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Case Report

Preseptal Cellulitis following a Bee Sting: A Case Study

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ABSTRACT

Introduction: Bee stings are common pediatric emergencies. Venom components like melittin and phospholipase A2 trigger inflammatory responses including allergic reactions, edema and erythema, which can progress to preseptal or orbital cellulitis through secondary infection or exaggerated immune responses. Early recognition, prompt management is vital in preventing vision-threatening complications.

Case Report: A 12-year-old presented with persistent right periorbital swelling five hours after a bee sting, despite initial treatment with antihistamines. Examination revealed diffused eyelid edema extending to the cheek and lips, accompanied by multiple pustules. Visual acuity and vitals remained stable. A provisional diagnosis of allergic reaction and right eye preseptal cellulitis was made. Management included intravenous corticosteroids (Hydrocortisone), broad-spectrum antibiotics (Ceftriaxone, Clindamycin), and antihistamines (Pheniramine). Supportive care with topical Ciprofloxacin and IV fluids led to marked improvement with reduction in periorbital swelling and without orbital progression.

Discussion: Pediatric patients are prone to exaggerated inflammatory responses due to thin subcutaneous tissue and increased vascular permeability. While reactions range from minor swelling to anaphylaxis, this case highlights localized hypersensitivity and secondary infection. Prompt systemic therapy and imaging (CT orbit) are essential to differentiate and manage preseptal versus orbital involvement.

Conclusion: Minor facial bee stings can lead to significant complications like preseptal cellulitis. Early antimicrobial and anti-inflammatory intervention, alongside multidisciplinary monitoring, ensures rapid recovery and prevents vision loss.

Keywords*: Bee sting, Preseptal cellulitis, Pediatric emergency, Periorbital edema, Allergic inflammatory reaction*

INTRODUCTION

Bee stings are frequent occurrences, particularly in children, and are usually associated with mild local reactions such as pain, erythema, and swelling. The venom of honeybees contains biologically active components such as melittin and phospholipase A_2, which induce inflammatory and allergic responses. While most cases are self-limiting, severe reactions can occur, including systemic hypersensitivity, anaphylaxis, and secondary infections.[1]

Preseptal cellulitis is an infection of the eyelid and surrounding tissues anterior to the orbital septum. It is commonly caused by local trauma, insect bites, or spread from adjacent structures. In pediatric patients, facial insect stings, particularly around the eye, may predispose to cellulitis due to increased vascularity and thinner skin.[2]

We present a case of preseptal cellulitis following a bee sting in a child, emphasizing the clinical course, management, and importance of early intervention.

CASE PRESENTATION / PATIENT DETAILS

A 12-year-old female presented to the hospital with complaints of swelling around the right eye following a bee sting. The sting occurred on **03 August 2025 at approximately 10 AM** over the right periocular region.

The patient initially developed localized swelling, which progressively increased over the next few hours. She received initial treatment at a local clinic with oral antibiotics and antihistamines; however, the symptoms did not improve. Due to persistent swelling and concern for progression, she was referred to a tertiary care center.

History

The patient developed swelling around the right eye within approximately five hours following a bee sting. The swelling progressively increased in size and involved the right periorbital region. There was no history of any trauma apart from the bee sting. The patient did not report any visual disturbances, diplopia, or pain during eye movements.

The patient was a known case of hypothyroidism for the past six months and was on regular medication with Tab. Thyronorm 25 mg once daily. There was no other significant past medical history. Family history revealed that she was the second child born to consanguineous parents.

Clinical Examination

On clinical examination, the patient was conscious, well-oriented to time, place, and person, and hemodynamically stable at the time of presentation. General examination revealed that the patient was afebrile, with pulse rate and blood pressure within normal physiological limits. The Glasgow Coma Scale score was recorded as 15/15, indicating normal neurological status without any evidence of altered sensorium.

Local examination of the affected region revealed diffuse swelling involving the right peri-orbital area. The edema was extensive, extending beyond the eyelids to involve the adjacent cheek and upper lip regions, indicating significant local inflammatory response. The eyelids were markedly edematous, and multiple pustular lesions were noted, with two present on the upper eyelid and one on the lower eyelid. Despite the marked swelling, there was no evidence of erythema extending beyond the localized region, and no signs suggestive of spreading cellulitis to surrounding facial areas were observed.
Ophthalmological examination was carried out to assess the involvement of ocular structures. Visual acuity was found to be normal, and pupillary reactions were brisk and normal in both eyes. Extraocular movements were full and painless, indicating absence of involvement of extraocular muscles. There was no proptosis, and no clinical signs suggestive of orbital involvement were detected. These findings were consistent with preseptal involvement without progression to orbital cellulitis.

Provisional Diagnosis

- Allergic reaction to bee sting
- Right eye preseptal cellulitis

Investigations

The following investigations were carried out:

- Complete blood count (CBC)
- C-reactive protein (CRP)
- Liver function test (LFT)
- Renal function test (RFT)
- Thyroid-stimulating hormone (TSH)
- Coagulation profile
- **CT Orbit (Plain)**

The CT scan revealed **no orbital involvement**, confirming the diagnosis of **preseptal cellulitis** rather than orbital cellulitis.

Management

The patient was managed with a comprehensive approach involving both systemic and local therapy aimed at controlling inflammation, preventing infection, and ensuring symptomatic relief. Systemic treatment was initiated promptly with intravenous hydrocortisone, administered as a stat dose of 100 mg followed by a maintenance dose of 10 mg/kg/day to reduce the inflammatory and allergic response associated with the bee sting. An intravenous antihistamine (Pheniramine/Avil) was given as a stat dose to counteract hypersensitivity reactions. Additionally, intravenous ranitidine was administered as part of supportive therapy.

To address the risk of secondary bacterial infection and cellulitis, broad-spectrum intravenous antibiotics were started, including clindamycin and ceftriaxone (Xone) given at 8-hour intervals. Adequate hydration and maintenance of fluid balance were ensured with intravenous fluids (DNS) administered at maintenance rates.

Local treatment included the application of ciprofloxacin (Ciplox) eye ointment to the affected area to provide topical antimicrobial coverage and prevent local infection. The patient's pre-existing medication for hypothyroidism, Tab. Thyronorm 25 mg once daily, was continued throughout the hospital stay without interruption.

Overall, the multidisciplinary management strategy focusing on anti-inflammatory, antihistaminic, and antimicrobial therapy contributed to rapid clinical improvement and prevention of complications.

Clinical Course

Following the initiation of treatment, the patient demonstrated significant and rapid clinical improvement. A marked reduction in periorbital swelling was observed within 48 hours, indicating a good response to the combined anti-inflammatory, antihistaminic, and antibiotic therapy. There was no evidence of progression to orbital cellulitis during the course of hospitalization, and the infection remained confined to the preseptal region.

Ophthalmological status remained stable throughout, with preservation of normal vision and no development of complications such as proptosis or restriction of extraocular movements. The patient remained afebrile during the hospital stay and maintained stable vital parameters, reflecting absence of systemic involvement. No additional complications were observed during the course of treatment.

In view of the satisfactory clinical improvement and stable condition, the patient was discharged with appropriate advice for follow-up and continuation of care as required.

Final Diagnosis

Allergic bee sting reaction with preseptal cellulitis

DISCUSSION

Bee sting reactions exhibit a wide clinical spectrum, ranging from mild localized inflammation to severe systemic manifestations, including anaphylaxis. The severity of the reaction is influenced by multiple factors such as the anatomical site of the sting, the quantity of venom injected, and the individual's hypersensitivity response.[3] Bee venom contains biologically active components such as melittin and phospholipase A_2, which induce inflammatory cascades leading to localized edema, erythema, and, in some cases, secondary infection.[4]

In the present case, the sting occurred in the peri-orbital region, which is particularly vulnerable due to its rich vascular supply and loose connective tissue. These anatomical characteristics facilitate rapid spread of inflammatory mediators, leading to pronounced swelling and predisposition to complications such as preseptal cellulitis. The localized inflammatory response in this patient progressed to preseptal cellulitis, a condition involving infection of the eyelid and surrounding tissues anterior to the orbital septum.

Clinically, preseptal cellulitis must be carefully differentiated from orbital cellulitis, as the latter is a more severe condition with potential vision- and life-threatening complications. Key distinguishing features of preseptal cellulitis include the absence of proptosis, no restriction or pain with extraocular movements, and preservation of visual acuity[5]. In contrast, orbital cellulitis is associated with impaired vision, painful eye movements, proptosis, and possible intracranial extension. In this case, the absence of these features, along with imaging findings, confirmed the diagnosis of preseptal cellulitis. Radiological imaging, particularly computed tomography (CT) of the orbit, plays a pivotal role in differentiating between preseptal and orbital cellulitis. Early and accurate diagnosis is essential, as orbital cellulitis requires more aggressive treatment and may lead to complications such as vision loss, cavernous sinus thrombosis, or intracranial spread if not promptly managed.[6]

Pediatric patients are especially susceptible to such complications due to anatomical and physiological factors, including thinner skin, increased vascularity, and an immature immune response. These factors facilitate rapid progression of inflammation and infection following insect stings or minor trauma.[7] Management of preseptal cellulitis requires a prompt and multidisciplinary approach. The cornerstone of treatment includes early initiation of broad-spectrum antibiotics to control infection, along with corticosteroids to reduce inflammation and edema. Antihistamines are also beneficial in managing the allergic component of the reaction. Close clinical monitoring is essential to detect any signs of progression to orbital involvement.[8]

In the present case, early recognition and timely initiation of appropriate therapy resulted in rapid clinical improvement and complete recovery without complications. This highlights the importance of early medical intervention and careful monitoring in cases of facial bee stings, particularly in pediatric patients.

CONCLUSION

This case highlights that even a seemingly minor bee sting, especially in the facial region, can lead to significant complications such as preseptal cellulitis. Early recognition, timely imaging, and prompt initiation of appropriate therapy

are crucial in preventing progression to orbital cellulitis and preserving vision. Increased awareness among caregivers and healthcare providers regarding the potential severity of facial insect stings in children is essential for early medical intervention and improved outcomes.

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