International Journal of Advances in Medicine
*Wiryandari NPN et al. Int J Adv Med. 2022 Jul;9(7):844-847*
http://www.ijmedicine.com
pISSN 2349-3925 | eISSN 2349-3933
DOI: https://dx.doi.org/10.18203/2349-3933.ijam20221714

**Case Report**

# A reminder of life-threatening reaction of hymenoptera sting cause anaphylaxis shock

**Ni Putu Nita Wiryandari[1]*, Ketut Suryana[2], Dewi Catur Wulandari[3]**

[1]Departement of Internal Medicine, Wangaya Regional General Hospital, Bali, Indonesia
[2]Department of Internal Medicine, Merpati Clinic, HIV and Allergy- Clinical Immunology Services Unit, Wangaya Hospital, Denpasar, Bali, Indonesia
[3]Department of Internal Medicine, Wangaya General Hospital, Denpasar, Bali, Indonesia

**Received:** 12 May 2022
**Revised:** 02 June 2022
**Accepted:** 06 June 2022

***Correspondence:**
Ni Putu Nita Wiryandari,
E-mail: npnitaw@gmail.com



## ABSTRACT

The prevalence of hymenoptera sting in general population still high. Large local reaction (LLR) is more common manifestation but can also cause anaphylactic shock and loss of consciousness, or even cardiac or respiratory arrest that all is defined as severe systemic sting reaction (SSR). The risk is generally considered low for future SSR in subjects with LLR but need to be considered and recognized immediately. We reported a case of 39-year-old women was stung by a wasp when driving motorcycle and presented to emergency room with anaphylactic shock (fulfill the amended NIAID/FAAN criteria). She also stung by wasp 2 years ago and cause her left upper and lower arms became swollen slowly and improved 3 days later after treatment with allergy drugs. Electrocardiography result refer to sinus bradycardia. Significant laboratory result showed hypokalemia (2.9 mmol/l). Patient treated by injecting epinephrine intramuscularly and glucocorticoids to preventing protracted symptoms and biphasic reactions.

**Keywords:** Hymenoptera sting, Large local reaction, Anaphylaxis shock

## INTRODUCTION

Hymenoptera insects include apidae (bees) and vespidae (wasps and hornets). Hymenoptera sting as other insect stings normally cause transient local reaction that resolve without medication.

Allergic reactions to stings can be local or systemic. Large local reactions (LLR) defined as a swelling exceeding a diameter of 10 cm at sting site that lasts for more than 24 hours.[1] Because the reaction develops gradually, these danger are subacute in nature, usually permitting adequate time for medical evaluation and treatment. While systemic sting reaction (SSR) catagorized by mild (flushing, urticaria, and angioedema); Moderate (dizziness, dyspnea, and nausea); and Severe (anaphylactic shock and loss of consciousness, or even cardiac or respiratory arrest).[2]

The prevalence of hymenoptera stings in the general population ranges from 56.6% to 94.5%. The prevalence of LLR ranges from 2.4% to 26.4%. In European epidemiological studies the rate of reported SSR ranges from 0.3% to 7.5%. The risk is generally considered low for future SSR in subjects with LLR. Considering that patients with LLR often have venom-IgE (or skin test) results similar to those in patients with anaphylaxis, they have a surprisingly low risk for a future SSR, in the range of 4% to 10%, while there was no risk of SSR in presence of at least two previous consecutive LLR.[3] Anaphylaxis shock by hymenoptera sting is rare but need to be considered and recognized immediately. Here we report

anaphylaxis shock case with large local reaction in previous stung as a reminder for life threatening effect of hymenoptera sting.[1]

## CASE REPORT

A 39-year-old previously healthy balinese woman was stung by an wasp when driving motorcycle; 5 min later a thick and swollen eyes and lips developed accompanied by difficulty swallowing, shortness of breath, tears and a lot of saliva came out.

Symptoms getting worsen with severe abdominal cramps, inkontinensia and impaired consciousness. She previously been stung by a wasp in the left hand about 2 years ago and her left upper and lower arms became swollen slowly and improved 3 days later after treatment with allergy drugs. history of allergic rhinitis, asthma or drug or food allergies was denied. History of atopy in parents and siblings also denied. No previous medical history.

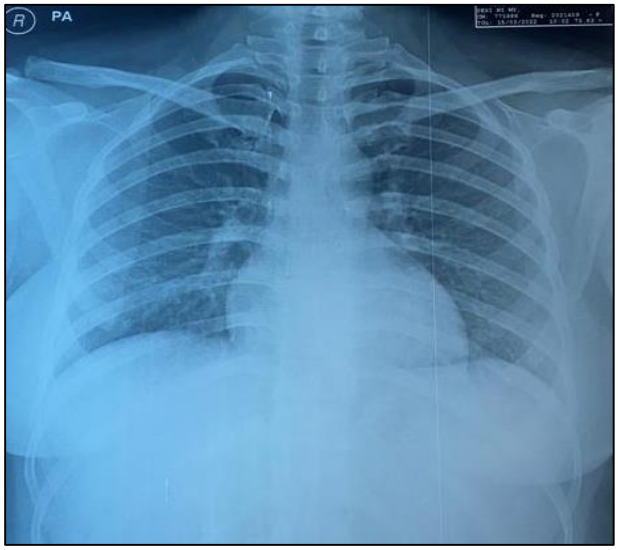


**Figure 1. Normal chest X-ray.**

On admission she was agitated, she was in painful distress, tachypneic stridor (approximately 28 breaths/minute), desaturated (arterial oxygen saturation, $SaO_2$, approximately 94 on oxygen mask) and hypotensive (blood pressure was 64/44 mmHg) with cool and moist extremities, heart rate 50 times/min regularly. VAS score was 6/10 for abdominal pain. Electrocardiography result refer to sinus bradycardia. Laboratory result showed slightly leucocytosis (12.57×103/ul) with slightly increase in lymphocyte count (5.37×103/ul) with hypokalemia (2.9 mmol/l). No abnormality in chest X-ray (Figure 1).

The working diagnosis was anaphylaxis shock ec Hymenoptera (wasp) sting, and hypokalemia. Patient was treated with fluid challenges 250 ml of ringer lactate then continue 20 drips per minute, ephinefrine 1:1000 0.3 cc intramuscular and dexamethasone 5 mg intravenous were administered. Dexamethasone 15 mg intravenous once daily, omeprazole 40 mg, intravenous once daily. Patient also get KCL 25 meq drip one time. Patient was given oxygen at 2 l/min and observed in intensive care unit. For 24 hour observation in ICU, patient show no severe allergic symptom and improvement of hypokalemia after correction (4.4 mmol/l). Patient move to regular ward and discharge after 2 days without any sequels.

## DISCUSSION

The risk of a systemic reaction of insect sting in patients who experience large local reactions is 4% to 10%.[4-6] One of specific risk factors for severe systemic sting reactions might be the individual mast cell burden.[7,8] Mast cell burden of the body can be reflected by the serum baseline tryptase concentration (BTC). It has been repeatedly observed that patients with Hymenoptera venom allergy and increased BTCs experience more severe allergic reactions to field stings than patients with normal levels.[7,8]

Other risk factor is species of insect itself. Severe, potentially life-threatening field-sting reactions were significantly more common in patients with vespid (wasp) than with honeybee venom allergy.[7] One or more preceding, less severe systemic sting reactions before the index sting, also considered as predictor for a severe allergic reaction.[7] In 2 retrospective surveys, there were a larger number of subjects who described worsening of the reaction with subsequent stings.[6,9]

The fact that the patient in this case is a productive woman, then this is also an augmenting factor in anaphylaxis. Estrogen might also play a role by enhancing endothelial expression of nitric oxide synthase and nitric oxide production, increasing vascular permeability, and intensifying anaphylaxis severity.[10] Asthma does not appear to be a risk factor in the development of major systemic reactions. However, asthma was a more common expression in these patients than in the non-asthmatic patients with major systemic reactions.[11]

The study confirms the expected time sequence of a classic Ig-E antibody-mediated event; that is, in almost two thirds of the patients who experienced systemic sting reaction, the initial symptom appeared within 10 minutes of exposure and within 30 minutes in 98%. In contrast, in approximately two thirds of those with large local reactions only, the response did not begin before 2 hours, suggesting that Ig-E antibodies probably did not induce many of these or reactions resemble late-phase inflammatory reactions that are immunoglobulin E (Ig-E) dependent.[6,11] All of the mediator release affects multiple organ systems. The diagnosis of anaphylaxis can be established if meet the amended NIAID/FAAN criteria.[12]

Although symptoms indicative of hypotension were commonly reported (in 53% of this group), only 15% experienced loss of consciousness.[11] Cardiac anaphylaxis can also cause bradycardia, arrhythmias, angina, or myocardial infarction. bradycardia could be the

occurrence of a neurocardiogenic reflex, triggered by cardiac mechanoreceptors and enhanced by increased levels of serotonin, catecholamines, prostaglandins and nitric oxide that are known to potentiate this reflex are elevated during anaphylaxis.[13] Abdominal cramps are common, resulting from gastrointestinal tract or uterine smooth muscle contraction. Skin test and measurement of allergen specific Ig-E level not performed in this patient because allergen have been identified.[12]

In this patient also found a decrease in potassium levels (2.9 mmol/l). A study also notice reduction in serum potassium levels during anaphylaxis attacks, likely because high catecholamine levels would induce potassium transport into the cells and produce a transient decrease in serum potassium.[14] Early identification of transcellular shifts is important because management may differ. The immediate goal of treatment is the prevention of potentially life-threatening cardiac conduction disturbances and neuromuscular dysfunction. The risk of rebound hyperkalemia is higher when treating redistributive hypokalemia.[15]

Injecting epinephrine (adrenaline) intramuscularly into the vastus lateralis of the quadriceps (antero-lateral thigh) being the first-line drug recommended to treat anaphylaxis. Positioning patient according to his/her presenting features. Most patients should be placed in a supine position during anaphylaxis unless there is respiratory distress in which case a sitting position may optimize respiratory effort; if pregnant, position the patient in a semi-recumbent position on the left side; if unconscious, place in the recovery position. The benefit of elevation of the lower extremities (trendelenburg position) is controversial.[16]

Glucocorticoids are commonly used in anaphylaxis, with the objective of preventing protracted symptoms, in particular in patients with asthmatic symptoms, and also to prevent biphasic reactions. Around half of biphasic reactions occur within the first 6-12 h following reaction. Patients with anaphylaxis need to be observed: this is important especially in severe reactions and those requiring multiple doses of epinephrine. Patient can be referred to allergy/immunology specialist for confirmation of the suspected trigger, advice on prevention and, where indicated, consideration for allergen immunotherapy.[16]

## CONCLUSION

This case reminds us that insect stings can have life-threatening effects through anaphylactic reactions. And as clinicians, carefully-performed history and examination can establish anaphylaxis diagnose clinically and allow us to provide prompt treatment earlier to save patient life.

*Funding: No funding sources*
*Conflict of interest: None declared*
*Ethical approval: Not required*

## REFERENCES

1. Tripolt P, Gradwohl L, Cerpes U, Laipold K, Binder B, Sturm G. Large local reactions and systemic reactions to insect stings: Similarities and differences. PLoS ONE. 2020;15(4):1-8.
2. Golden D, Demain J, Freeman T, Graft D, Tankersley M, Tracy J, et al. Stinging insect hypersensitivity: A practice parameter update 2016. Ann Allergy Asthma Immunol. 2017;118(1):28-54.
3. Golden D. Large Local Reactions to Insect Stings. J Allergic Clin Immunol Practice. 2015;3(3):331-4.
4. Gelincik A, Issever H, Unal D, Isik E, Demirturk M, Gul H, et al. The prevalence of Hymenoptera venom allergy in adults: The results of a very crowded city in Euroasia. Allergology International. 2015;64:35-40.
5. Pucci S, D'Alo S, DePasquale T, Illuminati I, Makri E, Incorvaia C. Risk of anaphylaxis in patients with large local reactions to Hymenoptera stings: a retrospective and prospective study. Clin Mol Allergy. 2015;13:21-3.
6. Golden D. Anaphylaxis to insect sting. Immunol Allergy Clin N Am. 2015;35:287-302.
7. Rueff F, Przybilla B, Bilo M, Muller U, Scheipl F, Aberer W, et al. Predictors of severe systemic anaphylactic reactions in patients with Hymenoptera venom allergy: Importance of baseline serum tryptase-a study of the European Academy of Allergology and Clinical Immunology Interest Group on Insect Venom Hypersensitivity. J Allergy Clin Immunol. 2009;124(5):1047-54.
8. Shaker M, Wallace D, Golden D, Oppenheimer J, Bernstein J, Campbell R, et al. Anaphylaxis-a 2020 practice parameter update, systematic review, and Grading of Recommendations, Assessment, Development and Evaluation (GRADE) analysis. J Allergy Clin Immunol. 2020;145(4):1082-123.
9. Lagopoulos V, Gigi E. Anaphylactic and anaphylactoid reactions during the perioperative period. Hippokratia. 2011;15(2):138-40.
10. Poziomkowska-Gesicka I, Kostrzewska M, Kurek. Comorbidities and Cofactors of Anaphylaxis in Patients with Moderate to Severe Anaphylaxis. Analysis of Data from the Anaphylaxis Registry for West Pomerania Province, Poland. Int J Environ Res Public Health. 2021;18(333):1-17.
11. Solley G. Stinging and biting insect allergy: an Australian experience. Ann Allergy Asthma Immunol. 2004;93:532-7.
12. Turner P, Worm M, Ansotegui I, El-Gamal Y, Rivas M, Fineman S, et al. Time to revisit the definition and clinical criteria for anaphylaxis?. World Allergy Organ J. 2019;12(10):100066.
13. Mostman Y, Blykers M, Mols P, Gutermuth J, Grosber M, Naeije N. Anaphylaxis in an urban Belgian emergency department: epidemiology and aetiology. Acta Clinica Belgica. 2015;0;0;1-8.
14. Tang R, Xu H, Cao J, Chen S, Sun J, Hu H, et al. Clinical Characteristics of Inpatients with

Anaphylaxis in China. BioMed Research International. 2015;12:210-4.
15. Anthony V, Wouk N. Potasium disorders: hypokalemia and hiperkalsemia. Am Fam Physician. 2015;92(6):487-95.
16. Cardona V, Ansotegui I, Ebisawa M, El-Gamal Y, Rivas M, Fineman S, et al. World Allergy Organization Anaphylaxis Guidance 2020. World Allergy Organiz J. 2020;13(10):100472.

**Cite this article as:** Wiryandari NPN, Suryana K, Wulandari DC. A reminder of life-threatening reaction of hymenoptera sting cause anaphylaxis shock. Int J Adv Med 2022;9:844-7.