Recent Techniques for Diagnosis of Oral Squamous Cell Carcinoma

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Abstract

Background: Oral squamous cell carcinoma comprises 90% of oral malignancies. The 5-suvival rate for OSCC is still very low despite recent advance which paves way for further researches to find efficient diagnostic tools.

Objective: To review literature for recent techniques for diagnosis of oral squamous cell carcinoma

Methodology: A web based research was conducted using Pub Med. The inclusion criteria were publications published in English with in recent years. Key words like “Oral squamous cell carcinoma”, “Oral cavity” “Diagnostic techniques” were used to search for articles. Studies in other languages and case reports were excluded.

Conclusion: Histopathological examination on biopsy tissue remains the gold standard for diagnosis. However, other methods of diagnosis are technique sensitive and further exhaustive research is required.

Keywords: Oral squamous cell carcinoma; Oral cavity; Diagnostic techniques

Introduction

Oral squamous cell carcinoma comprises 90% of all oral malignancies [1-3]. The incidence of Oral squamous cell carcinoma is expected to rise in coming decades as feared by the World Health Organization [4]. Despite aggressive treatment modalities OSCC still remain a disease with high mortality rate and lowest 5- year survival rate therefore this directs us towards search for efficient, effective and more sophisticated diagnostic tools to promptly address this fatal disease which may help the patient to suffer less trauma through surgeries, save time and money, increase survival rate with better quality of life [5].

The risk factors most frequently found associated with OSCC are alcohol and tobacco smoking [1,6,7]. Other risk factors as sunlight exposure, low socio-economic status, HPV infection, diet are well known risk factors as well [7].

Method

A web based search was conducted for research articles published in Pub Med/Medline, articles other than English language and case reports were excluded, however; review articles and original articles published in recent years were included in this study. Search was made using key words like, “Oral squamous cell carcinoma”, “Oral cavity”, “Diagnostic techniques”.

Review of the Literature

History of the patient and Clinical Examination

Many studies reported no association between influence of gender and treatment outcomes. Therefore nor age neither gender has strong impact on prognosis [5].

Several studies found significant association between low socio economic status and lack with awareness with limited access to health care services and poor oral hygiene [8].

A vast majority of authors recognized tobacco and alcohol as potential risk factors for OSCC and report increased mortality rate in tobacco users and alcohol drinkers [6].

Thorough clinical examination and palpation of lymph nodes help decide the customized diagnostic tool for each patient [9,10].

**Vital Staining**

Toluidine Blue is frequently used for vital tissue staining for OSCC. It is an inexpensive and rapid diagnostic tool. Epstein., et al. [11] showed Toluidine blue to have specificity and sensitivity of 63.2% and 92.5%. Methylene Blue is less toxic and cheaper than toluidine blue. Rose Bengal is by far reported as valuable diagnostic stain [12]. However, extensive studies to establish the fact are needed.

**Histopathology**

Gold standard for detection of OSCC remains histology as reported by Lane., et al with specificity and sensitivity of 100% & 98% respectively [13]. Either incisional or excisional biopsy is carried out the biopsy specimen is categorized on basis of severity of dysplasia into mild, moderate and severe according as described by the World Health Organization.

However, on excisional biopsy it is imperative to be sure that depth and margins are composed of normal (disease free) tissue [14].

**Photo Spectrometry:** On basis of principle of light reflectance and absorbance by abnormal tissues the light based devices work [15]. However, further investigations on large scale are needed.

**Cytology**

Oral Cytological studies mainly comprise use of methods such as, Fine Needle Aspiration Cytology, Exfoliative cytology and Liquid-based cytology. For High-risk groups for malignancy, cytology has proven to be efficient diagnostic tool with advantages of being inexpensive, fast, comparatively less traumatic, painless and easy in handling [16].

However, use of cytological studies for low risk groups still need further research to establish it as an efficient diagnostic method, Patton., et al [16].

**Molecular Analyses**

Cytogenetic analysis shows mutations in chromosome 9, 17, 3P, 13q21 & 18q21 [17]. Other frequently studied and mutated genes are p53, p14ARF, p73, MYC, SMAD3, TGFB2 & Cyclin D1 [17].

AgNOR analysis for number of keratinized cells and nucleolar activity on oral cytology must be included in routine to diagnose OSCC as reported by Remmerbach., et al. [18].

Tumor markers such as MCM (Mini chromosome maintenance), survivin, BURB1, Heat Shock Proteins, CD44 are promising diagnostic tools in near future [2,17]. However, Ki-67 and p53 are found to be most commonly applied bio makers in detection and prognosis of OSCC [19-25].

**Conclusion**

Histopathological technique is so far taken as gold standard, since other techniques still require extensive researches to be recognized as reliable and effective diagnostic modalities which can help reduce the trauma, prove to be cost effective and help decide the customized treatment planning for each patient. The current status in Pakistan regarding diagnosis of OSCC is still unsatisfactory. Further researches are immensely required to better help patient at early stages of disease so that survival rate of patient may increase.

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Bibliography


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