Case Report

Intra-Lesional Corticosteroid Therapy in Angioedema Secondary to Smokeless Tobacco: A Case-Based Evaluation of Therapeutic Efficacy

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ABSTRACT

The swelling that affects the face, lips, and tongue is known as angioedema. It is typically localized, asymmetrical, and mildly uncomfortable. The deep dermis and subcutaneous cellular tissue are affected by increased vascular permeability brought on by various bio-chemical mediators produced by mast cells (histamine, leukotrienes, prostaglandins), bradykinin, and complement products. This can cause swelling on the back of the hands, feet, and genitalia. Activation of the kallikrein-kinin cascade or mast cell degranulation can both result in angioedema. Acute urticaria or a more widespread anaphylactic reaction can also result from immunoglobulin E (IgE)-mediated hypersensitivity to foods or medications, which can also produce angioedema in the former scenario. This case report aims to present the clinical features and treatment of the angioedema in a 49-year-old male complaining of pain and swelling in the lower lip region.

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Introduction

Clinically angioedema refers to sudden and short-lived swelling of the skin, mucous membranes, or both including the upper respiratory [1]. The mouth and lips are vital for various critical stomatognathic functions such as mastication, vocalization, and facial aesthetics, with lip fullness being a key marker of youth and attractiveness. Angioedema, which affects up to 20% of the population and 40-50% of chronic urticaria cases, can occur at any age but is more common in adolescence and early adulthood [2]. Due to its lack of awareness and inadequate diagnosis of angioedema is uncommon or rare; its frequency in our environment remains unclear, although estimates range from 1 per 50,000 people to 1.09 per 150,000 people in Spain [3]. The etiopathogenesis of angioedema is broadly categorized into mast cell-mediated and bradykinin-mediated mechanisms. Mast cell–mediated angioedema arises from IgE-driven degranulation with histamine, leukotriene, and prostaglandin release, producing urticaria, pruritus, and rapid swelling that typically resolves within 24-72 hours and responds to antihistamines or corticosteroids [2, 4]. In contrast, bradykinin-mediated angioedema lacks urticaria or pruritus and results from excessive bradykinin due to dysregulation of the kallikrein-kinin pathway. This occurs in hereditary (C1 esterase inhibitors C1-INH deficiency/ dysfunction or factor XII mutations), acquired (autoantibodies or immune complex-mediated C1-INH consumption), or drug-induced forms, particularly with angiotensin-converting enzyme

(ACE) inhibitors [5-6]. Non-hereditary and idiopathic cases may involve either pathway or remain undefined, but all converge on increased endothelial permeability, plasma extravasation, and tissue edema, with airway involvement posing life-threatening risk [4]. Tobacco consumption remains a major public health concern in India, with widespread use of both smoked and smokeless forms. Smokeless tobacco products such as khaini, gutkha, and pan masala are commonly used due to easy availability, low cost, and sociocultural acceptance. These products are often retained in the oral vestibule for prolonged periods, resulting in chronic localized mucosal exposure and irritation, which may predispose to inflammatory and reactive oral lesions. The multifactorial nature of tobacco-induced angioedema integrates vascular, immunological, and neurogenic mechanisms. Unlike allergic angioedema, tobacco-related swelling may be non-IgE mediated and more closely linked to endothelial and neuropeptide dysfunction [7]. Clinical recognition is important, as affected patients may present with recurrent, unexplained lip or facial swelling without classical allergic triggers. Smoking cessation and avoidance of smokeless tobacco may play a central role in both prevention and treatment [8]. In this case report, we describe a rare presentation of localized angioedema of the lower lip, likely induced by chronic smokeless tobacco use.

Case Presentation

A 49-year-old male reported to the outpatient department with chief complaint of pain and swelling involving the lower lip for the past seven days. The swelling was insidious in onset, gradually progressive, and persistent, with no history of preceding trauma, fever, or similar episodes in the past. The patient reported associated discomfort during speech and mastication due to enlargement of both upper and lower lip. The patient was a known case of diabetes mellitus and hypertension for the past 10 years, both of which he was under regular medical management. He also had a chronic history of Khaini (smokeless tobacco) use for approximately 5-6 years, consuming 5-6 packets daily, each retained in the lower labial and buccal vestibules for about 20–25 minutes. Patient also gave a history of recurring swelling in the same region with intake of tobacco. He had previously consulted a general physician on multiple occasions for the same complaint and was prescribed medical therapy (Levocetirizine 10mg once daily ten days during bed time); however, he reported minimal to no symptomatic improvement. Owing to the persistent nature of the swelling and inadequate response to prior conservative management, the patient subsequently reported to our department. General physical examination revealed a well-oriented patient with stable vital signs. On clinical assessment, the lower lip appeared diffusely enlarged with yellowish-brown crustations along the lateral borders (Figure 1a). On palpation all inspectory findings were confirmed, the swelling was soft, non-pitting, tender and there was a localized rise in temperature. The overlying mucosa appeared dry and mildly erythematous. He did not exhibit any associated cutaneous, systemic, or other mucosal lesions elsewhere in the body. Based on the clinical presentation and acute history, a working clinical diagnosis of angioedema of the lower lip was made associated with chronic tobacco-induced irritation. A differential diagnosis of actinic cheilitis, and cheilitis granulomatosa were considered due to similarity in the clinical features. As part of the diagnostic work-up, histopathological examination through an incisional biopsy and relevant laboratory investigations were advised to rule out other inflammatory, infectious, or neoplastic etiologies. However, the patient declined to undergo biopsy and additional laboratory investigations due to socioeconomic constraints and personal reluctance. Hence, further investigative procedures could not be performed, and the diagnosis was based on detailed personal history, clinical evaluation, and therapeutic response. The patient was counselled regarding tobacco cessation; however, he expressed unwillingness to attend the counselling sessions. Considering that cheilitis granulomatosa and actinic cheilitis, similar to angioedema, demonstrate responsiveness to corticosteroids, intralesional corticosteroid therapy was planned as a common therapeutic approach. After discussion of available treatment options, and in view of the patient's previous treatment history with inadequate response to conservative management, the patient preferred to proceed with injection-based therapy. The informed consent was obtained, and an intralesional injection was planned as the treatment modality. Prior to the intralesional corticosteroid administration, the patient's vital parameters were reassessed. Blood pr-

essure was measured and found to be within normal limits at the time of the procedure, permitting safe administration of the planned injection. The patient received 0.5 mL of triamcinolone acetonide (10 mg/mL) mixed with 0.05 mL of 2% lignocaine with adrenaline was injected into two equidistant points along the lower lip vermillion-mucosal border, with the needle angled slightly inward to minimize risks of ischemia, hypopigmentation, or atrophy, as per the protocol reported in the literature by Galaviz-Chaparro OG *et al*. [4]. The procedure was well tolerated, and the patient was advised to report for follow-up after one week. He was subsequently counselled on tobacco cessation chairside and advised to maintain regular follow-up visits to monitor for any recurrence or residual mucosal changes. No additional medications, apart from his routine antidiabetic and antihypertensive drugs, were prescribed. During the first follow up, approximately 70% regression of the swelling and complete resolution of pain were observed. The lower lip exhibited a dry, mildly cracked surface with no evidence of yellowish-brown crustations or residual induration (Figure 1b). No tenderness on palpation was elicited and lower lip was similar to that of surrounding mucosa. At this point patient received another dose of intralesional injection in the same manner as previously mentioned. Following this intervention, a reduction of lesion noted be around 95% and with no new lesion or burning sensation, due to which the patient was kept on long term follow up with no topical or systemic intervention.

Following this, a marked reduction in lip swelling was observed, with complete resolution and no recurrence was noted in the next six months of follow-up. The lips regained symmetry and normal function**,** and no induration, fibrosis, atrophy, ulceration, or infection was detected. The patient reported absence of pain or discomfort and normal speech and mastication**.** Cosmetic satisfaction improved notably (Likert scale: 4/5 preoperatively to 1/5 postoperatively), with a parallel enhancement in oral health-related quality of life**.**

Discussion

Localized angioedema of the lip may present as an isolated orofacial manifestation without accompanying systemic features such as urticaria, respiratory compromise, or gastrointestinal symptoms, thereby posing a diagnostic challenge and necessitating careful clinical evaluation. In some cases, angioedema occurs in the absence of urticaria, demonstrates poor responsiveness to conventional anti-allergic therapy, and typically persists for 5–7 days; such presentations are often attributable to non-IgE–mediated mechanisms, particularly bradykinin-mediated pathways [9].

Although the exact pathology of tobacco-induced swelling involves a complex mixture of reactive compounds that cause localized vascular endothelial irritation and upregulation of pro-inflammatory mediators (interleukin-1 beta (IL-1β), interleukin-6 (IL-6), and tumor necrosis factor-alpha (TNF-α)), its clinical management often resembles that of non-hereditary angioedema (Figure 2) [10].

The standard management of systemic or severe angioedema is airway protection, antihistamines, and systemic corticosteroids [10]. However, the chronic and re-

Figure 1: Pre- and post-treatment clinical presentation of the patient, **a:** Pre-operative clinical presentation shows diffuse swelling of the lower lip with yellowish-brown crustations along the lateral borders, and the lower lip, **b:** One-week post-operative follow-up intralesional corticosteroid (triamcinolone acetonide) administration, demonstrating significant resolution of swelling, with the lip exhibiting a dry, mildly cracked appearance and absence of crustations

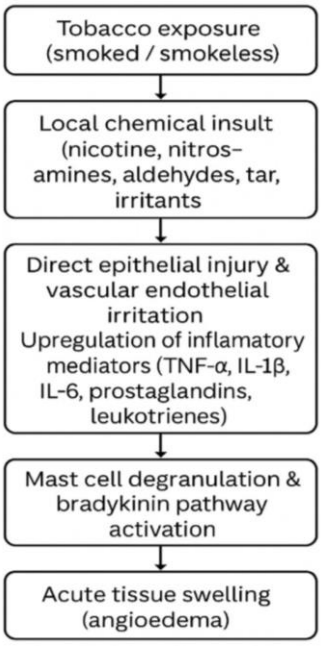

Figure 2: Schematic representation illustrating the etiopathogenesis of tobacco-associated angioedema of the lip

current nature of localized disorders often precludes prolonged systemic corticosteroid therapy due to the risk of significant adverse effects. Thus, intralesional corticosteroids therapy is a targeted treatment modality with limited systemic exposure [6, 10]. For long term management of recurrent or idiopathic angioedema, options include tranexamic acid, attenuated androgens or omalizumab, in addition to patient education, avoidance of triggers and regular specialist follow up [6,10]. The chronic and recurrent nature of the disease, however, often limits the long-term use of systemic corticosteroids due to potential side effects. Thus, intralesional corticosteroid treatment may be a more targeted treatment option with lower systemic exposure. Such therapy should be started after a careful assessment of persistent lip swelling by proper history taking, clinical examination and exclusion of other causes including trauma, infection, and granulomatous disorders [6, 10]. Written informed consent was obtained from the patient prior to the procedure after explaining the nature of the treatment, its potential benefits, and possible risks. To evaluate the therapeutic outcomes of angioedema affecting the lower lip, multiple clinical parameters were assessed (Table 1). The novelty of this report does not lie in the discovery of a new pathogenesis, but rather in presenting a highly pragmatic, minimally invasive therapeutic protocol. In resource-limited clinical settings where patients refuse extensive histopathological or systemic allergic workups, this targeted intralesional approach provides a crucial, cost-effective alternative to manage refractory localized lip enlargements. In the Indian clinical setting, the use of intralesional corticosteroid injecti-

Table 1: Parameters for assessing therapeutic outcomes in lip angioedema

Domain	Parameter	Assessment Method	Outcome
Clinical	Reduction in lip swelling (size/volume)	Measurement with calipers / standardized photography	Significant reduction in the size of the swelling
	Resolution time	Days/weeks to complete subsidence	Seven to ten days
	Recurrence rate	Follow-up documentation	No evidence of recurrence noted for a period of six months
	Symmetry and function	Visual inspection and lip movement tests	Bilaterally symmetrical and functional
	Residual induration/fibrosis	Palpation and clinical exam	No residual induration or fibrosis
	Complications (atrophy, ulcer, infection)	Clinical observation	No atrophy, ulcer, and infection were noted
Symptom-based	Pain/discomfort	Visual Analog Scale (VAS) / Numerical Rating Scale	0/10
	Itching, burning, tingling	Patient-reported frequency/intensity	No itching, burning, and tingling were noted
	Functional limitations (speech, eating)	Patient interview	His speech and mastication were normal
Patient-reported	Cosmetic satisfaction	Likert scale (1–5) or patient feedback	Preoperative-4/5 At follow up- 1/5
	Quality of life improvement	Dermatology Life Quality Index (DLQI) or Oral Health-Related QoL questionnaire	Objective improvement recorded in OHIP questionnaire
	Overall treatment satisfaction	Patient Global Impression of Improvement (PGI-I)	Overall improvement following therapeutic management
Objective Tools	Standardized clinical photography	Pre- and post-treatment comparison	Figures 1a-b
	Ultrasonography / imaging (if applicable)	Tissue thickness, edema quantification	Not applicable

ons for the management of localized lip angioedema has been only rarely documented, thereby highlighting the distinctiveness of this therapeutic approach in routine clinical practice. To report this case, informed consent of the patient was obtained

Conclusion

Intra-lesional corticosteroid therapy proved to be a highly effective, minimally invasive, and well-tolerated modality in the management of tobacco-induced angioedema of the lower lip. This targeted approach not only resulted in a significant reduction of edema and inflammation but also facilitated rapid symptomatic relief and favorable aesthetic recovery. The observed clinical improvement underscores the therapeutic potential of localized corticosteroid administration in addressing chemically induced angioedema, particularly when coupled with strict tobacco cessation. Early diagnosis, prompt intervention, and elimination of the etiological factor remain pivotal for optimal functional and cosmetic outcomes.

Limitation

The absence of histopathological and laboratory investigations limited definitive etiological confirmation, necessitating reliance on clinical findings and therapeutic response. The underlying pathogenic mechanism could not be characterized, and the association with smokeless tobacco use remains inferential rather than causal. As a single-case report with limited long-term follow-up and poor patient compliance, the findings lack generalizability.

Consent statement

Informed written consent was obtained from the patient for publication of her image.

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We declare that all authors contributed significantly and have read and approved the manuscript.

Author contribution

JS: Conceptualization, Methodology, Research, Writing -First version.

SNC: Conceptualization, Methodology, Research.

NN: Research, Writing-First version.

JS: Research, Writing - Proof reading & Editing

Data Availability

Datasets related to this article will be available upon request to the corresponding author.

Conflict of Interest

No conflicts of interest.

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