Clinical and Histopathological Evaluation of Healing After Excision of Leukoplakia with Diode Laser

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ABSTRACT

**Aim:** Oral Leukoplakia is considered commonest precancerous white lesion affecting oral mucosa. There are several medicinal and surgical options available to treat the lesion. Scalpel removal of the lesion leads to scar formation and pain along with bleeding at the time of surgery. Removal with Laser is another option for managing leukoplakia. There are very few studies present with removal of leukoplakia using Diode Laser. This study was undertaken to clinically and histopathologically evaluate the efficacy of Diode Laser in leukoplakia.

**Materials and Method:** Six patients, 5 male (84%) and 1 female (16%) with leukoplakia were treated with Diode laser (980nm) at 3 - 4 watts. Patients on steroid therapy or immune-suppressants and suffering from any other chronic debilitating diseases were excluded from the study. Wilcoxon Signed Ranks Test was applied for assessing the p-Value for statistical analysis.

**Result:** After one month, the patients were examined for normal clinical healing of the site. For more confirmation, re-biopsy was done and result showed normal tissue healing except in one patient (16%). Only one patient (16%) developed pain, swelling, fibrosis and recurrence.

**Conclusion:** It was concluded that laser provides good coagulation, healing, reduces surgical time and prevents high-grade infection.

**Keywords:** Diode Laser, Wound healing, Leukoplakia, Histology.

INTRODUCTION

According to the definition of the World Health Organization, “oral leukoplakia is a white patch of the oral mucosa that cannot be scraped off and that cannot be characterized clinically or pathologically as any other disease”\(^1,2\). Oral leukoplakia is considered as a common precancerous lesion of the oral mucosa. It is most commonly seen in patients having habit of tobacco, betel nuts and alcohol. It may also arise due to infection with Candida albicans, or human papilloma virus and due to vitamin A, B12, folic acid deficiency\(^3\).

Definitive treatment of oral leukoplakia is very important because of its chances of recurrence and malignant transformation depending on the location, clinical features, degree of dysplasia and etiological factors\(^2\). Diode Lasers are used for soft tissue procedures and wavelength is well absorbed by pigmented structures, providing good hemostasis and effective cutting of tissue. Cutting is clean, having good coagulation with minor charring. Depth of penetration ranges from 2 to 3 mm into
tissues, at 980 nm wavelength, which means that the absorption of laser energy is more than the thermal effect.

Very few studies are found in literature for excision of Leukoplaikia with diode laser. Need of this study is to evaluate efficacy of laser on leukoplaikia and soft tissue healing.

MATERIALS AND METHOD

In this study, total six patients and seven sites were included (Table 1). Patients on steroid therapy or immune-suppressants and suffering from any other chronic debilitating diseases were not included in this study. After obtaining consent from the patient, treatment was done under local anaesthesia.

Procedure was performed under aseptic conditions. Proper protection was taken by wearing eyeglasses. The site was anaesthetized under field block or infiltration. The diode laser (980nm) was calibrated and measured to the desired power. After achieving proper anaesthesia the site of lesion was marked with laser. Complete lesion was irradiated with laser at 3-4 watts.

Proper medication was given to the patient postoperatively (Cap Amoxicillin 500 mg thrice a day and Tab Diclofenac sodium - SOS) for five days. Betadine mouthwash was prescribed for better oral hygiene. All the patients were advised to do mouth exercise to avoid formation of unnecessary fibrous tissue during healing from 2nd day to 15th day of surgery. Patient’s tissue samples were sent to laboratory for histopathological examination. Patients were recalled after 1 month for evaluation of the site and punch biopsy was taken for histopathology.

All the data were collected on excel sheet, Mean and p values were calculated as per Wilcoxon Signed Ranks Test P Value.

RESULT

Total six patients, five males and one female, were included with total seven sites. Most affected site was buccal mucosa (43%) (Figure 1) followed by alveolar ridge (29%), buccal and labial vestibule (14%), (Table 1) presenting with leukoplaikia which were treated by excision of lesion using Diode laser (980 nm) at 3 or 4 watt. Patients were evaluated at regular intervals for pain, swelling, healing of site, histological evaluation of excision tissue and complications.

Post-operative pain was recorded based on Visual Analogue Scale for the patients. Out of all the patients, only one (p<0.317) patient noted moderate pain after excision and others had minimal pain or no pain (Table 2).

Out of all the patients, only one (p<0.317) patient developed small swelling over left buccal vestibule region (1.2 cm) (Table 3).

After removal of lesion, the tissues were histopathologically evaluated under a microscope (20X Magnification) and suggested as Leukoplaikia (Table 4, Figure 2). All the patients were recalled for follow up after 1 month (Figure 3) and re-biopsy was done using punch biopsy method and sent for histopathological re-evaluation of the site. (Figure 4). Normal tissue healing was seen in all the patients except in one (16%) (p<0.025) patient who had recurrent leukoplaikia after excision and some fibrous tissue was noted in the histological evaluation after 1 month (Table 5). The patient had not quit the habit, had developed fibrosis of lower labial vestibule fibrosis and was treated later with labial vestibuloplasty.

DISCUSSION

Oral Leukoplaikia has been redefined as “a predominantly white lesion of oral mucosa that cannot be characterized as any other definable lesions; some oral leukoplaikia will transform into cancer” (Axell T, 1996)⁴.

Oral leukoplaikia is considered as a common precancerous lesion of the oral mucosa. Most common influential factors causing leukoplaikia are smoking and consumption of alcohol⁵. In North America and Europe tobacco smoking causes leukoplaikia while in Asia tobacco chewing plays an important role in causing leukoplaikia. In Gujarat, the incidence rate of leukoplaikia is 11.7% and more because of Gutka chewing.

The malignant transformation of leukoplaikia depends on Time (Longer presence of leukoplaikia), Location (Lower buccal cavity, tongue), Type (Non-homogeneous leukoplaikia), the
presence of C. albicans (particularly on the ridge of the tongue) and the presence of dysplastic alteration\textsuperscript{5}. The risk of malignant transformation is 2 to 3 times higher in leukoplakia with moderate to severe dysplastic alterations when compared to leukoplakia with mild dysplastic alterations\textsuperscript{6}. It is 7 times more in non-homogeneous leukoplakia when compared to homogeneous leukoplakia and is markedly higher in older population.

Fig 1: Clinically evaluated lesion as leukoplakia.

Fig 2: Histological evaluated lesion and conformed as leukoplakia.

Fig 3: Post-operative healing of lesion after 1 month.

Fig 4: Normal healing of mucosa conformed histopathological.

Dietary sources like vitamin C, E, A and carotenoid significantly reduces the risk of oral premalignant lesion. High dose of vitamin C reduces the growing risk of premalignant lesion. High dose of vitamin A and E are associated with growing risk of premalignant lesion development\textsuperscript{6}.

Various non-surgical and surgical treatments have been reported for leukoplakia. Operation can include conventional surgery\textsuperscript{7}, electro cauterisation, CO\textsubscript{2} laser ablation, or cryosurgery\textsuperscript{8,9}. Randomised controlled trials for non-surgical treatment have not shown evidence that they effectively prevent malignant transformation and recurrence\textsuperscript{6}.

Surgical removal of leukoplakia with the help of scalpel will damage more surrounding tissues and chances for post-operative scar, pain and swelling are more. The benefits of laser therapy include the haemostatic effect, short duration of therapeutic intervention and minimum traumatization of adjacent tissues\textsuperscript{10}. Postoperative pain and swelling are minimal and rapid tissue healing with minimal scar on the abladed site was found with diode laser treatment as compared to cold knife. Therefore, there are so many advantages of laser treatment then scalpel in the treatment of leukoplakia.
There are various surgical as well as nonsurgical treatment options for leukoplakia. Amongst all diode laser provides most acceptable benefits for the patient and the operator. It provides blood free operating site, which helps in increasing accessibility and sterility for operator at the time of treatment, improves healing and reduces chances of infections postoperatively. Laser helps in both reduction of postoperative pain and swelling, and provides quicker healing as compared to surgical removal with knife or use of corticosteroids.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

REFERENCES


