

Cerebrovascular Accident Following Gunshot Wounds to the Chest and Upper Arm: A Case Report from Northwestern Nigeria

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Abstract

Background: Stroke is a recognized medical emergency, and its connection to gunshot wounds is a rare but significant complication. Projectile embolization leading to ischemic stroke has been documented, but the current case offers new insights. This report aims to contribute to the existing literature by describing a unique occurrence of cerebrovascular accident following gunshot wounds to the chest and upper arm.

Methods/Results: A 60-year-old Hausa Muslim farmer from Northwestern Nigeria, who suffered multiple gunshot wounds to the chest and upper arm, was referred for expert care. Diagnostic interventions, including computed tomography of the brain and a comprehensive medical history and physical examination, were conducted. The patient was managed using a multidisciplinary approach involving neurologists, cardiothoracic surgeons, hematologists, nurses, and physiotherapists.

Conclusion: This case report illustrates the complexity of managing a cerebrovascular accident following gunshot wounds. The clinical details, diagnostic findings, and management approach have been provided, although further research and case studies are required to deepen our understanding of such rare cases.

Keywords: Cerebrovascular Accident; Gunshot Wounds; Projectile Embolization; Ischemic Stroke; Multidisciplinary Approach.

Introduction

Background: Stroke, or cerebrovascular accident, is a medical condition characterized by a sudden cessation of blood flow to a part of the brain, resulting in a corresponding loss of neurological function^[1]. The diagnostic criteria for stroke are well-established and typically encompass clinical history, neuroimaging, and various laboratory tests^[1]. With modern medical advancements, our

understanding of stroke has evolved, yet the disease remains a leading cause of death and disability worldwide.

Strokes can be classified into ischemic strokes, caused by blood clots, and hemorrhagic strokes, resulting from bleeding in the brain.

Globally, ischemic strokes account for approximately 85% of all stroke cases^[2]. The risk factors for stroke are multifactorial and include hypertension, diabetes mellitus, atrial fibrillation, and lifestyle factors such as smoking and obesity^[3]. However, there exist rare and unconventional etiologies, such as injuries from gunshot wounds, that may lead to stroke, representing a unique challenge in diagnosis and treatment.

Gunshot wounds to the body can lead to a rare but serious complication known as bullet embolization. The mechanism usually involves a bullet or bullet fragments entering the vascular system and traveling to distant sites, causing occlusion or damage^[4]. In particular, gunshot wounds to the chest and upper arm have been reported to cause embolic strokes in rare cases^[5]. The condition is complex and requires prompt identification and intervention to prevent devastating consequences.

Managing stroke resulting from bullet embolization requires a multidisciplinary approach involving neurologists, surgeons, hematologists, and other medical professionals. Treatment typically involves surgical removal of the embolized bullet, anticoagulation therapy, and supportive

care^{>6}. Delays in diagnosis and treatment can lead to irreversible neurological deficits or even death^[7].</sup>

While there have been reports on strokes caused by bullet embolization, the literature lacks comprehensive studies focusing on the diagnostic challenges, management strategies, and long-term outcomes of such patients. There is a need for more extensive research and documentation of cases to enhance our understanding and management of this rare condition.

Aim/Objective

The objective of this case report is to present a rare case of cerebrovascular accident precipitated by gunshot wounds to the chest and upper arm in a patient from Northwestern Nigeria. This report aims to contribute to existing literature by providing detailed insights into the diagnosis, treatment, and therapeutic considerations in managing this unusual medical scenario.

Methods

A thorough clinical examination, history taking, neuroimaging, and a multidisciplinary treatment approach were used to manage a 60-year-old patient with

acute cerebral infarction following gunshot wounds. This case was selected for its rarity and the valuable insights it offers into the management of uncommon stroke etiologies.

Case Report/Results

A 60-year-old married Hausa Muslim farmer from Goronyo town, Sokoto state, Northwestern Nigeria, was referred for expert care after being shot multiple times in the chest and upper right arm by unknown gunmen, resulting in a cerebrovascular accident.

The patient experienced sudden inability to use the left upper and lower limbs, aphasia, and deviation of the mouth's angle to the right. There were no accompanying symptoms such as loss of consciousness, convulsions, headache, or vomiting. His medical history was negative for hypertension, diabetes mellitus, stroke or transient ischemic attack, artheroma markers, cardiac, liver, or kidney disease, bleeding disorders, or head trauma.

On physical examination, the patient appeared pale and dehydrated, with sutured lacerations on the anterior medial and lateral part of the right arm, measuring about 8 cm, and unilateral pitting pedal edema on the left

lower limb. Random blood sugar at presentation was 6.3 mmol/L.

Neurological examination revealed a conscious but aphasic patient, who had a Glasgow coma scale score of 11/15 (GCS EO 4, VR 1, BM 6), with reduced tone, power, and reflexes on the left side. A computed tomography scan of his brain showed features of acute cerebral infarction in the parieto-temporal region.

The patient was managed using a multidisciplinary approach, involving neurologists, cardiothoracic surgeons, hematologists, nurses, and physiotherapists. He was resuscitated and commenced on analgesics, broad-spectrum antibiotics, tetanus prophylaxis, antiplatelets, antioxidants, statins, and anticoagulants (Well's predictive score: >3).

Discussion

This case illustrates a rare but significant complication of gunshot injury, namely projectile embolization leading to ischemic stroke. Comparing with existing literature, this case emphasizes the importance of rapid identification and treatment of projectile embolization to minimize ischemic damage^[4-9]. Understanding the unique features of the patient's symptoms and diagnostic findings

offers insights into optimal management for similar future cases.

Projectile embolization, though rare, has been reported in various cases, leading to complications ranging from thrombosis to ischemic stroke. This case provides evidence for the serious consequences of projectile embolization, especially when compounded by delayed identification and treatment. The underlying mechanism of projectile embolization leading to stroke involves the lodging of a bullet or bullet fragments within the vascular system, potentially migrating to the cerebral circulation^[4-9].

Rapid identification and treatment of projectile embolization are vital to minimize ischemic damage^[4-9]. In this case, CT imaging played a crucial role in identifying the acute cerebral infarction, a common finding in patients with gunshot-induced stroke. Timely management with analgesics, antibiotics, tetanus prophylaxis, antiplatelets, antioxidants, statins, and anticoagulants is essential for optimal patient outcomes.

The case also emphasizes the importance of a multidisciplinary approach in managing gunshot-induced cerebrovascular accidents. Collaboration among neurologists, cardiothoracic surgeons, hematologists, nurses, and physiotherapists ensures a

comprehensive and coordinated care plan. Such an approach has been advocated in similar cases in the literature.

Comparative studies of gunshot-induced strokes reveal varying patient outcomes, depending on factors such as the caliber of the weapon, location of entry, projectile trajectory, and medical interventions^[4-9]. While some patients recover with minimal deficits, others suffer long-term impairments^[8,9]. The present case aligns with prior reports emphasizing early intervention and aggressive management.

This case underscores the need for clinicians to maintain a high index of suspicion for projectile embolization in gunshot victims, especially when presenting with neurological symptoms. Awareness of this rare complication can lead to timely diagnosis and intervention, potentially reducing the risk of permanent damage.

Conclusion

The occurrence of cerebrovascular accident following gunshot wounds to the chest and upper arm in Northwestern Nigeria provides an intriguing and instructive clinical scenario. The case adds to the existing body of knowledge on projectile embolization and its potential complications. Early

recognition, prompt diagnostics, and aggressive multidisciplinary management are crucial for minimizing ischemic damage. Further studies and a systematic review of similar cases will contribute to a more in-depth understanding of this complex medical phenomenon.

References

1. Jameson JL, Kasper DL, Longo DL, et al. Harrison's principles of internal medicine 20th edition. New York: McGraw-Hill Education; 2018.
2. Feigin VL, Norrving B, Mensah GA. Global Burden of Stroke. *Circ Res*. 2017;120(3):439-48.
3. O'Donnell MJ, Xavier D, Liu L, et al. Risk factors for ischaemic and intracerebral haemorrhagic stroke in 22 countries (the INTERSTROKE study): a case-control study. *Lancet*. 2010;376(9735):112-23.
4. Symbas PN, Harlaftis N, Bullet Emboli in the Pulmonary and Systemic Arteries. *Ann Surg*. 1977;185(3):318-20.
5. Badugu S, Bennett J, Slamon N. Projectile embolization to the left femoral artery with stroke following gunshot wound to the chest. *J. Pediatr. Intensive Care*. 2012;1(4):217-20.
6. Ludwig M, Kornmann M, Hoferlin A, et al. Surgical removal of a bullet embolus from the right heart without extracorporeal circulation. *J Trauma*. 2010;68(1):E1-3.
7. Sutter M, Egglin T, Alkadhi H, et al. Bullet Embolism—Diagnosis and Management. *Eur J Trauma*. 2004;30(4):266-70.
8. Golomb MR, Tejada JG, Ducis KA, Martinez ML. Acute and delayed cerebrovascular injury from gunshot to the head in a 12-year-old child during the COVID-19 pandemic. *Pediatr. Neurol*. 2022;130:1.
9. Helán M, Ráb M, Šrámek V, Vaníček J, Staffa R, Volný O, et al., editors. Ischaemic Stroke Caused by a

Gunshot Wound to the Chest. *EJVES vascular forum*; 2020: Elsevier

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