Open Access

Article Type: Case Report

Volume 2 Issue 3 - 2024

SCIBASE Journals

SciBase Clinical and Medical Case Reports

Delayed Symptoms of Rodenticide Poisoning in a 16-Year-Old: A Case Report

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Article Information

Received: Jun 05, 2024

Accepted: Jul 16, 2024

Published: Jul 23, 2024

SciBase Clinical and Medical Case Reports - scibasejournals.org

Citation: Mohammadi M, Hakemi A, Toussi AG, Dadpour B, Mousavi R, et al. Delayed Symptoms of Rodenticide Poisoning in a 16-Year-Old: A Case Report. SciBase Clin Med Case Rep. 2024; 2(3): 1027.

Abstract

Anticoagulant rodenticides, a key tool in pest control since the 1940s, have undergone significant evolution to overcome resistance and improve efficacy. However, resistance in rodent populations led to the development of second-generation anticoagulants such as Brodifacoum and Difenacoum, which are more potent but pose increased risks to non-target species, including humans. This case report describes the management of a 16-year-old Iranian male who deliberately ingested a super warfarin rodenticide, resulting in severe coagulopathy and delayed clinical presentation. Despite the initial absence of overt symptoms, the patient's condition required immediate intervention with intravenous vitamin K and blood products, demonstrating the complexity of diagnosing and managing rodenticide poisoning. Recovery was achieved with comprehensive medical and psychological interventions, demonstrating the need for high clinical suspicion and prompt treatment in similar cases. This report highlights the ongoing public health challenges posed by highly potent rodenticides and the critical need for awareness and preparedness among healthcare providers to effectively manage such emergencies.

Keywords: Super warfarin rodenticide; Coagulopathy; Anticoagulant poisoning.

Introduction

First introduced in the 1940s, anticoagulant rodenticides represent a key development in pest control strategies. Designed to control rodent populations, these chemical compounds work by disrupting the coagulation pathway, leading to uncontrolled bleeding and eventually death of the rodent [1]. Warfarin, one of the first of these anticoagulants, was discovered almost by accident. Originally synthesized in the 1920s as a pesticide, warfarin was later found to have medical applications. In the 1950s, it was approved for human use as a therapeutic anticoagulant, revolutionizing the treatment of thrombotic disorders through its ability to inhibit vitamin K epoxide reductase, a key enzyme in the activation of clotting factors [2]. Despite its success, the widespread use of warfarin revealed a significant limitation: re-

sistance in target rodent populations. This challenge led to the development of second-generation anticoagulants, often referred to as Long-Acting Anticoagulant Rodenticides (LAAR) or "super-warfarin" [3]. These compounds, including Brodifacoum and Difenacoum, are much more potent and persist longer in the environment than warfarin. They were developed to combat resistance and ensure the effectiveness of rodent control [4-6]. However, the increased potency and prolonged biological activity of super-warfarins also increased the risk of severe and delayed toxicity in non-target species, including humans. Although human exposure to rodenticides is usually accidental and mainly affects children, deliberate ingestion by adults is a more worrying scenario [4,7]. Such deliberate cases of rodenticide poisoning, although rare, have a worse prognosis than accidental exposure. Data from a 4-year study of pesticide poisoning in central Iran showed that 75% of cases were suicide attempts, and although rodenticides were not the most common form of pesticide poisoning, they had a higher mortality rate than other pesticides [8]. The most common clinical manifestations of rodenticide poisoning include mucocutaneous bleeding such as hematuria, gingival bleeding, epistaxis, and gastrointestinal bleeding [4]. Significant coagulopathy manifested by these clinical features usually results from the ingestion of large amounts of rodenticide. Although the onset of clinical symptoms typically begins within three days of ingestion, some cases have shown longer latency periods, making diagnosis difficult. Furthermore, the clinician may not initially be aware of the deliberate attempt, further complicating timely and accurate diagnosis [9-11]. In this report, we present a rare case of delayed presentation of rodenticide poisoning. This case emphasizes the diagnostic challenges and the necessity for a heightened clinical suspicion to ensure timely treatment, thereby reducing missed or misdiagnosed cases and providing affected patients with prompt and effective intervention.

Case presentation

A 16-year-old Iranian male was admitted to the Emergency Department (ED) with symptoms of gingival bleeding and generalized weakness that had begun three days earlier. He reported ingesting approximately 5 grams of a red pencil-shaped super warfarin rodenticide in a suicide attempt two weeks before admission. Of note, the patient had no significant family or past medical history and was not taking any medication at the time. On admission, his vital signs were stable; he was afebrile with a blood pressure of 123/75 mmHg and a pulse rate of 68 bpm. Physical examination revealed moist mucous membranes without lesions, intact skin without signs of bleeding, and no significant positive signs other than gingival bleeding. His platelet count remained within normal limits, which was significant as it suggested selective impairment of the coagulation pathway rather than generalized hematological dysfunction. He also complained of abdominal pain in the right lower quadrant, which was not tender on examination. An abdominal-pelvic CT scan with IV contrast showed fat stranding in the region, suggesting an inflammatory process. Based on the patient's history, signs and symptoms, and laboratory data, he was diagnosed with rodenticide poisoning and coagulopathy. Immediate treatment was initiated with intravenous vitamin K (10 mg), 10 units of fresh frozen plasma, and two units of blood transfusion to correct the coagulopathy and severe anemia. By the second day of admission, the gingival bleeding had resolved and no surgical intervention was required. Subsequent laboratory tests showed improvements with hemoglobin increasing to 7.5 g/dL, INR decreasing to 6.3 and PTT decreasing to 55 seconds. The patient's condition continued to improve and on discharge, laboratory values showed a stable condition with hemoglobin at 11.5 g/dL, INR normalized at 1.02, and PTT at 35 seconds. As part of his ongoing treatment, the patient was prescribed high-dose oral vitamin K, 75 mg four times daily. Over the following weeks, his Prothrombin Time (PT) and INR values stabilized within the therapeutic range. After achieving stable coagulation parameters, the patient was referred to the mental health service for further assessment and treatment to address the underlying issues that led to the initial ingestion. The timely and effective medical interventions, together with the subsequent mental health referral, highlighted a comprehensive approach to treatment, facilitating successful recovery and ensuring ongoing support for the patient's wider health needs.

Discussion

This case of a 16-year-old Iranian male with intentional super warfarin ingestion illustrates the complex interplay between clinical presentation, timely intervention, and the nuances of managing severe anticoagulant rodenticide poisoning. The patient's delayed presentation presented a significant diagnostic challenge. Intentional ingestion, especially in adults, is associated with a worse prognosis than accidental exposure. Studies from central Iran suggest that although rodenticides are not the most common agents in pesticide poisonings, they are associated with a higher risk of mortality. This underlines the urgent need for increased clinical vigilance and knowledge of toxicology in emergencies. In this case, the patient's ingestion of a significant amount of LAAR resulted in severe coagulopathy, manifested by gingival bleeding and general weakness - symptoms that are emblematic of the primary clinical manifestations of rodenticide poisoning. This case emphasises the importance of early recognition and intervention by healthcare providers in cases of super warfarin rodenticide poisoning due to the delayed symptoms associated with it. Clinicians should remain vigilant for atypical presentations of rodenticide poisoning to ensure timely and effective management. In addition, it is important to investigate potential abuse of anticoagulant medications in cases with similar presentations, as overlooking this aspect could delay critical treatment interventions.

Conclusion

This case report of a 16-year-old male with intentional ingestion of super warfarin rodenticide highlights the critical importance of early recognition and proactive management of rodenticide poisoning. Despite the inherent challenges posed by the delayed onset of symptoms associated with long-acting anticoagulant rodenticides, the successful outcome in this case underscores the efficacy of immediate and comprehensive treatment approaches. Clinicians must maintain a high suspicion of rodenticide toxicity in patients presenting with unexplained bleeding and coagulopathy, especially in the absence of a clear history of exposure. Ultimately, this case serves as an important reminder of the dangers associated with super warfarin rodenticides, both as a public health hazard and as a clinical emergency. It calls for increased awareness among healthcare providers of the potential for such poisonings and the need to be prepared in emergency settings to effectively manage these complex cases.

Declarations

Ethics approval: This case report was conducted under the ethical standards of the 1964 Helsinki Declaration and its later

amendments or comparable ethical standards. Ethical approval was granted by the Ethics Committee of Mashhad University of Medical Sciences, Mashhad, Iran. Written informed consent was obtained from the patient for publication of this case report and any accompanying data.

Data availability declaration: Due to the sensitive and confidential nature of the data associated with this case report, detailed clinical data and patient history, are not publicly available. However, de-identified data that support the findings of this study are available from the corresponding author upon reasonable request. Requests for access to these data will be reviewed by the corresponding author and will require compliance with applicable privacy regulations and approval by the institutional review board.

Conflicts of interest: The authors declare that there are no conflicts of interest regarding the research, authorship, and/or publication of this article.

Funding declaration: The authors declare that no funds, grants, or other support were received during the preparation of this manuscript.

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