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HEMOLYTIC UREMIC SYNDROME FOLLOWING *HEMISCORPIUS LEPTURUS* SCORPION STING: A CASE REPORT

Kambiz Ghasemi*

Department of Pediatric Nephrology, Clinical Research Development Center of Children's Hospital, Hormozgan University of Medical Sciences, Bandar Abbas, Iran.

***Corresponding Author: Kambiz Ghasemi**
Department of Pediatric Nephrology, Clinical Research Development Center of Children's Hospital, Hormozgan University of Medical Sciences, Bandar Abbas, Iran.

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ABSTRACT

Introduction: Scorpion sting from *Hemiscorpius lepturus* (*H. lepturus*) is a health threat to the inhabitants of the southern provinces of Iran. Here, we present a case of hemolytic uremic syndrome (HUS) following *H. lepturus* sting in a pediatric patient in Hormozgan province, Iran. **Case presentation:** A 13-year-old girl presented with scorpion sting to the emergency department. On admission, the patient was agitated and quite lethargic. She reported multiple vomiting episodes and bloody urine. The site of the scorpion sting was non-tender and no erythema was observed. The scorpion brought by the parents was identified as *H. lepturus*. Laboratory test results revealed anemia, thrombocytopenia, and acute kidney injury, indicating a diagnosis of HUS. She received blood, fresh frozen plasma, and hemodialysis and responded to these treatments. The patient was discharged after 10 days of hospitalization. **Conclusions:** HUS can be a serious complication in children after *H. lepturus* sting. Care takers and physicians should be aware of this potential complication and take the necessary measures to diagnose and treat it.

KEYWORDS: HUS, scorpion, *Hemiscorpius lepturus*, child, case report.

INTRODUCTION

Scorpion sting is an important global health issue, especially in tropical and subtropical countries such as Iran.[1] *Hemiscorpius lepturus* (*H. lepturus*), belonging to the Hemiscorpiidae family, is one of the most dangerous and venomous species. *H. lepturus* is found in southern regions of Iran, including Hormozgan, Khuzestan, Ilam, and Sistan and Baluchestan and poses a great threat to individuals living in these provinces, specifically younger children.[2]

H. lepturus sting can lead to local complications, such as cellulitis and necrosis of the sting site, as well as systemic complications such as hemolysis, rhabdomyolysis, confusion, cerebral infarction, cardiovascular disorders, and renal failure.[3] Hemolytic uremic syndrome (HUS), classically correlated with Shiga toxin from *Escherichia coli*, is the clinical triad of acute kidney injury, thrombocytopenia, and anemia.[4,5] However, the microangiopathic hemolytic anemia in patients stung with *H. lepturus* can gradually lead to HUS, which has been attributed to ADMATS13 deficiency.[6, 7] Here, we present another case of HUS following *H. lepturus* sting in a pediatric patient in Hormozgan province, Iran.

CASE REPORT

A 13-year-old girl presented with scorpion sting to the emergency department of Bandar Abbas Children's Hospital in December 2019. On admission, the patient was agitated and quite lethargic. She reported multiple vomiting episodes and bloody urine. The site of the scorpion sting was non-tender and without erythema. The scorpion brought by the parents was identified as *H. lepturus*.

Vital signs evaluations revealed a blood pressure of 145/90 mmHg (stage I hypertension). The urine volume was a low as 0.6 ml/kg/h. Primary laboratory assessments showed 3.6×10^6 /µl red blood cell (RBC) count, 9.5 g/dL hemoglobin, 82 fL mean corpuscular volume, 135 mEq/L serum sodium, and 5.2 mEq/L serum potassium levels. Moreover, on admission, her blood urea nitrogen (BUN) level was 45 mg/dL with a serum creatinine level of 2.4 mg/dL, which is indicative of stage I acute kidney injury. The patient was admitted to the pediatric intensive care unit (PICU) and further laboratory tests were requested, including urinalysis, glucose-6-phosphate dehydrogenase (G6PD), partial thromboplastin time (PTT), prothrombin time (PT), liver function tests, complete blood count (CBC) and platelet

count, and Coombs' test. The results showed normal PT and PTT. Alanine aminotransferase was 70 U/L and aspartate aminotransferase was 62 U/L. Her platelet count was 142,000 /µl. Urinalysis revealed 2+ proteinuria and many RBCs.

On the second day of admission, CBC showed decreased hemoglobin (7.8 g/dL) and platelet count (65,000 /µl). A peripheral blood smear (PBS) was performed and revealed Burr cells and fragmented RBCs. The anemia, thrombocytopenia, and decreased urine output confirmed the diagnosis of HUS. Other laboratory test results included increased serum creatinine (3.2 mg/dL), elevated BUN (90 mg/dL), serum albumin: 3.2 g/dL, serum protein: 6 g/dL, phosphorus: 5.8 mg/dL, calcium: 8.9 mg/dL, and lactate dehydrogenase (LDH): 15380 U/L. Renal ultrasound was normal. Prazosin was prescribed to control blood pressure. Also, serum bicarbonate was administered at 1.5-fold the maintenance dose. The patient was scheduled for hemodialysis due to the presence of uremia symptoms.

The patient was hospitalized for a total of 10 days, during which she received hemodialysis 6 times; daily hemodialysis for the first 3 days and every other day for the rest of her hospitalization. Moreover, the patient received 3 packed red blood cell and 4 fresh frozen plasma infusions during hospitalization. Laboratory test results on the 10th day showed a serum creatinine level of 1.9 mg/dL, hemoglobin of 10 g/dL, platelet count of 165,000 /µl, and LDH of 1650 U/L. She was discharged after 10 days of hospitalization. Upon the first follow-up, 2 weeks post-discharge, hemoglobin was 10.2 g/dL, serum creatinine 1.4 mg/dL, platelet count 320,000 /µl, and creatine phosphokinase (CPK) 35 U/L. At the second follow-up, 3 months post-discharge, CPK levels were at 35 U/L.

DISCUSSION

In the current study, we reported a case of HUS following *H. lepturus* sting in a 13-year-old girl. She presented to the emergency department with agitation and lethargy with multiple vomiting episodes and bloody urine. Laboratory test results revealed anemia, thrombocytopenia, and acute kidney injury, indicating a diagnosis of HUS. She received blood, fresh frozen plasma, and hemodialysis and responded to these treatments. The patient was discharged after 10 days of hospitalization.

HUS falls into the category of diseases called thrombotic microangiopathies and comprises of three main clinical findings, including acute renal impairment, thrombocytopenia, and microangiopathic hemolytic anemia.[8,9] HUS has previously been described in some pediatric case reports of scorpion sting. In 2008, Valavi et al. reported the first case of HUS after *H. lepturus* sting in Iran. The patient was a 7-year-old girl who presented with a 12-hour history of bloody urine.[6] In agreement with our findings, they found Burr cells and fragmented RBCs in her PBS, indicating microangiopathic hemolytic anemia.[6] In 2011, Valavi et al. reported the development of HUS in a 7-year-old boy, 2 days after envenomation with *H. lepturus*. They tried to determine the causes of HUS by evaluating C3, C4, CH50, and H factors; however, all were normal. Nonetheless, Von Willebrand factor cleaving protease (ADAMTS-13) showed significantly decreased activity. The patient responded to plasma exchange.[7] They hypothesized ADAMTS-13 deficiency as the underlying mechanism of HUS in these patients and performed a larger study on a series of 60 scorpion stung children.[3] In this study, they measured plasma levels of ADAMTS-13 and its IgG antibody and demonstrated decreased ADMATS-13 in 91.7% and increased antibodies in 98.3% of the patients.[3] Although we did not evaluated these indices in our patient, the previous studies show the potential role of ADAMTS-13 deficiency in the pathophysiology of HUS following scorpion sting.

CONCLUSIONS

HUS can be a serious complication in children after *H. lepturus* sting. Care takers and physicians should be aware of this potential complication and take the necessary measures to diagnose and treat it.

Declarations

Ethics approval and consent to participate

The study received ethics approval from the Ethics Committee of Hormozgan University of Medical Sciences under the ethics code: IR.HUMS.REC.1397.070 and it complies with the statements of the Declaration of Helsinki. Written informed consent was obtained from the parents of the patient.

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

Consent for publication

The parents of the child reported in this article gave written informed consent for the publication of her case.

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Author's contributions

Conceptualization and study validation: KG
Writing and reviewing: KG

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