REVIEW ARTICLE

EARLY DIAGNOSTIC STRATEGIES FOR ORAL CANCER- A REVIEW

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ABSTRACT

Aim of this review article is to Discuss the evidence based earliest detection of cancerous lesion, and makes early diagnostic strategies

Method- we reviewed evidence from current screening technique and used advanced diagnostic aids for the early diagnosis of oral cancer.

Conclusion-Oral cancer is exponentially increasing as we know being aoral health care professional. It has to become most common causes for mortality. Delays in diagnosis is contributing to poor management of oral cancer. Early diagnosis can minimize its effect and improve of quality of individual's life. Education and awareness has a significant impact in reduction of median patient delay in oral cancer[1].

INTRODUCTION

As per National cancer registry program (2013) Oral cancer consist of 20-30% of all cancer, the prognosis of patient is good which early diagnosed .It has been found that 58% of patient with oral cancer are responsible for the delay in the diagnosis of their cancers. (morelatto.*et al*.2007). High incidence of oral cancers is in India, France, and South Africa. Age of onset 6-7th decade, sex ratio 3:1,30,000 new cases diagnosed yearly Early detection save life. When tissue changes in the mouth, cancer can often be seen and felt easily, With early detection and timely treatment, deaths from oral cancer could be dramatically reduced. Risk factors for oral cancer are Chemical irritants (mouthwashes, alcohol with high alcohol content) Physical irritants (prolonged denture irritation, chronic cheek biting habits, irregular teeth or chronic cheek biting habits) Prolonged sun exposure, Hormonal effects, Increased cellular aging, Decreased immunological surveillance with aging and Viruses(HSV-1,HSV-2.HPV) etc. Earlier diagnosis and treatment option is required and earliest detection is possible through screening program and by implementation of diagnostic Aids and Biomarkers.

Risk of developing oral cancer are predominantly in older male, alcoholic, tobacco users and individuals of lower socioeconomicle strata having poor diet. Prevalence of disease is higher in some racial group African, American and Hispanics in New York show higher prevalence of oral cancer.

Frequent sign and symptoms

Early condition- persist red and white patch non healing ulcer, progressive swelling, unusual surface changes, sudden tooth mobility without apparent, unusual oral bleeding,

Late condition-indurates area, parasthesia, airway obstruction, truisms, and cervical lymphadenopathy.

Current scenario for Diagnosis- delay in detection

In a study held in UK, 100 cancer patients examined out of which only 54% patient was referred via dentist or general medical practitioner directly to the specialist. Those patient who were directly came with indirect routes, they have increased diagnostic interval. Increased diagnostic interval to poor prognosis. There are problems with oral health care professional some are doing examination regularly there patient but not in systematic way and explain to the patient about malignant lesion because of lack of proper diagnosis. And they stuck with treating lesions via adjusting denture and adjusting teeth. And some due to poor knowledge and due to lack confidence oral health care professional are referring normal lesion with suspicious lesion to higher diagnostic centers. It's also give negative influences in the early detection and diagnosis. Lack of public awareness about symptoms signs, and risk factors of oral cancer. Absent of symptoms in early stages of cancer, and also Absence of routine examination in at least 50% of public.

Early diagnosis strategies

Early detection of oral cancer must be evidence based; we have concentrate on screening, practitioner training, and awernence.

Screening

Screening for oral cancer includes history and physical examination. The examination performed by the dentist to look for the signs of cancer or precancerous conditions in mouth. The goal of screening is early diagnosis of oral cancer, when there is a greater chance for a cure. It can be done by examination of mouth during a routine dental check up or by use of additional tests to aid in identifying areas of abnormal cells in the mouth.Screening is indicated for oral cancer in a certain population, a suitable test should be employed

Points to remember when screening for oral cancer

- Special attention should be on the lesions of lateral border of tongue and floor of mouth.
- Always note any changes in color texture of all soft tissue or any swelling, if you detect an abnormality determine the history of the lesion.
- Follow up, to ensure a definitive diagnosis of an abnormality.
- Teach your patient about signs and symptoms of oral cancer.

Criteria for the implementation of a screening program[4]

The disease must be an important health problem
An accepted treatment must be available for patients with recognized disease
There must be a recognizable latent or early symptomatic stage
A suitable test should be available
The test should be acceptable to the population
There should be an agreed policy on whom to treat as patients
The screening program should be cost-effective
The screening process should be a continuous process and not a 'once and for all 'project

Practitioner training

Oral health provider and health care provider should be trained for detect and diagnosed for cancerous lesion. And they should regularly update them with new diagnostics tools. Health care provider having target to detect some number of cases per months and refer them higher authorities.

Even follow to all private practitioner as well as government health worker; we can give some points for private health care provider for their effort which will be helpful for their registration renewal.

Some advanced Diagnostic aids which help in Early Detection

Vital staining technique

Iodine staining

Vital iodine stain (3% solution) has been used to determine the best site for biopsy. This technique works on binding of iodine to glycogen granules in the cytoplasm, resulting in a black brown tissue colour, in areas lacking glycogen, iodine isn't absorbed and such area remain colorless or turn yellow.

Toluidine blue staining

Toluidine blue is a met achromatic dye that binds to nucleic acids of cell and can help in better visualization of high risk areas-with rapid cell proliferation of oral cancer.

This will guide the clinician to

- Detect carcinoma in situ and early stage of oral cancer.
- Delineation of surgical fields for biopsy sites.
- Detection of second primary cancers or satellite tumours.
- Recognition of post-treatment recurrence(Rosenberg and Cretin 1989)

ViziLite Plus -

ViziLite Plus is lesion identification and marking system that is used as an adjunct to the conventional head and neck examination. It comprises of a chemiluminescent light source (ViziLite) to improve the identification of lesions and a blue phenothiazine dye to mark those lesions identified by ViziLite. Epithelium tissue will appear acetowhite when viewed under ViziLite's diffuse low-energy wavelength light. Normal epithelium will absorb the light and appear dark. It can assist a dentist or oral health care provider in identifying an abnormality in the oral cavity.

Methyline blue staining

Methylene blue has been used for detection of oral cancer. It is a heterotrophic aromatic chemical compound. At room temperature it is solid, odurless dark green powder which yields a blue color when dissolve in water.

Light based detection system

Reflective tissue fluorescence

In this technique the mouth is rinsed with 1% acetic acid wash, which helps to remove debris and increase the visibility of epithelial cell nuclei as a result of mild cellular dehydration.
The blue white illumination will be reflected by abnormal tissue, making occult lesion distinguishable from normal mucosa (Lingen *et al*. 2008)[4]. The normal mucosa appears blue Whereas abnormal mucosal lesions reflect the light and appear more aceto-white with brighter and more distinct margins[4].

Tissue fluorescence imaging

In this technique an intense blue light (400-460 nm) is illuminated to oral mucosa and the abnormal tissue emits fluorescence due to altered structure and metabolism of epithelium and sub epithelial stroma[4]. Normal mucosa emits pale green auto fluorescence while abnormal tissue appears darker in comparison to surrounding healthy tissue[4].

Velscope

The velscope headpiece emits a safe blue light into the oral cavity causing tissue fluorescence from the surface of epithelium through to the basal membrane. Abnormal tissue typically appears as an irregular, dark that stands out against the green fluorescence pattern of healthy tissue.

Orascoptic

This instrument work in conjunction with a mild acidic acid rinse improving the visualization of lesions. This examination enhances the ability to identify potential cancer at its earliest

stages. Early detection of precancerous tissue can minimize oral cancer and possibly save life.

Microlux diagnostic Light

Refractive light technology, aid helps save lives in the detection of pre cancerous abnormalities and makes patient care simple and inexpensive. It improves identification and monitoring of soft tissue abnormalities, during a routine examnation simply the patient rinse with Microlux Dl acetic acid 1% solution for 1 minute. Then the oral examination is repeated using Microlux DL. .Under diffused light from the special Microlux DL fiber optic light guide, acetowhite lesions become more visible eg-leukoplastic lesion. The irregular cells take on a whitish hue which contrasts with surrounding tissue, helping to identify abnormalities which require further testing.

Tissue fluorescence spectroscopy

This technique having a small optical fiber that produces various excitation wave lengths and a spectrograph which records on a computer and analyzes via software, the spectra of reflected fluorescence from the tissue[5]. This technique is very accurate in distinguishing normal mucosa from different lesions. And small size of optical fibber is not practical to scan large areas of oral mucosa[4]distinguish benign lesions from malignancy[5]

Cellular and molecular system

There are many diagnostic aids which can detect premalignant and malignant changes in Cellular and molecular level at early stages. These methods employ histochemistry and immunologic techniques in detection of early changes. Yet these techniques are used for research purposes because they are not clinically applicable. In addition these methods are expensive and are not widely accessible and only expert clinicians can use this for early diagnosis. More studies are conducted to evaluate these techniques as screening methods of oral cancer.

Brush Biopsy

When biopsy is needed, we can use this method, this will be helpful for oral health care provider for early diagnosis. CD-x brush is a kind of specialized oral brush, which can penetrate the thickness of themucosa and collect representative sample of the lesion. Sample is collected by this specially designed brush. "Brush biopsy" employs CD-x brush, which is then analyzed by computer. Some studies have used CD-x brush, but have analyzed the result by visual histopathology examination and not by computer[6]

Awareness

For patient awareness hospital should be regularly conduct awareness camp against oral cancer, and government should start some policies which help for awareness camp.

CONCLUSION

Screening programs help in early detection of oral cancer by employing biomarkers and specific diagnostic aids now days clinical application of diagnostic aids and biomarkers are rising. A recent systematic review on screening programs and preventive measures on oral cancer concludes that systematic visual oral examination by a clinician is by far the most common
Method for screening. Screening is cost-effectiveness and feasible thus increase its popularity. Visibility of the lesion may be enhanced by employing special dyes[8] there are many diagnostic aids for early detection of oral cancer. Yet the gold standard of oral cancer diagnosis is surgical biopsy, which can be performed by a trained dentist/physician. Diagnostic aids can be used in different situations when abiopsy is not indicated and can help the clinician to:

1. Choose the best site for biopsy
2. Follow up a patient with a premalignant lesion
3. Screen for oral cancer in high risk patients or high risk sites of oral cavity (e.g. ventral Tongue, floor of the mouth etc.)

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