Management of Gingival Enlargement Caused by Phenytoin Used in Epilepsy Patients: A Case Report

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Abstract

Epilepsy is a chronic neurologic disorder characterized by recurrent seizures with or without loss of consciousness. Phenytoin is a drug for patients with symptoms of epilepsy that causes gingival enlargement.

A 22-year-old female patient complained of major gingival enlargement on her anterior maxilla. The result of the amnesia revealed that the patient had been consuming phenytoin for 3 years, and the gingival enlargement presented 3 months prior. Surgical and non-surgical treatment were performed in the form of gingivectomy and gingivoplasty followed by drug replacement by a neurologist. Control was done gradually as a maintenance program. The gingiva returned to normal and the patient was satisfied with the result.

Gingival enlargement caused by the use of epilepsy drugs, such as phenytoin, cannot be completely removed, but can be minimized by maintaining oral hygiene and consulting a neurologist for drug replacement.

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Introduction

The enlarged gingiva, known as gingival enlargement or gingival overgrowth, is the most common sign of gingival disease inwhich the gingiva increases in size from the normal form.[1,2] Gingival enlargement caused by drug use can occur in a whole or part of gingiva.[3] Drug-induced gingival enlargement usually occurs in the interdental papillae and extends to the marginal region of gingiva. It appears pink in colour, hard, and is consistently supple.[4,5] Phenytoin is normally used as a medication for patients with symptoms of epilepsy. Based on several studies, phenytoin causes gingival enlargement with a prevalence of approximately 40-50% after 3 months of taking the drugs.[6] This report describes the management of gingival enlargement caused by the use of phenytoin in epilepsy patients.

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Case Report

A 22-year-old female patient visited Hasanuddin University Dental Hospital with major complaints of overgrowth on the anterior maxilla gingiva. The patient reported a history of epilepsy and had consumed phenytoin for 3 years prior. On intraoral examination, it was noted that there was an enlargement in the interdental region of the papilla on elements maxillary right first incisors, second incisors, canine, maxillary left first incisors, second incisors, and canine. The enlarged gingiva appeared pink in colour and had a supple consistency (Figure 1). Based on medical history and examination, the patient was diagnosed with gingival enlargement caused by phenytoin use.

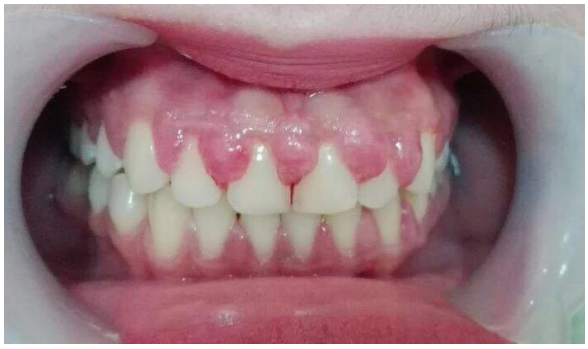
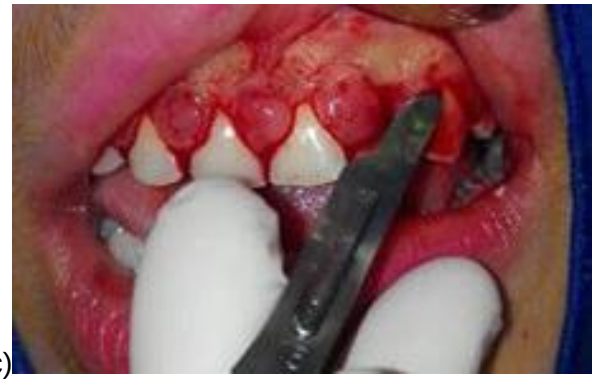


Figure 1. Gingival enlargement caused by phenytoin use.

(a)

(b)

(c)



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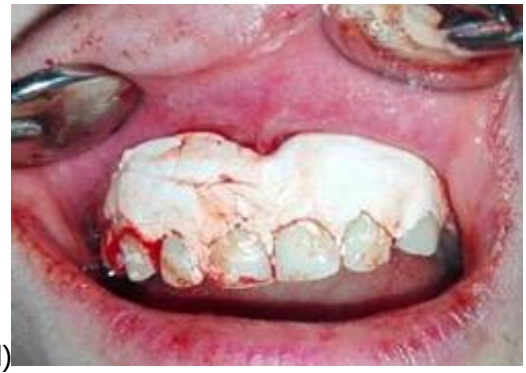

Figure 2. Procedures for the management of gingival enlargement.

The management of gingival enlargement was performed by surgerical and non-surgical methods. Non-surgical treatment included scaling and administering medication in the form of 0.12% chlorohexidine gluconate mouthwash. The patient was also referred to a neurologist for replacement of epilepsy drugs. Surgical treatments included gingivectomy and gingivoplasty, starting with anaesthesia using 4% articaine hydrochloride and epinephrine on the mucobuccal and gingival sulcus regions (Figure 2a). Determination of bleeding point using pocket marker was started from element maxillary right first incisors, second incisors, canine, maxillary left first incisors, second incisors, and canine (Figure 2b). Blade no. 15 was used to incise the labial and lingual surfaces, and to incise the interdental part using periodontal orban knife. Blade no. 12 and tissue scissors can be used as additional instruments. The incision was started from the apical bleeding point using a scalpel no. 15 with a 45 degree angle to the tooth surface by following the gingival contour (Figure 2c). The granulation tissue, calculus and necrotic cementum were removed with a Gracey curettage and an electric scaller until the root surface was clean. The gingivectomy was continued with a gingivoplasty procedure using blade no. 15 and tissue scissors. The operating area was irrigated using 0.9% NaCl solution followed by periodontal packing (Figure 2d). The patient was prescribed an analgesic and 0.12% chlorohexidine mouthwash and was instructed to return one week after. Clinical examination one week after surgery showed the gingival contours returning back to normal. The patient was instructed to return 1 month and 3 months after the procedure and undergo a maintenance program.[7,8]

Discussion

Epilepsy is a chronic neurological disorder characterized by recurrent seizures with or without loss of consciousness. Phenytoin is one of the drugs perscribed for epilepsy patients. The systemic effect of frequent phenytoin use is gingival enlargement.[9] Among the existing epilepsy drugs, phenytoin has the highest prevalence of gingival enlargement of approximately 50%.[10] This is inline with research conducted by Thomas et al.[11] in proving that patients taking phenytoin had a prevalence of 20-50% gingival enlargement.[11] Guncu et al.[12] also asserted that 50% of patients taking phenytoin had enlarged gingiva. Further, the oral hygiene factor has a close relationship result to enlargement.[4,12]

Clinical manifestations of gingival enlargement usually appears within 1-3 months after commencement of drug use, but may vary due to age, sex, genetics, and oral hygiene. The enlargement starts from the interdental papillae and extends down to the gingival margins but does not cause any pain. Enlargement in marginal and papillae usually blends into a massive tissue covering most of the crown. Lesions are shaped like berries, hard, chewy and pink, and tend not to bleed. Enlargement usually occurs throughout the mouth, but is more common and severe within the anterior maxilla and anterior mandibular teeth.[3,4]

Although the exact mechanisms of gingival enlargement have not been elucidated yet, but several mechanisms have been suggested. Phenytoin may stimulate the immune system through mechanisms including the induction of lymphoid overgrowth, lymphomas and cell-mediated immunological reaction via interleukin-1β (IL-1β) and tumour necrosis factor alpha (TNF-α), pro-inflammatory cytokines, and upregulating the production of inflammatory mediators (e.g. interleukin-6 [IL-6] and interleukin-8 [IL-8]) and also medullasin. This latter mediator is a neutrophil elastase-like serine proteinase, distributed mainly in neutrophils, and partly in the monocyte/macrophage. It has been suggested that medullasin participates in the activation of inflammatory response through modulating cytokines. Phenytoin may cause a decrease in sodium along with calcium flux and in cellular folic acid uptake. This can produce a systemic response as well as a localized folate deficiency in the gingival tissue. The folate deficiency induced by phenytoin can cause degenerative changes in succular epithelium and also exacerbate inflammation. Phenytoin may encourage the growth of bacteroides, actinomyces, fusiform bacteria, prevotella intermedia, type II porphyromonas gingivalis, and treponema denticola. These microorganisms may contribute to gingival enlargement through developing bacterial biofilm and aggravating inflammation. The pathogenesis of gingival enlargement due to drug use begins with changes in fibroblasts. Inflammatory changes in gingival tissue regulate the relationship between drugs and fibroblasts, resulting in increased collagen production. Drugs also have a negative effect on the entry of calcium ions into cell membranes, which interfere with protein synthesis and collagen function.[3,6,13]

Hallmonn and Rossmann[8] found that anticonvulsant drugs can inhibit intracellular calcium ion entry.[8] Guncu et al.[12] also suggest that phenytoin may regulate cytokine changes in gingival tissue, thereby causing dysregulation of connective tissue and matrix components found in gingival enlargement.[12,14] Kato et al.[15] showed a reduction in the expression of the genes encoding collagen types I and III in combination with a higher density of these fibers in gingival overgrowth. Uzel et al.[16] demonstrated that connective growth factors were elevated in phenytoin-induced gingival overgrowth, which characterizes a more fibrotic tissue. The study in the Department of Oral Medicine and Radiology, Government Dental College and Research Institute(2012) revealed a higher incidence of gingival enlargement in phenytoin-treated epileptic patients with the observation of gingival enlargement in all patients in the test group after 6 months of phenytoin administration.[17]

In this case, the management of the patient was performed by gingivectomy and gingivoplasty surgery techniques because the enlarged area was no more than 6 teeth and there was no loss of attachment. The surgery was accompanied by replacement of epilepsy drugs by a neurologist. After surgery, the patient was instructed to attend regular check-ups and to maintain oral hygiene in accordance with the results of several studies showing the benefits of oral hygiene care programs in patients who use phenytoin to control the occurrence of seizure symptoms.

Conclusions

The use of phenytoin as an antiepilepsy drug may cause gingival enlargement, yet the condition can be minimized by maintaining oral hygiene and reducing drug doses. Effective communication between patient, dentist, and neurologist can prevent gingival enlargement.

Declaration of Interest

None declared.

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