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Original Research Paper

Internal Medicine

HYPOPITUITARISM-A RARE COMPLICATION FOLLOWING SNAKE BITE: A CASE REPORT STUDY

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ABSTRACT

Background: Snakebite envenomation is a major public health issue in tropical and rural regions, often leading to acute complications such as coagulopathy, neurotoxicity, and acute kidney injury (AKI). However, endocrine complications, particularly hypopituitarism, are rarely reported and frequently overlooked in clinical practice. Russell's viper (Daboia russelii) bites are increasingly associated with delayed-onset anterior pituitary dysfunction, potentially manifesting months or even years after the initial insult. **Case Presentation:** We report the case of a 21-year-old male from rural India who presented with progressive fatigue, weight loss, pallor, and loss of secondary sexual characteristics, one year following a Russell's viper envenomation. His initial episode was complicated by AKI, requiring six sessions of haemodialysis. Six months post-discharge, he developed symptoms consistent with hormonal insufficiency. Hormonal assays revealed central hypothyroidism, secondary adrenal insufficiency, and hypogonadism, with pituitary MRI showing anterior pituitary hypoplasia, confirming the diagnosis of panhypopituitarism. He was successfully managed with glucocorticoid, thyroxine, and testosterone replacement therapy, with marked symptomatic improvement at three-month follow-up. **Conclusion:** This case highlights the rare but serious complication of delayed hypopituitarism following Russell's viper envenomation. Long-term endocrine monitoring should be considered in all snakebite survivors with systemic involvement. Early recognition and hormone replacement can significantly improve quality of life and prevent morbidity associated with untreated hypopituitarism.

KEYWORDS :

INTRODUCTION

Snakebite envenomation remains a major public health issue in tropical and subtropical regions, particularly in rural areas of developing nations [1]. According to the World Health Organization, venomous snakebites affect up to 2.7 million people annually, causing 81,000 to 138,000 deaths worldwide [2]. While acute effects like coagulopathy, neurotoxicity, and acute kidney injury (AKI) are well recognized, endocrine complications—especially pituitary dysfunction—are less frequently reported and often underdiagnosed [3]. Acute pituitary insufficiency, hyponatremia from natriuretic effects, and hypokalaemia due to intracellular potassium shift may occur in the early phase after envenomation [4].

A key concern is chronic hypopituitarism, which can emerge months or even years after the bite, making timely diagnosis difficult for clinicians [5]. The pathogenesis is multifactorial, involving direct cytotoxic damage to pituitary cells, ischemic necrosis from disseminated intravascular coagulation (DIC), and vascular occlusion caused by fibrin thrombi [6]. The insidious onset of symptoms highlights the need for prolonged monitoring and routine endocrine evaluation in snakebite survivors, especially those who experienced severe systemic effects like AKI [7]. This case report discusses a patient who developed chronic hypopituitarism one year after a Russell's viper bite, aiming to raise awareness of this rare but significant delayed complication.

Case Report

A 21-year-old non-alcoholic, non-smoking male from rural Solapur district, India, presented to our endocrinology clinic with complaints of progressive fatigue, weakness, loss of appetite and weight loss. The patient's medical history was significant for a Russell's viper snake bite that occurred a year prior, at the age of 20. At the time of the snake bite, the patient developed oliguria and acute kidney injury (AKI), necessitating six cycles of hemodialysis. He was discharged with a diagnosis of snake bite-induced AKI, with normal creatinine levels and adequate urine output. Prior to the snake bite, the patient reported being healthy with good appetite.

Approximately six months after the snake bite incident, the patient began experiencing gradual onset of easy fatigability, lethargy, and malaise. These symptoms were accompanied by weight loss (approximately 8–10 kg over 3 months). Over time, he observed changes in his physical appearance, including pallor and the development of coarse facial features. The patient also noted a significant reduction in secondary sexual characteristics, with sparse facial, axillary, and pubic hair growth.

On physical examination, the patient was found to be conscious, alert, and cooperative, with a Mini-Mental State Examination (MMSE) score of 30/30. He exhibited moderate pallor without jaundice or cyanosis. His blood pressure was 100/50 mmHg, with a regular pulse of 76 beats per minute. The patient's skin was pale and coarse in texture, and his voice was noticeably hoarse. Thyroid examination revealed no palpable abnormalities. Abdominal examination was unremarkable, with no organomegaly or masses detected. Cardiovascular and respiratory examinations were within normal limits. Neurological assessment demonstrated intact higher functions, cranial nerves, sensory, and cerebellar functions. No fasciculation was noted. Genitourinary examination revealed a testicular volume of 15 mL, which is below the normal range for his age, and sparse pubic hairs.

Fig.01-Showing Testicular Atrophy

Laboratory investigations revealed anaemia (Haemoglobin: 9.2 g/dL, Packed Cell Volume: 29.5%, Mean Corpuscular

Volume: 67.6 fL, Corrected Reticulocyte Count: 1.1%). White blood cell and platelet counts were within normal limits. Renal function tests showed normal urea (28 mg/dL) and creatinine (0.4 mg/dL) levels. Urinalysis was unremarkable, with no evidence of proteinuria or hematuria. Serum electrolytes, liver function tests, and glucose levels were all within normal ranges. Serum calcium was 10.1 mg/dL, and ferritin was mildly elevated. Endocrine evaluation revealed a low Free T4 level (0.13 ng/dL) with a normal TSH (4.2 μIU/mL), suggesting central hypothyroidism. Further hormonal assays demonstrated markedly low serum cortisol (1.74 μg/dL) and serum testosterone level (Total) – (0.673 ng/mL), with reference value (4–10.8).

Magnetic Resonance Imaging (MRI) of the pituitary gland revealed hypoplastic anterior pituitary. This finding, in conjunction with the clinical presentation and hormonal profile, strongly suggested a diagnosis of delayed hypopituitarism secondary to snake bite.

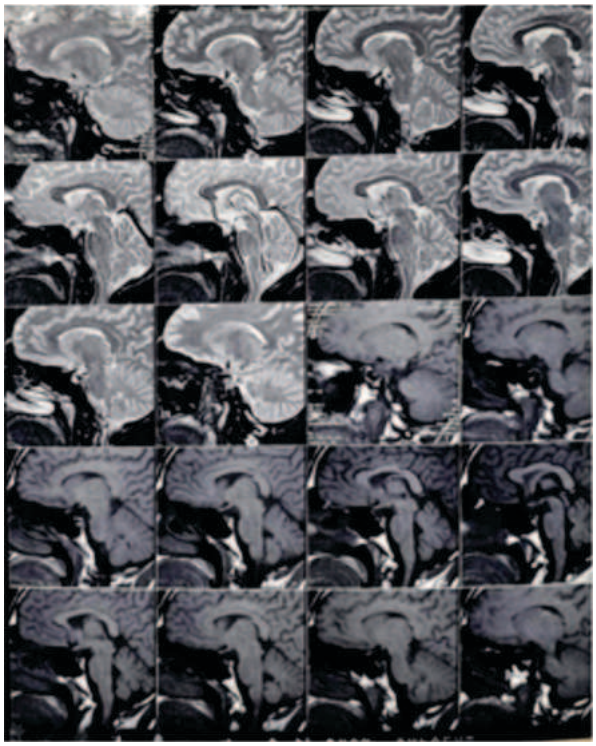

Fig.02-MRI Showing Hypoplastic Anterior Pituitary

Based on the diagnosis of panhypopituitarism, the patient was initiated on hormone replacement therapy. This included prednisolone (5 mg once daily at 8 AM), levothyroxine (100 μg daily), and testosterone enanthate (250 mg intramuscular injection every 3 weeks).

At the three-month follow-up, the patient reported significant improvement in his general well-being, concentration, and physical activity. He had also achieved adequate weight gain. No adverse effects were observed from the hormonal replacement therapy.

DISCUSSION

This case highlights the underrecognized risk of delayed endocrine dysfunction following hemotoxic snakebite, particularly from Russell's viper. While acute complications like acute kidney injury (AKI) are well documented, long-term effects such as hypopituitarism are often overlooked. Hypopituitarism post-envenomation is increasingly reported, typically presenting months to years after the bite. The proposed mechanisms include direct cytotoxic effects of venom, ischemic damage from disseminated intravascular coagulation (DIC), and vascular occlusion from fibrin thrombi, leading to pituitary necrosis. Inflammatory responses and oxidative stress may further damage the pituitary microvasculature.

In this case, symptoms began six months post-bite, with diagnosis confirmed a year later. MRI revealed anterior pituitary hypoplasia—consistent with previous findings such as partially empty sella and atrophy, all suggestive of vasculotoxic damage. The patient exhibited classic signs of panhypopituitarism, including coarse facial features, weight loss, pallor, sparse body hair, and testicular atrophy. Lab results confirmed central hypothyroidism, secondary adrenal insufficiency, and hypogonadism. Literature indicates a high prevalence of these deficiencies in similar cases: hypogonadism (100%), central hypothyroidism (96.4%), adrenal insufficiency (82%), and growth hormone deficiency (77%).

Acute kidney injury, a common result of vasculotoxic bites, may contribute to pituitary dysfunction via systemic inflammation and metabolic derangements. This patient's prior need for dialysis likely intensified pituitary vulnerability. Treatment with hormone replacement—glucocorticoids, thyroxine, and testosterone—led to significant symptomatic improvement and enhanced quality of life, without side effects during three months of follow-up. This case underscores the need for long-term endocrine monitoring in snakebite survivors, especially those with AKI, to detect and manage delayed hypopituitarism effectively.

CONCLUSION

This case highlights the need to recognize panhypopituitarism as a rare yet serious delayed complication of Russell's viper envenomation. Clinicians should suspect endocrine dysfunction in snakebite survivors presenting with nonspecific symptoms like fatigue, weight loss, hypotension, or hypogonadism, particularly if they had acute kidney injury or required dialysis. Long-term follow-up, hormonal evaluation, and MRI imaging are essential for timely diagnosis. From a public health perspective, the case emphasizes the importance of developing protocols for monitoring delayed effects of snakebites, especially in rural, resource-limited settings where follow-up is often lacking. Greater awareness among clinicians and policymakers is vital to improving early recognition and management of such endocrine complications. Further research is needed to better understand the mechanisms, identify predictive markers, and establish standardized screening strategies. Prompt diagnosis and hormone replacement can significantly improve quality of life, making early detection both life-saving and impactful.

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Conflict of Interest

There was no conflict of interest.

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