

Diagnostic Aids for Oral Cancer: An Insight

Maithilee Jani¹, Komal Kamath², Palak Patel³, Peshal Patel⁴, Kritika Bajpai⁵, Saloni Shah⁶

1- B.D.S, Ahmedabad Dental College & Hospital. 2- B.D.S, VK Institute Of Dental Sciences.. 3- B.D.S, KLE Vishwanath Katti Institute Of Dental Sciences. 4- B.D.S, Pacific Dental College & Hospital. 5- B.D.S, School Of Dental Sciences, Sharda University. 6- B.D.S, Mahatma Gandhi Vidyamandir Dental College.

Correspondence to:
Dr. Maithilee Jani, B.D.S, Ahmedabad Dental College & Hospital.
Contact Us: www.ijohmr.com

ABSTRACT

Currently, one cannot pretermite the fact that carcinoma in the oral cavity is an extremely common form as a part of the group of head and neck cancers in the world. However, it remains to be dilapidated by a majority of the population in the world when compared to carcinomas in other portions of the human body. It is imperative to understand that oral carcinoma is extremely lethal and fatal if not diagnosed and treated at a primitive stage of the disease. The core objective of the article is to provide a brief understanding on variegated diagnostic aids available for the purpose of diagnosis in cases of oral carcinoma.

KEYWORDS: Oral Cancer; Diagnostic Aids; Lugol Staining; Toludine Blue; Dna- Ploidy

INTRODUCTION

Oral Carcinoma can be described as any form of cancerous lesion development observed in the mouth.¹ It is an extremely lethal disease and falls under the category of head and neck carcinomas. Within a certain frame of time, the cases of oral carcinomas have taken a toll especially in developing countries like India. According to the current statistics, it has been eminent that oral carcinoma stands at number 11 amongst all the carcinomas in terms of a number of cases.² India, as a developing nation, accounts for about 35% of the total cases of the oral carcinoma which is expected to have a significant splurge due to the use of tobacco products and lack of oral hygiene measures. Oral cancer entails to different locations in the oral cavity with tongue and the floor of the oral cavity as most typical sites. In India, statistics have recently suggested that the cardinal reason for mortality in both the sex groups is oral cancer especially due to abuse of tobacco.³ Tobacco has proved to be a major risk factor for oral carcinoma claiming death toll close to 9 million people in a single calendar year.⁴

Considering the severity of the condition, it is critical for oral health care professional especially dental practitioners to be efficient to diagnose the disease at an early stage with the aid of diagnostic instruments and techniques. Usually, oral cancer is not diagnosed until after a later stage due to the negligence of the patient and lapse of appropriate diagnosis by the dental practitioner.⁵ In such a state, it is obligatory that advanced diagnostic aids are made available to the dental professionals to diagnose the pathology at an extremely primary stage. Various risk factors associated with oral carcinomas have been tabulated in Table 1.

Considering the elevated mortality rate associated with oral cancer, it has been adjudged that early diagnosis could provide a chance to appropriate management of the

RISK FACTORS
<ul style="list-style-type: none"> ● Betel quid & tobacco ● Alcohol ● Smokeless Tobacco & Smoke form of Tobacco ● H.P.V virus ● X-ray and Gamma-radiation

Table 1- Risk Factors/ Etiological Factors For Oral Cancer⁶

pathology and thus ameliorate the prognosis of the disease which is peculiarly based on patient co-operation and early suspicion by health care professional based on clinical findings. Currently, the histo-pathological study of the lesion of oral cancer is considered to be the golden caliber for confirmation of oral carcinoma. The prime shortcoming in conjunction with the use of the slide technique is the colossal amount of juncture it takes for confirmation of the disease. Moreover, the elucidation of the slide may vary from one oral pathologist to another leading to an inaccurate diagnosis, especially of the stage of the disease. Some of the recent Diagnostic Aids for detection of oral cancer are as follows (Table 2):

ADVANCED DIAGNOSTIC AIDS
<ul style="list-style-type: none"> ● M-TAS System & Technology ● DNA-ploidy ● Lugol's Iodine Staining ● Tomography ● VELscope System

Table 2- Advanced Diagnostic Aids For Oral Cancer

RECENT DIAGNOSTIC AIDS

1) M-TAS System & Technology: M- TAS system abbreviated as Micro-Total-Analysis-System, also referred to as the Lab-on-Chip has been developed as an analogous system to a silicon chip. They focus on the

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biological cells especially ones present in the saliva, with the help of the concept of fluorescence.⁷ One of the major advantages of the technique is that it can be manipulated and managed by the nominally up skilled workforce as well. The silicon chip is furnished to recognize cancer as well as the pre-cancer cells by the means of the proteins kindred to the membranes.

2) DNA-ploidy: DNA ploidy technique is mainly based on computer perusal which is specifically delineated to spot out the malignant changes in the cell. One of the major factors associated with carcinogenesis is the changes in the genetic structure of cells.⁸ With the aid of DNA ploidy technique, the cells suspected to have been undergoing malignancy are stained with the help of Feulgen Dye. The standard cells are compared using the computer technology to the probable malignant or pre-malignant cells which would clearly contrast out the cancer cells.

3) Lugol's Iodine Staining: The use of Iodine Staining as an important diagnostic aid for detection of cervical cancer started in the year of 1932.⁹ Over a period of time, its use has been extended to conclude the stretch of the lesion around the cancerous growth. The principle of staining is based on the shade of the color determined by the quantity of the DNA material. The glycogen present in the cancerous cells is amalgamated with the Iodine stain, resulting into a dark brown stain.

4) Tomography: For the early and effective detection of cancerous cells and dysplastic changes, optical coherence tomography was employed as early as the 1990s. With a contrasting imaging system, backed by the use of particles as small as few nanometers, it is less arduous to detect the changes in the structure of the involved tissue. In a carcinogenic tissue, the light is scattered leading to a slightly disrupted dimension-nal dispersal.¹⁰

5) VELscope System: The VELscope System is based on the contrast of the light source interaction with the normal and carcinogenic tissues. There is an acute auto-fluorescence seen in the normal tissues which seem to fade away in the dysplastic tissues. This fading away is

based on the significant decline of the adenine as well disruption of the collagen matrix.

CONCLUSION

Currently, there is no single diagnostic aid that can prove to a front for early detection of oral cancer. Clinical evaluation backed by biopsy and successful examination is still the only confirmatory test available. A strive into the horizon of the development of different technologies is imperative to detect the dysplastic changes at an early stage and significantly decline the mortality and morbidity associated with the pathology.

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