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Oral erythroplakia – A case report

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Abstract
Erythroplakia is relatively uncommon lesion in the oral cavity has been known to have precancerous potential, often showing the features of epithelial dysplasia. Erythroplakia is predominantly a disease of the middle aged to older adults, with no significant gender predilection. A significant number of cases with erythroplakia progress to carcinoma. We report a case of a 65 year old male patient presenting with erythroplakia on the palate. Toluidine blue, a metachromatic dye was used for the purpose of vital staining of the lesion to elucidate dysplastic changes clinically. Incisional biopsy further confirmed the diagnosis.

Keywords: Erythroplakia, premalignant lesion, toluidine blue, dysplasia

1. Introduction
Head and neck cancers are a heterogeneous group of cancers that arise from the mucosa of the larynx, pharynx, oral cavity, nasal cavity and paranasal sinuses. The majority of these epithelial malignancies are squamous cell carcinoma of the head and neck (HNSCC), and the histologic grade can vary from well-differentiated keratinizing to undifferentiated non-keratinizing. It is generally accepted that oral cancer may arise from potentially malignant disorders. Oral erythroplakia has been identified as the one with the highest malignant transformation rates [1, 2].

Frequently, patients with early-stage cancer present only with vague symptoms and minimal physical findings; early identification of signs and symptoms of both oral potentially premalignant disorders, as well as oral cancer, may decrease the trouble associated with this disease. Oral potentially malignant lesion is an area of genetically and/or morphologically altered tissue that is more likely to develop cancer than a normal tissue [3]. Even if erythroplakia is an infrequent the risk of malignant transformation is the highest among all other oral potentially malignant disorders. Therefore, it is important for general dental practitioners to identify the correlation between oral cancer and erythroplakia and considerate possible implications.

The term 'erythroplasia' was originally used to describe a precancerous red colour that developed on the penis [4]. According to the original definition stated by WHO in the year 1978, oral erythroplakia is defined as 'any lesion of the oral mucosa that presents as bright red velvety plaques which cannot be characterized clinically or pathologically as any other recognizable condition [5]. Reported prevalence varies between 0.02% and 0.2% (adapted from Reichart *et al*.) [6]. Clinically, it can be flat or depressed and is sometimes found together with leukoplakia (erythroleukoplakia); it predominately occurs in the floor of the mouth, the soft palate, the ventral tongue and the tonsillar fauces. It is usually asymptomatic. However, some patients may complain of a burning sensation and/or soreness. Erythroplakia shows dysplastic features and often presents as 'carcinoma in situ' or 'invasive carcinoma' at the time of biopsy. Heavy alcohol consumption and tobacco use are known to be important aetiological factors. Surgical excision is the treatment of choice though more studies are needed. The differential diagnosis includes: erythematous candidiasis, early SCC, local irritation, mucositis, lichen planus, lupus erythematosus [7, 8].

The epithelium is often atrophic and shows lack of keratin. Sometimes hyperplasia is seen. The red color is due to the epithelial thinness that allows the underlying microvasculature to show through [9].

1.1 Case Report

A 65 years old male patient presented to the department of Oral Medicine & Radiology at SMBT Dental College and Hospital, with the chief complaint of loose tooth in upper right back region of the jaw since 2 months (Fig.1.1). Patient was apparently alright 2 months back when he experienced loose tooth in the right upper back region of the jaw due to which he experienced difficulty in chewing food.

Patient's medical, dental and family history were noncontributory. He had the habit of tobacco chewing 4-5 times a day since 35- 38 years and bidi smoking 2-3 bidis per day since 15 - 20 years. He was not conscious about the red lesion on his palate because it was asymptomatic the lesion was discovered as an incidental findings during clinical examination.

On clinical examination, a diffuse erythematous patch was seen on the hard palate (Fig.1.2) extending in to the anterior part of soft palate (Fig.1.3). Diffuse vertical grooves approximately 2mm in depth were seen on the hard palate. Food lodgments was seen in the grooves on the palate. The palate was soft and tender on palpation bleeding on probing was seen from the grooves diffuse depapillated areas were present on dorsum of tongue along with whitish coating (Fig.1.4)... The white coating on the tongue was scrapable. The saliva was found to be thick and ropy in consistency

Fig 1.1: Extra oral profile of the patient

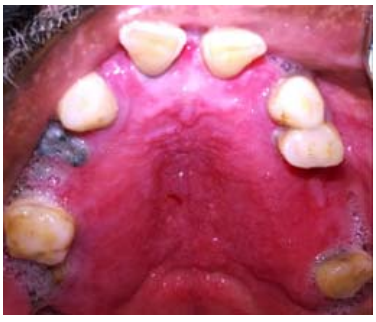

Fig 1.2: Diffuse erythematous patch seen on hard palate

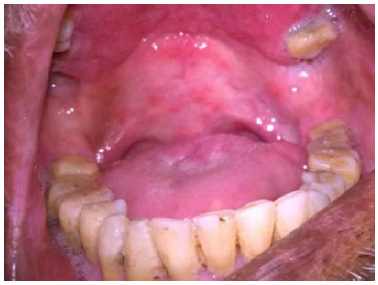

Fig 1.3: Diffuse erythematous area seen on soft palate

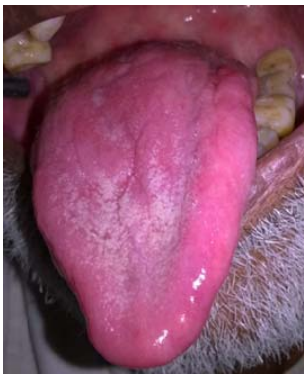

Fig 1.4: Diffuse depapillated areas were present on dorsum of tongue.

A clinical provisional diagnosis of oral erythroplakia was made and a differential diagnosis of atrophic candidiasis, smoker's palate, erosive lichen planus and allergic stomatitis was formulated. To establish a definitive diagnosis, toluidine blue staining was carried out as an adjunct, prior to incisional biopsy. Toluidine blue test is an *in vivo* demonstration of oral cavity cancers based upon the observation that the topical application of toluidine blue, an acidophilic metachromatic nuclear stain, will stain a dysplastic area due to its affinity for mitotic cells whereas normal mucosa will not retain the stain. The staining procedure was carried out with the following technique [10]:

Step 1: Rinsing: - initially the patient was asked to rinse the mouth twice with water (20 sec each). After rinsing the patient was asked to rinse with 1% acetic acid.

Step 2: Drying of area: - mucosal areas were dried with gauze gently. Care was taken to not abrade the tissue while drying.

Step 3: Application of toluidine blue solution: - 1% toluidine blue solution was applied to the lesion with cotton swab. The swab was kept over the lesion for 15- 20 seconds.

Step 4: Rinsing: - The patient was asked to rinse again with acetic acid. After rinsing with acetic acid, the patient gargled with water.

Step 5: Positive staining: The palate stained positive suggestive of dysplastic changes (Fig.1.5). The dorsum of tongue gave a false positive test as the stain was mechanically retained (Fig.1.6).

Incisional biopsy was performed while extracting 16 since it was the root piece with 16 which was the patient's chief complaint. Routine blood investigations carried out were within the normal range. Patient's consent was taken prior to the surgical procedure. The tissue was fixed in 10% formalin and sent to the department of oral pathology for clinico histopathological co- relation.

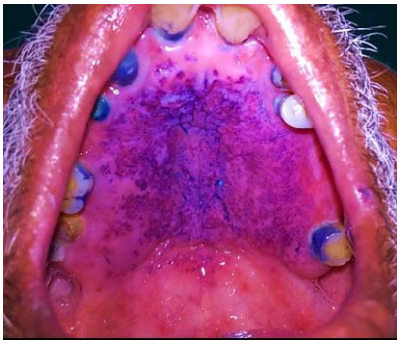

Fig 1.5: Positive toluidine blue stain on palate

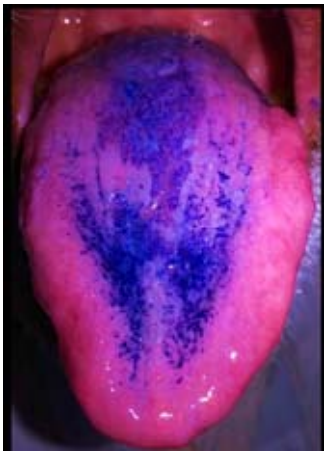

Fig 1.6: False positive staining on the dorsum of the tongue due mechanical retention.

The histopathological report confirmed our diagnosis of erythroplakia. Histopathologically, the surface of keratinization layer was seen to be thin (Fig.1.7) and epithelial atrophy (Fig.1.8) with mild dysplasia was seen.

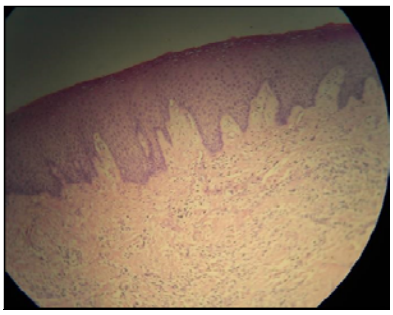

Fig 1.7: Surface Keratinization layer appears thin

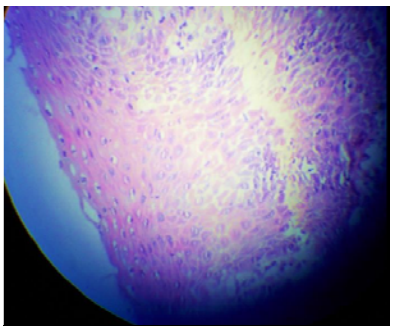

Fig 1.8: Epithelial atrophy is seen with mild dysplasia

2. Discussion

In 1911, Queyrat described a sharply defined, bright red, glistening velvety precancerous lesion of the glans penis, which he termed "erythroplasia [11] Although red lesions of the oral mucosa have been noted for many years, the use of the term "erythroplakia" in this context has been common for only about 25 years.

Erythroplakia is an uncommon and subtly innocuous change of the oral mucosa, but it has very specific and identifiable clinical characteristics, therapies, and prognostic features. It may appear as smooth, velvety, granular or nodular lesion, often with well-defined margins adjacent to normal looking mucosa. The red lesions may sometimes be associated with white spots or small plaques (erythroleukoplakia). The lesion is seldom multi-centric, and rarely covers extensive areas of the mouth. It is soft on palpation and does not become indurated until an invasive carcinoma develops in it. It is often asymptomatic, although some patients may complain of a sore, burning or metallic sensation in the oral cavity.

Because localized areas of redness are not uncommon in the oral cavity, areas of erythroplakia are likely to be disregarded by the examiner, or often falsely determined to be transient inflammatory responses to local irritation. Much has been written about the malignant potential of oral leukoplakia, but too often the dental profession has ignored the more dangerous discoloration, erythroplakia, which carries a much greater malignant risk than the white lesions. Reports entirely devoted to oral erythroplakia are very few, and only two reviews, none of which are of recent date, have been published.

The natural history of oral cancer is such that it is usually preceded by a precancerous stage, in the form of potentially malignant disorders. These disorders cannot be differentiated from early oral cancers by visual examination alone, regardless of the expertise of the clinician. Also, clinical examination alone cannot distinguish between dysplastic and non-dysplastic lesions [12]. The gold standard for diagnosis of dysplasia is histopathological examination [13] But scalpel biopsy is an invasive procedure, with the disadvantage of tumor seeding. It is usually done when the lesion displays either symptoms or clinical features of malignancy, while many innocuous appearing early stage oral cancers are merely observed clinically and left undiagnosed. Thus various adjunctive and non-invasive tools have been developed both at the clinical as well as molecular level to assess the oral lesions of uncertain biologic significance. One such technique is vital staining, including toluidine blue. Vital staining is the process of dyeing living cells or tissues. The staining reveals the otherwise un-apparent cytological details.

Toluidine blue was first used by Richart in 1963 to stain uterine cervical carcinoma in situ [14]. It was developed as tolonium chloride by Abbott laboratories, and has been used as a dye for wool and silk, in medicine, as an anti-heparin compound, and as a histological stain [15] Its application for the detection of oral premalignant and malignant lesions was first reported by Neibel and Chomet in 1964 [16].

Toluidine blue is a basic metachromatic dye that stains the acidic cellular components. Since cancer cells contain quantitatively more DNA and RNA than normal epithelial cells, toluidine blue has greater affinity for these cells. Additionally, malignant epithelium contains wider intracellular canals, which facilitate the greater penetration of the dye. Thus toluidine blue is able to delineate areas of malignancy. It is a simple, fast, and inexpensive technique. Although it has been shown to have a high false positive rate due to mechanical retention in areas of inflammation, ulceration and fissures, this can be reduced and re-confirmed by re-staining after two weeks [17, 18].

In this case, we used the toluidine blue vital staining as an adjunct prior to incisional biopsy, to establish a definitive diagnosis. The palate stained positive, suggestive of positive dysplastic changes. The dorsum of tongue gave a false-positive result, as the stain was mechanically retained. The diagnosis of erythroplakia was confirmed by histopathological examination.

3. Conclusion

Erythroplakia has been considered as one among the most severe of all oral premalignant lesions. The incidence of severe dysplasia or carcinoma in these

lesions is very high (80 – 90%). Histopathologically, it has been documented that in the erythroplakia of the homogenous type, 51% transform into invasive carcinoma, 40% carcinoma in situ and 9% mild or moderate dysplasia.

The etiology of oral erythroplakia reveals a strong association with tobacco consumption and the use of alcohol. In a country like India, betel-nut, paan and tobacco-chewing is highly prevalent, along with smoking. A recent case control study of oral erythroplakia from India reported a prevalence of 0.2%. Therefore a search for erythroplakia should be a part of every oral soft tissue examination in persons aged 35 years and older. Persons with erythroplakia should be advised to stop tobacco / alcohol habits and should be encouraged to take a diet rich in vegetables and fruits (anti-oxidants). Biopsy is mandatory. Care must be taken to obtain a representative biopsy specimen in such cases, with sampling of multiple areas within the lesion, as carcinoma may be present only focally.

In view of the high malignant potential of these lesions, the recommended

treatment is surgical excision, including laser. Data on laser excision, however, is only limited. Even after surgical excision, the recurrence and development of malignancy at the same site is very high. Reliable data, however, on this aspect is also insufficient. Even then, long-term follow-up is warranted after surgical removal.

A more extensive research and reliable studies are strongly called for to evaluate a number of hitherto unanswered questions. More data on incidence and prevalence, biological behavior and adequate treatment are urgently needed. A clear understanding of this lesion may save lives by identifying oral cancers prior to invasion or at an early stage, thereby avoiding extensive surgery and spread of the disease to other parts of the body.

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