TPM Vol. 32, No. S1, 2025
ISSN: 1972-6325
https://www.tpmap.org/

Open Access

SEVERE FIRE ANT ENVENOMATION IN ADVANCED PARKINSONISM: EXTENSIVE STINGS FROM IMPAIRED PERCEPTION AND RESTRICTED MOBILITY

BONEY PRIYA P JOSE[1], BALAJI M B[1], VIMAL S[2]*, DR. T. PUGAZHENDHI[3]

[1]DEPARTMENT OF BIOCHEMISTRY, SAVEETHA MEDICAL COLLEGE, SAVEETHA INSTITUTE OF MEDICAL AND TECHNICAL SCIENCES, SAVEETHA UNIVERSITY, CHENNAI, TAMIL NADU, INDIA.

[2]DEPARTMENT OF DERMATOLOGY, VENEREOLOGY AND LEPROSY, SAVEETHA MEDICAL COLLEGE, SAVEETHA INSTITUTE OF MEDICAL AND TECHNICAL SCIENCES, SAVEETHA UNIVERSITY, CHENNAI, TAMIL NADU, INDIA.

[3]TUTOR, DEPARTMENT OF PUBLIC HEALTH DENTISTRY, SREE BALAJI DENTAL COLLEGE & HOSPITAL, CHENNAI, INDIA

Abstract

Ants are social insects known to pose various medical risks, particularly species such as fire ants (*Solenopsis* sp.). Their stings can result in a range of symptoms, including localized inflammation, the formation of vesicles and sterile pustules, as well as more severe allergic reactions that can lead to anaphylactic shock. This case report details a severe incident involving extensive ant bites in a middle-aged man diagnosed with advanced Parkinsonism. Due to his condition, he experienced restricted movements that exacerbated his reaction to the stings. By presenting this case, we aim to raise awareness within the medical community regarding the potential complications arising from fire ant bites, particularly in patients with limited mobility. This highlights the importance of prompt recognition and appropriate treatment in managing such cases effectively.

Keywords: Ant bite; Ant venoms; Hypersensitivity; Anaphylaxis; Parkinsonism; Case report

Case report

A 45-year-old male with a history of advanced Parkinsonism for the past 10 years was admitted to our hospital with extensive reddish ulcerative lesions covering his body. The lesions developed following ant bites sustained approximately one day before hospitalization. The patient had recently missed doses of his Parkinsonism medications, resulting in noticeable slowness of movements and contributing to his inability to scratch the bites adequately. Upon evaluation, he was found lying in bed with numerous ants crawling over him, which likely exacerbated his condition.

Following the ant bites, the patient experienced skin lesions accompanied by mild fever and drowsiness. On clinical examination at presentation, he exhibited a pulse rate of 75 beats per minute, blood pressure of 150/84 mmHg, body temperature of 37.0°C, and a respiratory rate of 20 breaths per minute. Physical examination revealed multiple erythematous crested plaques with ulceration localized on the scalp, eyelids, chest, trunk, axilla, and groin regions. Additionally, the patient demonstrated bilateral pitting pedal edema. Other systemic examinations yielded normal findings, apart from the characteristic features associated with Parkinsonism.

A skin biopsy was obtained from the lesion on the left axilla. Histopathological analysis revealed epidermal changes with focal parakeratosis, minimal spongiosis, and subepidermal perivascular inflammation characterized by an infiltrate of lymphocytes and eosinophils. These findings were suggestive of a hypersensitivity reaction consistent with an allergic response to the ant bites.

The patient was initiated on treatment, which included intravenous amoxicillin and clavulanic acid to cover for potential infection, intravenous dexamethasone for inflammation management, topical fusidic acid cream to prevent infection at the lesion sites, and a moisturizer containing aloe vera and glycerin to promote healing. Furthermore, his antiparkinsonian medications were promptly reinstated. The ophthalmologist prescribed antibiotic eye drops as a precautionary measure to manage any potential ocular complications resulting from the proximity of the lesions to the eye.

Over the course of treatment, the patient's condition was closely monitored, and he received supportive care to ensure optimal recovery from the adverse effects of the ant bites and to manage his underlying Parkinsonism effectively.

DISCUSSION

Ant bites pose an environmental hazard worldwide [1]. The first recorded human fatality caused by an ant bite was reported by Edwards in 1913 [2]. Fire ants are a type of aggressive and venomous ants belonging to the genus Solenopsis. They are known for their reddish-brown coloration and their painful stings, which often result in a burning sensation, hence the name "fire ants." These ants are highly adaptable and have established large colonies in many areas, particularly in warm and tropical regions.

While ant bites can elicit various reactions in individuals, including localized pain, pustules, and allergic responses, severe systemic manifestations are rare. However, there have been documented cases highlighting uncommon complications resulting from fire ant bites. A case study conducted by Koya et al. reported a rare occurrence of rhabdomyolysis and acute renal failure following a fire ant bite [3]. Similarly, Lee et al. documented a case of acute renal failure and hemolytic uremic syndrome in a 21-year-old man who experienced a large local reaction on the left arm due to fire ant bites [4]. Additionally, there have been reports of seizures, serum sickness, eosinophilic fasciitis and nephritic syndrome resulting from fire ant bites [5].

The venom of the fire ants consists of a complex mixture of various proteins (<5%) and alkaloids (>95%) (A). Immediate effects of the stings like the local pain and pustules are mainly caused by the toxic alkaloids, while the later allergic responses are attributed solely to venom proteins [6]. Venom alkaloids do not trigger IgE antibody responses and, therefore, are not responsible for allergic reactions [5]. The venom also contains a water-insoluble, non-proteinaceous alkaloid that causes local swelling and can induce hemolysis [6].
Different patterns of dermal reactivity to fire ant stings have been described. It can be classified into local, large local, or systemic (anaphylaxis) [5]. A local reaction manifests as an immediate flare and wheal that becomes prominent within 20 minutes and resolves within 2 hours [5]. A sterile pustule may develop within 24 hours and typically resolve within a week [4,5]. Large local reactions are IgE-mediated and may persist for several days [6]. They are characterized by erythema, edema, fibrin deposition, and infiltration of eosinophils, neutrophils, and lymphocytes in histology[7]. Serious systemic reactions, such as life-threatening laryngeal edema, bronchospasm, and hypotension, occur in less than 2% of cases, making them relatively uncommon [8, 9]. Anaphylactic reactions to fire ant stings can recur in previously sensitized individuals, potentially leading to life-threatening complications [10]. These complications arise due to the cytotoxic, neurotoxic, and hemolytic effects of the ant venom [11]. Moreover, the venom triggers coagulation and predisposes individuals to a hypercoagulable state [12].

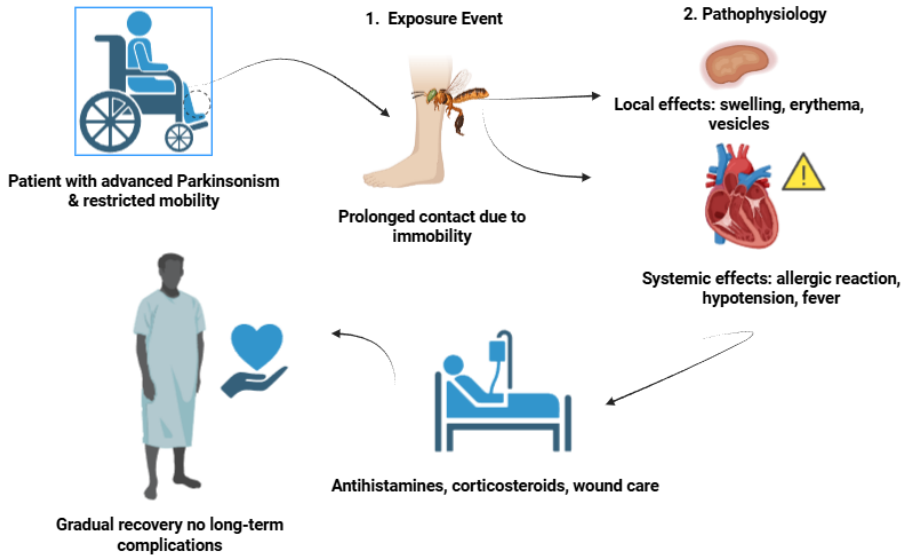

Figure 1. Clinical course of a patient with advanced Parkinsonism who sustained extensive fire ant stings due to restricted mobility, outlining exposure, local and systemic effects, management, and recovery.

CONCLUSION

In most instances, ant bites lead to localized reactions that are manageable with appropriate care. However, this case underscores the unique vulnerability of individuals with advanced Parkinsonism to more severe and widespread reactions, as demonstrated by our patient who developed extensive ulcerative lesions after multiple ant bites. It is critical for healthcare providers to recognize the potential for systemic reactions in such patients and to act promptly to ensure appropriate medical intervention.

This case is the first documented instance of an ant bite reaction in a Parkinson's disease patient, highlighting the need for heightened awareness in both clinical and community settings regarding the potential complications that can arise from insect bites. Proper management—including quick access to medical care, initiation of appropriate treatments, and ongoing monitoringcan significantly alleviate the risks associated with these uncommon but serious complications. Future awareness and research may further delineate the relationship between neurodegenerative diseases and heightened sensitivity to environmental allergens and irritants.

REFERENCES

1. Ratnatilaka GA, Herath RRGCSB, Dias RKS. Severe anaphylaxis following ant bites. Ceylon Med J. 2011 Mar;56(1):34–5.
2. Edwards TC. Death Following an Ant Bite. California State Journal of Medicine. 1914;12(7):290.
3. Wang J, Wu M, Gopinath SC, Idris AM, Zhang X. Identifying fibril formation on interdigitated parallel microelectrodes for diagnosing Parkinson's disease. Biochemical Engineering Journal. 2025 Jun 14:109831.
4. Lee YC, Wang JS, Shiang JC, Tsai MK, Deng KT, Chang MY, et al. Haemolytic uremic syndrome following fire ant bites. BMC Nephrol. 2014 Dec;15(1):5.
5. Mallepalli JR, Quinet RJ, Sus R. Eosinophilic fasciitis induced by fire ant bites. Ochsner Journal. 2008;8(3):114–8.
6. Kandaswamy K, Guru A. Harnessing virulence factor-derived peptides for innovative oral cancer treatment. Natural Product Research. 2024 Jul 30:1-2.
7. Prahlow JA, Barnard JJ. Fatal Anaphylaxis Due to Fire Ant Stings. The American Journal of Forensic Medicine and Pathology. 1998 Jun;19(2):137.
8. Desforges JF, deShazo RD, Butcher BT, Banks WA. Reactions to the Stings of the Imported Fire Ant. N Engl J Med. 1990 Aug 16;323(7):462–6.
9. deShazo RD, Banks WA. Medical consequences of multiple fire ant stings occurring indoors. Journal of allergy and clinical immunology. 1994;93(5):847–50.
10. Chellapandian H, Jeyachandran S. Conotoxins: emerging analgesics for neck and spinal surgery pain management. Natural Product Research. 2024 Sep 24:1-2.
11. Freeman TM. Hypersensitivity to Hymenoptera Stings. N Engl J Med. 2004 Nov 4;351(19):1978–84.
12. Koya S, Crenshaw D, Agarwal A. Rhabdomyolysis and Acute Renal Failure After Fire Ant Bites. J GEN INTERN MED. 2007 Jan;22(1):145–7.