



Trauma and reconstruction

High flow or low flow? An unusual case of ischemic priapism following gunshot wound to the cervical spinal cord

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ABSTRACT

Ischemic priapism has rarely been reported in the setting of acute spinal cord injury. Herein, we present a 25 year-old male with cavernous blood gas evidence of ischemic priapism following a traumatic gunshot wound with a retained bullet fragment in the third cervical vertebra. The patient received definitive treatment with corporal aspiration and irrigation, with no evidence of priapism recurrence. This unusual case emphasizes the critical importance of obtaining a cavernous blood gas, even when a common cause of non-ischemic priapism is apparent. Suspicion for ischemic priapism must be maintained, especially in the setting of multiple known risk factors.

Introduction

Priapism is defined as a full or partial erection lasting greater than 4 hours. Three distinct subtypes of priapism include ischemic priapism, stuttering priapism, and non-ischemic priapism. Ischemic priapism involves the sequence of venous occlusion followed by decreased cavernous artery inflow. If left untreated, ischemic priapism can lead to irreversible erectile dysfunction. Priapism is a relatively rare event, with an annual incidence of approximately 5.34 per 100,000 men who present to American emergency departments.¹ We present an unusual case of confirmed ischemic priapism following a traumatic gunshot wound to the cervical spine.

Case presentation

A 25-year-old African American male presented to the emergency department (ED) following multiple gunshot wounds. Upon arrival to the ED the patient was found to have Glasgow Coma Scale (GCS) of 3, heart rate of 98, and oxygen saturation of 21% on room air. The patient underwent intubation, bilateral chest tube placement, and full trauma workup. The CT imaging was most notable for a retained bullet fragment in the C3 spinal canal with complete effacement of the canal (Fig. 1). A

fentanyl and propofol drip were initiated for sedation. The patient was subsequently transferred to the trauma intensive care unit (TICU) for further management. Approximately two hours after arrival to the TICU, the patient was noted by nursing staff to have a rigid erection. The erection persisted for an additional 5 h at which time urologic consultation was ordered.

Laboratory findings were notable for hemoglobin: 12.2, hematocrit: 43.7%, and a toxicology screen positive for ethanol and negative for cocaine. White blood cell count, creatinine and lactic acid were within normal limits. A focused urologic examination confirmed a fully rigid and erect circumcised phallus, orthotopic urethral meatus, and bilaterally descended testicles with no associated wounds or other superficial skin changes. Initial cavernous blood gas results were: pH: 7.02, CO₂: 95 mm Hg, and O₂ <18 mm Hg (Table 1). Due to concern for ischemic priapism, the patient was managed urgently with corporal aspiration and irrigation until the penis was completely flaccid. A large volume of dark red blood was withdrawn. The cavernous blood gas immediately following the procedure was: pH: 7.35, CO₂: 45, O₂: 64. After bedside intervention, the penis remained flaccid. There was no evidence of recurrence during the remainder of the hospital course. The patient was extubated, he was found to have complete motor and sensory quadriplegia.

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Discussion

Priapism is defined as a full or partial erection lasting greater than 4 h.² On initial evaluation it is critical to distinguish between ischemic priapism and non-ischemic priapism. Ischemic priapism occurs primarily due to venous occlusion, with inability of blood to leave the corpora. Structural changes to the corporal smooth muscle can occur in 12 hours and irreversible erectile dysfunction can occur in 48 hours if the condition is left untreated.² Patients with ischemic priapism present with a painful and rigid erection, whereas those with non-ischemic priapism typically have tumescence without complete rigidity.

There are multiple etiologies of ischemic priapism including alcohol and drug abuse, malignant infiltration of the corpora, total parenteral nutrition, medications, hyperosmolar IV contrast, and spinal or general anesthesia.² Two well described causes of ischemic priapism are sickle cell anemia and cocaine abuse. Based on his hemoglobin count of 12.2 g/dL sickle cell anemia was deemed less likely. Based on the patient's toxicological screening there was no evidence of recent cocaine use which makes this etiology unlikely. This patient's toxicology screen was positive for alcohol, which may be a contributing etiology. However, chronic alcohol consumption, not acute, is associated with priapism.³ The patient lacked any clinical or laboratory manifestations of chronic alcoholism. Furthermore, the patient did receive general anesthesia in the form of propofol and IV contrast in his initial workup and treatment

Table 1

Cavernous Blood Gas levels.

	Cavernous Blood Gas		
	PO2 (mmHg)	PCO2 (mmHg)	pH
Patient's Blood Gas	18	95	7.02
Ischemic Priapism	<30	>60	<7.25
Non-Ischemic Priapism	>90	<40	7.4

after presenting to the emergency department. Although an acute spinal cord injury was the inciting event, multiple factors may have contributed to the development of ischemic priapism.

Non-ischemic priapism occurs due to a high flow rate of blood into the corpora, commonly caused by penile, perineal or groin trauma or spinal cord injury.^{2,4} Patients present with a painless, semi-tumescient and prolonged erection. In this particular patient, a spinal cord injury was present with a retained bullet fragment at the third cervical vertebra. Given the nature of his injury, non-ischemic priapism would be expected as opposed to ischemic priapism.⁴ Interestingly, this patient was found to have clear evidence of ischemic priapism on cavernous blood gas measurement, despite the presence of acute spinal cord injury. Current literature rarely mentions acute spinal cord injury as an etiology of ischemic priapism. The underlying pathophysiologic mechanism linking acute spinal cord injury to ischemic priapism, if one exists, has

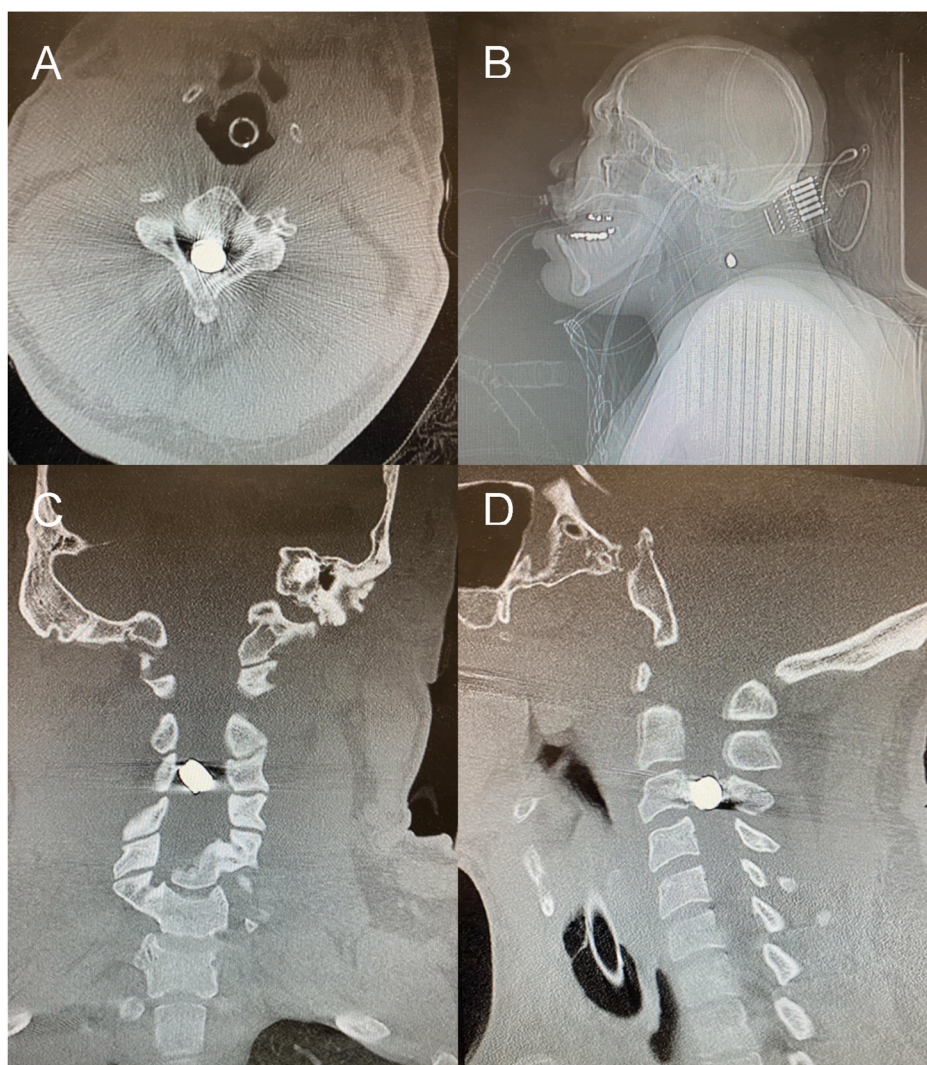


Fig. 1. Retained bullet fragment is identified at the level of the third cervical vertebra. (A) Axial CT Cervical Spine without contrast. (B) Sagittal X-ray Head/Neck. (C) Coronal CT Cervical Spine without contrast. (D) Sagittal CT Cervical Spine without contrast.

not been fully elucidated.^{2,4}

Overall, this case emphasizes the critical importance in distinguishing between ischemic and non-ischemic priapism at the time of evaluation with a cavernous blood gas, especially when risk factors for both ischemic and non-ischemic priapism are present. In the absence of a cavernous blood gas confirming ischemic priapism, expectant management may have been inappropriately pursued in this case given the high likelihood for non-ischemic priapism in the setting of acute spinal cord injury. Even in the setting of a clear inciting event commonly associated with non-ischemic priapism, urologists should maintain a high level of suspicion for ischemic priapism and obtain a corporal blood gas to distinguish the two diagnoses. Invariably, the consequence of untreated ischemic priapism is permanent erectile dysfunction.

Conclusion

This case report identifies a rare instance of ischemic priapism following a traumatic gunshot wound to the cervical spine. Despite the presence of a common etiology of non-ischemic priapism, multiple potentially synergistic risk factors may have led to the ischemic presentation described. Further studies are needed to fully elucidate the underlying mechanism behind ischemic priapism in the setting of acute spinal cord injury. This case underlines the critical importance in

obtaining a cavernous blood gas in distinguishing ischemic from non-ischemic priapism when the diagnosis is in question.

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Declaration of competing interest

The authors have no conflicts of interest.

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