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A Buzzworthy Case: Acute Ischemic Stroke Following Bee Sting Envenomation

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Abstract

Stings by honey bees is common worldwide , usually resulting in allergic symptoms ranging from minor urticaria to severe anaphylaxis .However neurological complications following bee sting is very rare and till date only around 25-30 cases of cerebral infarction following bee sting have been reported .Here , we report a case of 41 year old man with acute ischemic stroke following bee sting

Key Words: bee sting , ischemic stroke , kounis phenomenon.

Introduction

Bee stings, though commonly associated with localized pain and allergic reactions, can occasionally have far-reaching consequences that extend beyond their immediate discomfort. This case report presents a rare and intriguing instance of a 41-year-old male farmer who, in the absence of any known comorbidities, experienced an acute ischemic stroke within hours of a bee sting. This unusual neurological complication raises questions about the intricate interplay between venomous insect envenomation and the human body's response.

While the immediate effects of bee stings are well-documented, particularly in terms of anaphylactic reactions and localized inflammation, the connection between bee venom and acute ischemic stroke remains a seldom-explored medical mystery. This case serves as a striking illustration of the intricate and, at times, unexpected ways in which venomous insect envenomation can impact human health.

Case report :

41 year old male , with no known comorbidities , farmer by occupation presented to the emergency department with weakness of right upper limb and lower limb and difficulty in speech for past 1 day .He gave history of bee sting the previous day at around 4pm and onset of symptoms was around 8pm .There was deviation of mouth to the left , drooling of saliva on the right side . There was no history of smoking or alcohol consumption.

On admission , his BP was 130/80mmhg , Pulse rate was 88/minute ,GCS was 15/15 . ECG showed sinus rhythm .On examination , he was conscious , oriented . He had right sided facial weakness and right hemiparesis with power 0/5 on right side .Other cranial nerve functions were intact . Sensory and Cerebellar examinations were normal . (could not be tested on right side due to severe weakness).Examination of other systems were normal .NIHSS score on presentation was 9 . MRI brain showed Hyperacute to acute infarct involving the left fronto parieto temporal lobe . His blood investigations were within normal limits. Echocardiography showed normal ejection fraction with no evidence of clot. Carotid and vertebral Doppler study revealed normal blood vessel flow.

Patient was started on antiplatelets and statins and regular speech therapy and physiotherapy was given .

Fig 1. Patient having right sided facial palsy

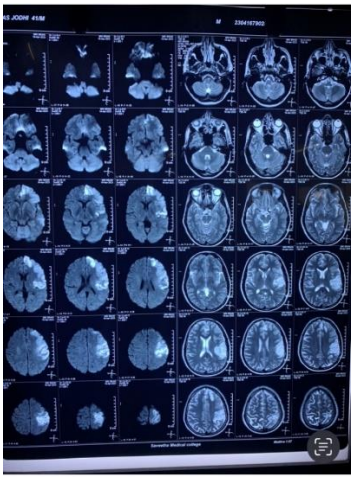

Fig 2. MRI brain showing infarct involving the left fronto parieto temporal lobe

Discussion :

It's important to note that the pathophysiological response to bee venom can vary from person to person. While most individuals will experience localized pain and swelling, some may develop allergic reactions that can be life-threatening.

The pathophysiology of a bee venom sting involves a series of complex reactions within the body as it responds to the foreign substances introduced by the bee's venom. Here's a breakdown of the key steps in the pathophysiological process:

1. Venom Composition: Bee venom is a complex mixture of various components, including peptides, enzymes, and biogenic amines. Some of the major components include melittin (a cytolytic peptide), phospholipase A2, hyaluronidase, histamine, and various enzymes.
2. Immediate Pain and Inflammation: Upon a bee sting, the venom is injected into the skin and underlying tissues. The venom contains melittin, which directly damages cell membranes, leading to immediate pain and inflammation at the sting site. This process triggers local release of inflammatory mediators.
3. Histamine Release:Bee venom also contains histamine, which is a potent vasodilator. Histamine is quickly released at the sting site, leading to the dilation of blood vessels. This results in increased blood flow to the area, contributing to redness, swelling, and heat.
4. Immune Response:The body recognizes the bee venom as a foreign substance, triggering an immune response. Immune cells, such as mast cells and eosinophils, become activated. This immune response is essential to neutralize the venom and remove foreign particles.
5. Local Inflammation: As part of the immune response, the body releases proinflammatory cytokines, such as interleukins and tumor necrosis factor (TNF). These cytokines further contribute to local inflammation, which is characterized by redness, swelling, and pain.
6. Systemic Allergic Reactions: In some individuals, especially those who are allergic to bee stings, the immune response can become systemic. This can lead to the release of histamine throughout the body, resulting in symptoms like hives, itching, and potentially life-threatening anaphylaxis. Anaphylaxis is characterized by widespread systemic symptoms, including difficulty breathing, low blood pressure, and swelling of the throat, which can be fatal if not treated promptly.
7. Delayed Allergic Reactions: In some cases, delayed allergic reactions can occur hours to days after the sting. These reactions may involve skin symptoms like itching, hives, or eczema. In severe cases, they can lead to symptoms similar to anaphylaxis.
8. Secondary Infections: Due to the breach of the skin barrier, there is also a risk of secondary bacterial infections at the sting site if not properly cleaned and treated.

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The neurologic symptoms brought on by bee venom include cavernous sinus thrombosis, polyradiculopathy, cranial nerve palsies, stroke, and epilepsy. The recorded time span from envenomation to the stroke was reported to be anything from 15 minutes and 4 days, with a median of 16 hours. After being envenomated, our patient's stroke started 3–4 hours later. Although no proper explanations have been given for manifestation of stroke following bee sting envenomation, following theories have been postulated :

1. Due to hypotension and reduced cerebral perfusion due to anaphylaxis, 2. Hypercoagulable state and platelet aggregation due to thromboxane A2 and phospholipase activation, 3. Vasoconstriction due to retrograde stimulation of the superior cervical ganglion and carotid spasm etc. Kounis outlined The type 1 form of myocardial infarction after bee and wasp stings has pre-existing normal blood vessels with vasospasm brought on by venom, which is more likely in our patient given that he has no comorbidities.Type 2 variant describes envenomation-induced allergic reaction causing preexisting atheromatous plaque to rupture..

Conclusion

The presented case of acute ischemic stroke following a bee sting envenomation underscores the need for vigilance and awareness of the potential neurological consequences of this seemingly innocuous event. While bee stings are generally associated with localized discomfort and, in some cases, allergic reactions, their capacity to induce an acute stroke highlights the intricate interplay between venomous insect envenomation and the human body's response.

This exceptional case exemplifies the multifaceted nature of the human body's reaction to bee venom, emphasizing the importance of understanding and addressing the diverse ways in which venomous insect stings can impact health. The complex pathophysiological mechanisms discussed herein, including anaphylaxis-induced hypotension, hypercoagulable states, platelet aggregation, and vasoconstriction, provide valuable insights into the potential triggers of stroke following bee stings.

Furthermore, the association of stroke with bee stings, although exceedingly rare, underscores the significance of a comprehensive clinical assessment and the importance of early medical evaluation and intervention. Had the patient presented to medical professionals earlier, thrombolytic therapy might have been a consideration. This case serves as a reminder of the necessity for heightened awareness and education regarding atypical neurological complications following bee stings, ultimately contributing to improved patient outcomes and medical preparedness.

In conclusion, the intricate relationship between bee venom envenomation and stroke represents a captivating area of study within the realm of medical science, underscoring the remarkable and often unexpected facets of human physiology. By unraveling the complexities of this case, we hope to promote a deeper understanding of the diverse consequences that venomous insect stings can have on human health, ultimately leading to earlier recognition and more effective management of similar cases in the future .Had the patient presented to us early , possibility of thrombolysis could have been considered .

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