

Bee venom anaphylaxis at a Northern Cape winery in South Africa and an inadequate emergency response: a near fatal combination

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Abstract

Background: Bee venom allergy is an important cause for anaphylaxis and may have potentially fatal consequences. At-risk occupations include florists, horticulturists, farmers, bakers, fruit sellers, foresters and beekeepers. Control measures include changing jobs, wearing protective clothing, controlling the distance between beehives and the work place, and farming with less aggressive species. Management of a sting depends on the severity of the response and ranges from local topical treatments to intensive care admission for anaphylaxis.

Findings: The patient had an anaphylactic reaction and epinephrine was not timeously administered because the nursing sister was not familiar with the use of the EpiPen®. The viability of the nursing sister's thumb was threatened after she accidentally dispensed the epinephrine into her thumb as a result of her panic. Hospital management was prompt and both patients were treated appropriately. The nursing sister had an informal meeting to address the incident but was not issued with a warning. The patient was re-instructed on the use of the EpiPen® and continued working in his job.

Conclusion and recommendations: In this case, venom desensitisation should be considered, and it is questionable that the man should continue working in this environment. The patient had near fatal consequences as a result of poor initial emergency care management. New nursing personnel need to be adequately inducted on the first day of a new job; this cannot be delayed as in this case. Workers with known allergies to bee stings need to be frequently re-instructed on the use of self-injectable epinephrine; co-workers should also be trained.

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Introduction

Hymenoptera venom allergy is due to a variety of insects, most commonly bees, wasps and ants, and is one of the main reasons for anaphylaxis, accounting for 1.5% to 2% of anaphylaxis cases in the general population and 34% to 40% in at risk populations.^{1,2} The reaction to Hymenoptera venom may be a local, regional or systemic reaction.³ At-risk occupations include florists, horticulturists, farmers, bakers, fruit sellers, firemen, foresters and beekeepers.^{3,4} Avoiding exposure to the allergen is often difficult in these occupations. Control measures may include wearing protective clothing such as long sleeves and trousers, or leather gloves,⁴ controlling the distance between the hive and the work place, and farming with less aggressive bee species.⁴ In high risk cases, it is advisable to remove the person from the job.⁴



The management of a local bee sting includes removal of the stinger, cold compression of the sting site, application of topical steroids, and administration of oral steroids and antihistamines. A regional reaction will require first aid

management as for a local reaction and, in addition, may require medical assistance and oral steroids. A systemic reaction will require administration of epinephrine and hospitalisation. Anaphylaxis will require intensive care admission. It is imperative that hypersensitive individuals have access to self-medication for emergency treatment. This includes access to adrenalin for auto-injection, e.g. via the EpiPen®. Individuals should be well-trained and frequently instructed on how to administer the drug; it should be kept with them at all times and co-workers should be trained in how to manage an emergency situation. If not adequately trained in the use of the device, the inappropriate administration of adrenalin can be detrimental.^{3,4-7}

Venom immunotherapy is effective in preventing allergic reactions in patients who suffer from severe allergic reactions to stings. This treatment may be lifesaving and improves the quality of life of those affected.⁸

Occupational health nurses potentially face a variety of emergency care situations in the workplace. It is thus imperative that they are adequately trained to deal with these emergencies and that they receive the necessary induction on how an occupational health unit functions when starting work at a new job site.

This case study highlights the management of a bee sting-related anaphylaxis in a winery in a worker with known bee allergy. It discusses lessons to consider in the clinical and occupational management of this potentially fatal condition.

Written informed consent was obtained by the patients to use their clinical data. The case study was approved by the Ethics Committee of the Faculty of Health Sciences of the University of the Free State (clearance number ECUFS NR 206/2014).

Case description

Mr M was employed as a machinist at a winery in the Northern Cape Province (South Africa). The high sugar content of the grapes attracts a high number of bees. He is highly allergic to bee stings and had two incidents leading to hospitalisation, one of which was an intensive care unit (ICU) admission. Following the second incident, the company issued him with an EpiPen® auto-injector which was stored in the refrigerator. On 17 January 2011, Mr M was stung by a bee at work for the third time and had an anaphylactic reaction.

Professional nurse (Pn) L was the newly appointed occupational health nurse for the winery. The day the incident occurred was her first day in this position. She had not received an induction on how the clinic functioned as this was scheduled for the following week. She was thus not familiar with where things were in the clinic when Mr M had his anaphylactic reaction. Pn L was informed about the

EpiPen® but was not familiar with how the device worked and, in her haste and anxiety, dispensed the drug into her thumb. There was no emergency medication or equipment at the clinic.

Mr M and Pn L were both admitted to hospital. Mr M had severe bronchospasm and was cyanotic. His oxygen saturation was 78% on admission. His blood pressure was 92/46 mmHg and his heart rate was 148 beats per minute. He was treated with intravenous steroids and subcutaneous adrenaline in the emergency room and was admitted to the ICU.

Pn L was severely agitated and had difficulty breathing. Her blood pressure was 179/118 mmHg and her pulse was 152 beats/minute on admission. Her left thumb, up to the extensor retinaculum, was pale and cold as a side effect of the vasoconstriction of the epinephrine. She was sedated to calm her, and a warm towel was wrapped around her left hand. Nitro-glycerine paste was applied.

Both patients recovered quickly without long-term consequences and were discharged within 48 hours. Mr M was re-educated regarding the use of the EpiPen®. The necessary injury on duty forms were duly completed. Pn L had an informal meeting to review the incident. The review committee decided not to institute formal charges against Pn L but to rather use the incident as a learning experience.

Discussion

The initial emergency care management at the winery was poor. The nurse's panic and lack of understanding of how to use the EpiPen® had near fatal outcomes. The consequences of injecting herself in the thumb could have had dire consequences. Familiarisation with equipment and procedures in the occupational health clinic should not have been delayed. Having a patient with known bee sting allergy and a history of previous anaphylaxis in a high risk area should have been part of her induction to the new position.

The history of two previous episodes of bee venom anaphylaxis and the retention of the person in this position necessitates that the occupational health clinic should have the capacity to manage such an emergency. Intravenous fluids and medication such as steroids and adrenaline, and oxygen, should be readily available. The clinic did not have an emergency trolley; this should be standard equipment.

The first principle of the control of hazards is to ensure that the hazard is removed but, in this setting, it is difficult to remove the bees. Ideally, Mr M should have been re-deployed to a work area in the winery where he potentially would not be exposed to bee stings. However, it was not possible to re-deploy Mr M and, in light of the high unemployment rate in this area, he might not have readily found another

job. The control measures adopted were thus to make emergency medication (EpiPen®) available to the worker. The case, nevertheless, highlighted that control measures need to be properly implemented. The patient should be able to administer the adrenalin himself, or a co-worker should be able to do so. The errors the nurse made were unfortunate but highlighted the importance of making sure that everyone working with someone who has a bee allergy is familiar with the administration of the EpiPen®.

Bee venom desensitisation therapy is a safe and effective treatment in people who have known life threatening reactions to bee venom. Desensitisation therapy can improve the quality of life and work experience of susceptible individuals.⁸ Fatality due to a bee sting anaphylaxis is a strong possibility in this individual. As re-deployment within the company was not a feasible option, the patient is an appropriate candidate for desensitisation therapy.^{5,8}

The delayed induction of the nurse highlighted the importance of orientating new workers to their workplaces. Her induction was scheduled for the week following commencement of duty. The case highlights the importance of early induction, especially to emergency care management. Duties should not commence until induction is complete. The nurse did not have a disciplinary hearing but an informal meeting was held to discuss the matter and lessons learnt. Considering the lack of induction, this action was appropriate but, under any other circumstances, the matter might have required disciplinary action.

Conclusions and recommendations

This case had near fatal consequences. The initial emergency management was poor and highlights the importance of adequate and continued training in emergency medical care in the workplace. Occupational health clinics should have emergency trolleys. Bee stings can be fatal and susceptible workers should carry adrenalin pens on their person; co-workers need to be trained in the administration of the adrenalin. The hospital management was prompt and appropriate. The importance of proper induction before the commencement of duties is imperative.

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Lessons learned

1. Bee stings can be fatal and, in the occupational setting, susceptible workers should be well-trained on how to self-medicate in an emergency setting
2. Medical personnel need to be adequately trained to handle such emergencies and emergency medication needs to be available in the occupational clinic
3. All occupational health personnel should be properly inducted in the workplace before commencing duty or on the day they start
4. Venom immunotherapy should be considered in high risk individuals who are exposed to bee stings and cannot be removed from the exposure

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