Thromboembolic Stroke: A Sequela of Hymenoptera Venom-induced Anaphylaxis

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Outline

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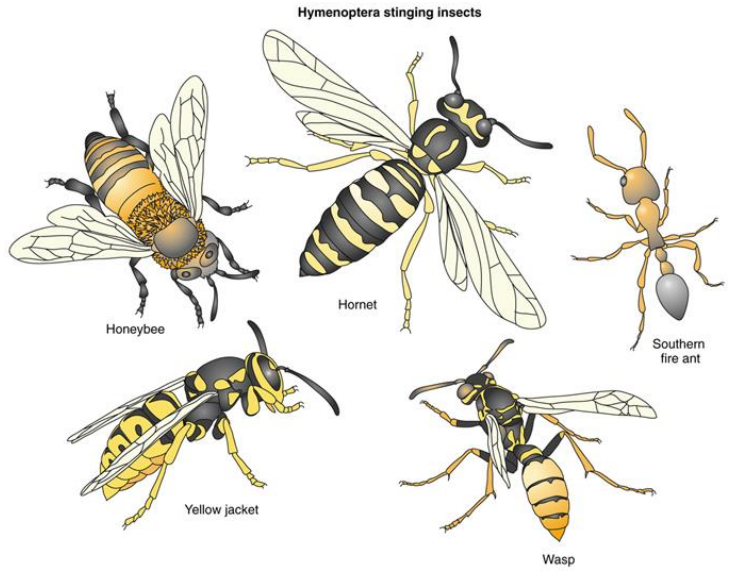
Introduction

- Hymenoptera sting can lead to a systemic allergic reaction in 3% of adults
- 40 fatal stings occur each year in the US
- Most Common Symptoms:
  - Cutaneous signs (e.g., urticaria, angioedema, flushing, pruritus)
  - Respiratory signs (e.g., dyspnea, throat tightness, stridor, wheeze)
- Circulatory component (e.g., dizziness, hypotension, shock)
- Thromboembolic stroke associated with hymenoptera venom-induced anaphylaxis has not been documented in the literature



Case Report: HPI

- 44 year old Male
- Hx of hypertension
- Stung by hymenoptera in his right knee
- Within 20 minutes developed
  - Lightheadedness, dizziness, diaphoresis, hives
- Within 1 hour
  - Ataxic gait, dysarthria, left sided hemiparesis, and facial droop
- Co-workers called EMS
- No history of anaphylaxis or being stung that he could recall

ED Course

- 75 minutes after sting was treated in ED with:
  - Diphenhydramine, Famotidine, and Methylprednisolone
- Vital signs were stable in the ED and was not given epinephrine
- CT head was negative
- MRI showed an acute infarction with thrombus in the right middle cerebral artery

ED Course

- Initial Labs:
  - INR-1
  - PT-10.3
  - Platelet count 259
  - Additional labs for venous thromboembolism or DIC, CRP were not obtained
- Neurology evaluated the patient and was given tPA

Hospital Course

- Thromboembolic work up did not reveal any source of emboli
  - Neck MRA
  - Echocardiogram
  - Cardiac Event monitor (out patient was negative)
- Repeat MRI showed resolution of emboli
- Day 3 of admission function of his left side significantly improved
- Discharged on Atorvastatin, Aspirin, injectable Epinephrine

Clinic Testing- 3 weeks later

Allergen	(ug/ml)	Wheal Size on Scale 0 to 4
Wasp	0.01	2
White hornet	0.01	3
Yellow hornet	0.1	3
Honey bee	1	1

Allergen	IgE Level (Normal <0.35 KL)
Yellow Jacket	4.97
White hornet	2.68
Yellow hornet	2.04
Honey bee	<0.35

Clinical Course

- Given the specific stinging insect was not identified by the patient a conservative approach was taken to desensitize him to all skin test positive results.
- Venom immunotherapy (VIT) was initiated

Discussion

- Activation of the coagulation cascade during anaphylaxis is known, however its precise mechanism remains elusive
- Smith et al. obtained blood samples of two participants with severe anaphylaxis after insect challenge
  - Assessed for ability to correct the ptt of plasma selectively deficient in a coagulation factor
  - Factor V and VIII markedly decreased at 2% and 14%
  - Fibrinogen was reduced to 1/9th of the level obtained at baseline
  - The consumption of these coagulation factors is consistent with a concomitant thrombotic process
- There have been few cases describing stroke after anaphylaxis but there were shown due to documented hypotensive episodes and imaging showed no emboli

Conclusion

- Three percent of the population is at risk for anaphylaxis induced by hymenoptera sting.
- Hymenoptera anaphylaxis has been associated with thrombotic processes.
- A spectrum of diseases share the common pathogenesis of thrombosis, including stroke and myocardial infarction both of which carry high morbidity and mortality.
- In light of the under recognition of fatalities caused by hymenoptera sting there is likely an under appreciation for the non-fatal thrombotic processes provoked by them as well.
- Venom immunotherapy 95%-100% effective in preventing systemic reactions
- This is the first definitive case demonstrating thromboembolic stroke in the setting of hymenoptera induced-anaphylaxis.

References

- 1. Adkinson Jr, NF, et al. Middleton's Allergy Principles and Practice. Philadelphia: Saunders Elsevier. 2014. 8th ed. Vol. 2. 1260.
- 2. Wani M, et al. Multiple cerebral infarctions with severe multi-organ dysfunction following multiple wasp stings. Ann Indian Acad Neurol. 2014 Jan;17(1):125-7.
- 3. Crawley F, Schon F. Cerebral infarction: a rare complication of wasp sting. J Neurol Neurosurg Psychiatry 1999;66:550-551.
- 4. Billir O, et al. A different reason for cerebrovascular disease. Am J Emerg Med. 2013 May;31(5):891.e5-6.
- 5. Adkinson Jr, NF, et al. Middleton's Allergy Principles and Practice. Philadelphia: Saunders Elsevier. 2014. 8th ed. Vol. 2. 1245.
- 6. Kotchen, TA. Hypertensive Vascular Disease. In: Kasper DL, Fauci AS, Hauser SL, Longo DL, Jameson JL, Loscalzo J, eds. Harrison's Principles of Internal Medicine. 19th ed. New York, NY: McGraw-Hill; 2015:1615.
- 7. Smith PL, et al. Physiologic manifestations of human anaphylaxis. J Clin Invest. 1980 Nov; 66(5): 1072–1080.

Thank you