

Role of Ultrasonography in Oral Submucous Fibrosis: A Short Review

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ABSTRACT

Sonography was introduced in the medical field in early 1950's but it took few years for it to get entry in to dentistry. Recently some studies have shown that ultrasonography can be used as non-invasive imaging modality to assess the extent and severity of the fibrosis and vascularity across the mucous membrane. This review emphasizes the role of ultrasonography in diagnosing and predicting the prognosis of Oral Submucous fibrosis. ultrasonography

Keywords: Oral Submucous Fibrosis, Ultrasonography, Investigation

Introduction

Oral Submucous fibrosis (OSMF) is premalignant condition of oral mucosa which causes blanching, burning sensation, vesicles, ulcerations, excessive salivation, stiffness of mucosa and reduced mouth opening. Early detection and treatment of OSMF is always a prime concern for dentists, who are the first person to detect this disease. Histopathological examination of the affected mucosa is the standard investigation for detecting such condition. But biopsy is not always possible in all patients since biopsy itself can induce scarring and fibrosis.³ There are different treatment options for OSMF and the selection of each one largely depends on the severity of the condition and prognosis. Lot of scientific research is going on in this field to discern new comprehensive investigative methods to rule out this premalignant condition at an earlier stage with accuracy.

Ultrasonography

Recently Ultrasonography (USG) was introduced as an adjunctive investigative and prognostic tool to diagnose OSMF. USG is a non-invasive technique which utilizes acoustic energy in the form of waves having frequency above the human hearing range. It appraises the extents of lesion as well as its relationship to the neighboring tissues.

Ultrasonography and fibrosis

The most important parameters describing the interactions between ultrasound and tissue through which it is transmitted are attenuation, velocity and impedance.⁴ The attenuation and velocity are directly proportional to the amount of collagen present in the tissue and inversely proportional to the water content and this property is

usually expressed as echogenicity which is the ability to bounce an echo.^{5,6} Tissues that have higher echogenicity are called "hyperechogenic" and are typically represented with lighter colours on images. In contrast, tissues with lower echogenicity are called "hypoechoic" and are usually represented with darker colors. Collagen has greater modulus of elasticity as compared to other tissue which results in higher velocity and impedance and ultimately leads to more echogenicity.⁷ So in OSMF, fibrosis is delineated as hyperechoic areas.

Research

Manjunath K et al (2011) evaluated OSMF by clinical and histopathological examination, and compared the results with those from ultrasonographic technique. They also measured the prognosis of the lesion by checking the Peak Systolic Volume of blood in the lesion area using color Doppler.¹

Krithika C et al (2013) assessed the sonographic features of the buccal mucosa in patients with OSMF. They concluded that this technique can be used as a non-invasive imaging modality to assess the disease extent and severity across the entire buccal mucosa to supplement clinical evaluation since higher echogenicity was noted in cases compared to controls.²

P Rangaiah (2010) showed a significant increase in submucosal thickness in OSMF patients which was successfully measured ultrasonographically in a hospital based cross sectional study.⁸

Devathambi JR (2013) could demonstrate increase in submucosal thickness of the buccal mucosa as well as masseter muscle thickness by using USG in advanced stages of OSMF.⁹

Kamala KA et al (2010) investigated thickness of masseter muscle by ultrasonography in OSMF patients with muscle hypertrophy. The study also estimated the normal thickness of masseter muscle and proved that USG is a reliable diagnostic technique for evaluation of muscle hypertrophy in OSMF patients.¹⁰

Though USG has several advantages, the procedure is very much operative sensitive and fails to detect mild fibrosis. Further research and explorations are required in this field to overcome these limitations.

Conclusion

From the previously conducted studies it is clear that USG has been used to detect and measure fibrosis, vascularity, thickness of submucosa and muscle layer. All these parameters can be correlated to the stage of the OSMF. So definitely this investigation method can be used as a diagnostic and prognostic tool in evaluating OSMF.

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