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Intracerebral Migration of Stray Bullet Leading to Sudden and Fatal Worsening

Manzar Hussain and Ehsan Bari

ABSTRACT

Gunshot wounds to the cranium are one of the leading cause of death and disability in young adults. Stray bullets are also being increasingly seen in clinical setting. We report a case of a 14-year-old boy who sustained a stray bullet to the cranium during election festivities. He arrived at the health care facility institution nearly 24 hours after the event in good neurological condition. He remained neurologically stable for about 8 hours after his presentation and later on deteriorated due to intracranial bullet migration. This required immediate bifrontal decompressive craniotomy along with right frontal lobectomy. However, the patient could not survive.

Key words: *Migrating bullet. Pediatric population. Stray bullet. Spent bullet. Cranium. Brain death.*

INTRODUCTION

Cranial gunshot wounds constitute a major cause of morbidity and mortality in the young adults.¹ Surgical management varies from emergent to elective,² based on the neurological status of the patients. Patients sustaining stray bullet injury belong to a special sub - group¹ and their injuries are usually not severe. However, these patients run the risk of acute deterioration from bullet migration as observed in the presently reported case.

CASE REPORT

This 14-year-old student presented almost 24 hours after sustaining single stray bullet to the anterior aspect on the right side of forehead during post-election day celebrations. Local bleeding caught the attention of the patient and his family. His family took him to another hospital where he was managed non-operatively. Almost 24 hours after the accident, he was presented at our institution, with stable vital signs and drowsiness. He had neck stiffness. His neurological examination showed Glasgow coma scale of 15, pupils were bilaterally and equally reactive to light, no focal neurological deficit. He had a single entry wound 1 cm towards the right of midline and 1 cm in front of coronal suture with ragged margins. CT head and brain plain (Figure 1) was repeated which showed single bullet in right frontal region, with minimal brain edema. He was

admitted in the neurosurgical special care unit and managed with conservative therapy, along with plan to remove bullet fragment and wound debridement on next elective operating list. Patient was nursed in supine position. Almost 8 hours after his admission he suddenly deteriorated and his Glasgow coma scale became 3, along with fixed and dilated pupils. Patient was intubated and repeat cranial tomography (Figure 2) was performed which showed about 4 cm bullet migration in the posterior cranial direction in the ipsilateral hemisphere. It was associated with signs of brain stem herniation, gross global edema and effacement of basal cisterns. Immediate bifrontal decompressive craniotomy along with right frontal lobectomy was performed. Post-operatively patient showed no signs of improvement and was declared dead after fulfilling brain death criteria.

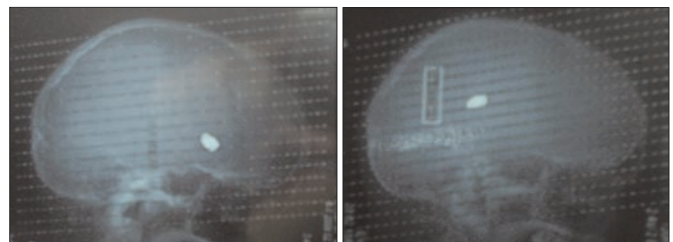


Figure 1: Pre-deterioration.

Figure 2: Post-deterioration.

DISCUSSION

Cranial gunshot wounds are one of the important causes of morbidity and mortality in the young patient population sustaining cranial injuries, along with road traffic accidents and falls.¹ The management of cranial gunshot wounds is surgical, however, the urgency depends upon the neurological status of the patient and varies from emergent to elective.² Stray bullets are a well known entity in neurosurgical literature.³ Patients

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sustaining stray bullets present a separate pathological picture. These injuries are due to vertical descend of the bullet. The bullet has sufficient kinetic energy to penetrate not only the scalp but also the cranium and at times may traverse through the brain parenchyma.³ Because of the associated low velocity they neither produce cavitation nor draw bone fragments inward.³ These bullets because of their weight and the smoothness of the surface tend to migrate within the cranial cavity.³ This most frequently happens in infants and children. This observation mandates that repeat imaging be performed at frequent intervals.³ The spontaneous migration of bullets within the brain as a consequence of gravity has been reported sporadically.^{4,5} There are very few literature reports of spontaneous migration of a bullet within the brain, with no neurological deficit.⁶ To our knowledge no death has been reported as a consequence of migrating bullet in pediatric population.

Penetrating cranio-cerebral injury in children and adolescents is an increasing cause of emergent neurosurgical admissions.⁷ In our setup it is often the non - gang violence that leads to such injuries. Recently a sharp rise in the pediatric population presenting with penetrating trauma has been witnessed. The medical and social implications of such injuries are enormous. Migration of bullet within the cranial cavity is a well recognized phenomenon, but the fatal consequences are not very frequent. There management demand special attention as the decision of non-operative management in the initial phase is fraught with danger. If the patient treated conservatively, the resting position should be dictated in order to avoid an eventual

migrating bullet to eloquent regions of the brain causing additional neurological deficits.⁵ This patient showed stable initial neurological status with sudden worsening leading to irreversible eventual outcome. This case emphasizes that perhaps a little more proactive approach would have saved his life.

Penetrating trauma to the brain is a major event and demand vigilance on the part of the physician. Bullet migration cannot be taken lightly as it may have devastating consequences. Any event that leads to stress can cause migration of bullet with fatal consequences.

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