tumour size and grade, and presence of metastases. The success of the programme can also be evaluated by the measurement of the prevalence of disease in the screened population, the proportion of disease at earlier stages and the incidence of interval cancers [18, 19].

As well as being able to measure the outcome of screening it has been suggested by the International Union Against Cancer (UICC) that a number of principles should be met before a cancer is suitable for screening (Table 1) [20, 21].

SCREENING FOR ORAL CANCER AND PRECANCER

Carcinoma of the mouth is particularly suitable for screening because it meets the criteria outlined in Table 1 and the mouth is easy to examine. Although not common, oral cancer is a serious disease and with a death rate of over 50% is more fatal than most other cancers including cervical cancer and malignant melanoma [1]. Modern treatments have not resulted in improved survival but facial surgery and radiotherapy are associated with significant physical and psychological morbidity. It could be argued that because oral cancer affects predominantly the elderly, early detection and intervention would produce little benefit for society as a whole in terms of “useful life-years” saved. However, the overall lack of improved survival and the increasing incidence among younger people indicate that detection of potentially malignant and early malignant oral lesions may now be the only way of preventing a worsening health problem. The potential advantages and disadvantages of screening for oral cancer and precancer are given in Table 2.

Although it is clear that malignant lesions must begin small and enlarge over time, very little is known of the natural history of oral cancer and we do not know how long it takes for a lesion to develop to a stage when it may be incurable. Thus smaller lesions may not necessarily be “early” in a chronological sense. However the main determinants of prognosis for

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Table 1. Principles for the introduction of a screening programme

The disease should be common or should be the cause of substantial mortality and morbidity
The natural history of the disease should be known
There should be evidence of the effectiveness of treatment for the lesions discovered as a result of screening
The screening test should be safe and acceptable to patients and have a high sensitivity and specificity

any individual case of oral cancer appear to relate to the clinical presentation of the primary tumour—in particular to the size of the lesion and to the degree of local or distant spread [7]. For example, an increase in size of a lesion from less than 2 cm to between 2 and 4 cm results in a change from stage I to stage II disease and reduces the chances of surviving 5 years by 33%.

With regard to the prognostic advantage of early detection of precancerous lesions data are not so readily available. However it seems obvious that if a patient is known to have a precancerous lesion then regular observation should result in early detection of any malignant change with the resulting improvement discussed above.

In addition it is possible to intervene and advise the patient to stop any high risk habits (smoking and drinking). Intervention studies in India in which patients were persuaded to give up tobacco-habits have shown a significant reduction in the incidence of leukoplakias [22]. It was not possible to determine the effects on the incidence of oral cancer but the authors predicted that such intervention studies have the potential to reduce the incidence and morality from oral cancer.

A test for the detection of early cancer or precancer must be easy to perform and sensitive enough not to miss any disease. In the case of oral cancer the most sensitive test is almost certainly a thorough and methodical visual examination of the surface of the oral mucosa. [23, 24]. Recently, Warnakulasuriya *et al.* [25] initiated a trial in Sri Lanka to screen for oral cancer and precancer and found that primary health care workers, using a simple examination technique, were able to detect referable lesions (oral cancer or precancer) with a sensitivity of over 90% and a positive predictive value of 58%. The criteria for a positive test were clear and unequivocal—a

Table 2. Advantages and disadvantages of screening for oral cancer and precancer

Advantages
Reduced mortality
Reduced incidence of invasive cancers
Improved prognosis for individual patients
Reduced morbidity for cases treated at earlier stages
Identification of high-risk groups and opportunities for intervention
Reassurance for those screened negative
Cost savings
Disadvantages
Detection of cases already incurable may increase morbidity for some patients
Unnecessary treatment of those potentially malignant lesions which may not have progressed
Psychological trauma for those with a false positive screen
False reassurance for those with a false negative screen
Reinforcement of bad habits among some individuals screened negative
Costs

Table 3. Lesions to be included or excluded as a positive result

Include	Exclude
Squamous cell carcinoma	Geographic tongue
Leukoplakia	Median rhomboid glossitis
Erythroplakia	Pseudomembranous candidosis
Lichen planus	Aphthous ulceration
Lupus erythematosus	Traumatic ulcers
Submucous fibrosis	Frictional keratosis
Stomatitis nicotina	
Actinic keratosis	

screen was positive if a white patch, red patch or ulcer were detected. These criteria can be modified by defining a number of clinically identifiable lesions to be included or excluded as positive lesions (Table 3). Lesions to be included are those which may be associated with early cancer or precancer [26, 27] or may indicate an increased risk of development of cancer while those to be excluded are benign innocent lesions.

MANAGEMENT AND RECRUITMENT OF PATIENTS

Protocols for the management of patients entering a screening programme would need to be carefully considered and must take into account psychological and ethical factors as well as the natural history and prognosis of the disease. Individuals must be recruited into a screening programme and once entered must be offered screens at set intervals, appropriate to the disease, for the rest of their lives. As each patient is recruited into the programme facilities must be available to record and update all relevant details so that follow-up and outcome can be carefully audited.

The main issues to be considered are which individuals to recruit and how should they be recruited? It is impractical and costly to attempt to screen the whole adult population for a disease and there is evidence that careful targetting of high-risk groups is effective, results in high recruitment rates and provides the best coverage of the population [28].

With regard to oral cancer, over 90% of cases arise in patients over 40 [27], it is more common in social class V, and most patients are smokers and drinkers. Although most patients are male, the greatest recent increase has been among females. Factors associated with lifestyle are often difficult to identify, or people are reluctant to admit, to them and therefore the simplest way to target the high-risk population may be to offer screening to all individuals over 40 years of age.

Recruitment of patients is also a problem but may be carried out opportunistically—by screening patients when they attend for some other, unrelated reason (e.g. for a routine check-up), or by population screening in which individuals are invited to attend. Population screening is the most frequently used method for other screening programmes and is used routinely by general medical practices. For oral screening, although dentists are better trained to carry out the examination, a dependence on general dental practices may not reach enough of the population.

A combination of the two methods is probably the best approach. Patients over 40 should be advised and encouraged to attend a dentist as part of their overall healthcare and should receive a mucosal screen as part of the routine dental examination. Positive patients should be referred to a specialist for further evaluation and treatment. Negative patients should be informed that they have been screened for oral

mucosal disease and that the test was negative but that they should continue to receive routine dental care. If other lesions are noted, which do not constitute a positive screen, the patient can be specifically advised to seek treatment or can be referred. Negative patients should be recalled for further screens at appropriate intervals depending on their age and habits.

ETHICAL AND PSYCHOLOGICAL CONSIDERATIONS

The potential harm of a screening programme can be reduced by careful planning and by careful consideration of the effects on individuals and the population. The psychological disadvantages of screening are included in Table 2 and include increased levels of anxiety to individual patients, trauma of a false positive result, unnecessary investigations and distress of a true positive result [29]. These can be reduced by careful and honest dissemination of information. Thus the exact reason for the test, the nature of the disease, the level of risk and the disorder being screened for must be explained to the patient. They must be told the positive benefits of the screen, the chances and significance of a positive result and the nature and availability of effective treatment. All patients (positive and negative) must be informed of their result and positive patients must be seen by a specialist within days of receiving the result. Negative patients should be told when the next screen is due and can be given advice on how to maintain their low risk state, e.g. reinforce advice on smoking and alcohol.

Thus the programme organisers have an ethical responsibility to ensure that the benefits to each patient outweigh the possible harm. In fact, ideally there should be no harm to any patient although not all patients will benefit. The absolute obligations are to inform all patients of the risks and benefits, to ensure a high quality screening test, to ensure effective treatment when necessary and to audit follow-up.

To meet these obligations it is implicit in the organisation of screening that there would also be a programme of health education and promotion both for the professionals who must carry out the procedures and to raise public understanding and awareness of the disease.

SUMMARY AND CONCLUSIONS

Many of the issues raised in this paper have yet to be resolved and it is not yet clear how oral screening would be implemented best. There seems little doubt that oral cancer is a serious disease and that it is suitable for screening. Although a simple oral examination is probably the most appropriate screening "test", the sensitivity and specificity of a standardised procedure has yet to be fully evaluated.

Dentists are the most suitable people to carry out this test but problems of patient recruitment must be overcome to ensure the adequacy and effectiveness of the programme when applied to the general population. Many of these issues, and others regarding health promotion and costs and benefits have recently been considered by the UK Working Group on Screening for Oral Cancer and Precancer [30]. Although their report is still in preparation it seems likely that screening for oral cancer is viable and cost effective if carried out in an opportunistic way within dental surgeries. It is essential in the short term that such a programme, in association with professional and public education, is properly evaluated in the form of a randomised controlled trial.

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