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Diode Laser Therapy for Drug Induced Gingival Enlaregement: A Case Report

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***Abstract*:-**

- ***Background:***

Calcium channel blockers (CCBs) are frequently prescribed for treating cardiovascular conditions. Amlodipine, a third-generation CCB, is known to cause gingival enlargement in some patients. This case report discusses the diagnosis and management of gingival enlargement induced by amlodipine in a patient with hypertension.

- ***Methods:***

Phase-1 non-surgical periodontal therapy combined with diode laser gingivectomy and gingivoplasty was performed for conservative management of the enlargement.

- ***Results:***

Favorable clinical outcome was observed with excellent gingival healing and more aesthetic gingival morphology.

- ***Conclusion:***

Treatment of drug induced gingival enlargement with diode laser proved to be moreeffective and resulted in faster healing and mild discomfort.

I. INTRODUCTION

Certain drugs can cause an adverse reaction in gingival tissue, leading to excessive growth of the gums, a condition known as drug-induced gingival overgrowth (DIGO) or drug-induced gingival enlargement. Medications associated with this condition fall into three primary categories: antiepileptic drugs (such as Phenytoin), immunosuppressive agents (such as Cyclosporin), and calcium channel blockers (such as Nifedipine and Amlodipine). The extent of gingival enlargement can be influenced by the level of gingival inflammation and the patient's oral hygiene status.

This overgrowth can negatively impact oral aesthetics, hinder proper oral hygiene, and lead to difficulties in swallowing and speech. Management of DIGO typically involves replacing the causative drug, conducting phase-I non-surgical periodontal treatment, and, if necessary, performing surgical periodontal therapy. In recent years, laser therapy has emerged as a superior alternative to conventional surgical methods, offering benefits such as reduced infection risk, better hemostasis, a clearer surgical field, shorter operative times, lower anesthetic requirements, and less postoperative discomfort.

This report presents a case of gingival overgrowth in a hypertensive patient treated with amlodipine. The condition was managed conservatively using diode laser gingivectomy and gingivoplasty following phase-I periodontal therapy.

II. CASE REPORT

A 49-year-old female patient presented to the Department of Periodontology with complaints of swelling and bleeding gums. The patient's medical history revealed hypertension, for which she was taking amlodipine 5mg daily. The general examination showed she was of normal build. Intraoral examination indicated poor oral hygiene and generalized diffuse gingival enlargement in both the maxillary and mandibular regions. The gingiva appeared erythematous with a lobulated surface and bled upon probing

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(figure 1). Routine blood tests were normal. The patient was referred to her physician for a possible substitution of amlodipine.

Complete phase-I non-surgical periodontal therapy was conducted, and the patient was given oral hygiene instructions. At the follow-up visit, there was a significant reduction in inflammation and a slight decrease in gingival enlargement. Remaining gingival excess was managed with diode laser gingivectomy and gingivoplasty using a 910 nm wavelength laser (figures 2 and 3). The healing process was smooth, with no reported local discomfort. The clinical outcome was favorable, and the gingival condition resolved without complications. At an 18-month follow-up, the periodontal health was stable and aesthetically pleasing (figures 4 and 5). The diode laser equipment used is shown in figure 6.

III. DISCUSSION

Certain classes of drugs are known to induce drug-induced gingival overgrowth (DIGO). This adverse reaction is primarily linked to three categories of medications: anticonvulsants (such as phenytoin), immunosuppressants (such as cyclosporine A), and various calcium channel blockers (including nifedipine, verapamil, diltiazem, and amlodipine). Amlodipine, a second-generation dihydropyridine calcium channel blocker, has been documented to cause gingival enlargement. The first case of amlodipine-associated gingival overgrowth was reported by Seymour et al. in 1994. The prevalence of this condition with amlodipine is relatively low, around 3.3%, compared to other drugs in the same class.

The exact pathogenesis of drug-induced gingival enlargement is not fully understood, but two main pathways, inflammatory and non-inflammatory, have been suggested. The non-inflammatory mechanism involves defective collagenase activity due to reduced folic acid uptake, blockage of aldosterone synthesis in the adrenal cortex with a consequent increase in adrenocorticotropic hormone (ACTH) levels, and upregulation of keratinocyte growth factor. On the other hand, inflammation may result from the direct toxic effects of concentrated drug in gingival crevicular fluid and/or bacterial plaque accumulation, leading to the upregulation of cytokine factors like transforming growth factor beta-1 (TGF-ß1). Despite different mechanisms of action, the clinical and microscopic appearance of DIGO is similar across different drugs. DIGO typically begins a few months after starting the medication in susceptible individuals, initially appearing as small, red soft tissue growths in the interdental papillae that spread and cover the gingiva, resulting in thickened, lobulated tissue that may partially or completely cover the tooth surface.

The primary target cell is the gingival fibroblast, and lesions are characterized by increased connective tissue. In gingival fibroblasts, decreased folate uptake leads to changes in the metabolism of matrix metalloproteinases, resulting in inactive collagenase. Consequently, the accumulated connective tissue cannot be degraded, presenting as DIGO.

The clinician's primary goal in treating DIGO is to mitigate the drug's effects on the gingiva without compromising the patient's overall health. Treatment typically involves drug substitution, in consultation with the patient's physician, and effective control of local inflammatory factors like plaque and calculus. Non-surgical approaches are preferable in initial cases where gingival overgrowth is not severe. However, surgical periodontal therapy is often necessary in advanced cases. Despite being effective, these treatments do not always prevent lesion recurrence.

Conventional gingivectomy involves making a 45° oblique incision with a scalpel under anesthesia, which can cause significant postoperative pain, swelling, and infection. The surgical field may also be obscured by bleeding, and postoperative complications can arise. Laser-guided gingival resection offers advantages such as reduced infection, better hemostasis, a clearer surgical field, shorter operative time, less anesthetic requirement, less postoperative discomfort, and more aesthetically pleasing gingival morphology.

In this case, the diode laser was chosen for its coagulative properties, as its wavelength is well absorbed by pigmented tissues, making it suitable for soft tissue surgery due to its cutting and coagulation capabilities. The initial treatment involved phase-I periodontal therapy, including scaling and root planing, which significantly reduced inflammation. Subsequent treatment with a diode laser was then performed to manage the remaining gingival overgrowth.

IV. CONCLUSION

The use of diode lasers has proven to be a highly effective alternative in managing drug-induced gingival enlargement, offering superior hemostasis and reduced postoperative inflammation compared to traditional gingivectomy procedures. The aesthetic recovery of the gingiva post-surgery is notably enhanced, providing a more visually pleasing outcome. Additionally, the diode laser procedure is safe, comfortable, and minimally painful, which significantly reduces patients' fear of surgery and improves overall compliance with treatment. This case highlights the advantages of diode laser therapy in treating gingival overgrowth, emphasizing its role in modern periodontal care as a preferred method due to its efficacy, patient comfort, and excellent clinical results.

- Running Title: Laser Treatment of gingival enlargement
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FIGURES

Fig 1: Pre-Operative Clinical Photograph Showing Gingival Enlargement

Fig 2: Gingivectomy with Diode Laser at 910 nm Wave Length

Fig 3: Immediate Post-Operative Photograph

Fig 4: 6 Months post-operative photograph

Fig 5: 18 Month Post-Operative Photograph

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Fig 6: Medency Dental Diode Laser 810/980nm