CASE REPORT

Gunshot Injury of the Neck
- An Unusual case of Survival

Anurag Tripathi1, Shalini Gupta2, Khushboo Gupta3, Ranjit Patil4

ABSTRACT:

Gunshot injuries are major problems worldwide from the medical and economic perspectives and are associated with profound morbidity and significant mortality. A 39-year-old man had multiple pellet injuries after being shot. An asymptomatic condition of the patient, with only complain of rigidity of the neck. A computed tomographic scan of the head and neck confirmed the presence of a foreign body. The patient was managed conservatively with bullet and pellets still in the musculature of neck. In conclusion, the absence of other complications and a favourable outcome with conservative medical treatment after a gunshot injury contribute to the rarity of this case.

Key words: Gunshot injury, computed tomography, pellets

INTRODUCTION

Gunshot injuries (GSI) cause profound morbidity and significant mortality. Firearms and gunshot wounds are now common in today’s society. These injuries occur in both military and civilian settings.1 Gunshot injuries could be devastating especially when it involves vital organs and could result to instant death. The cost of treating patients that survive these injuries could be enormous especially when the injuries are to the head, chest, abdomen and the spine.2 Hot debate continues to rage regarding cause, effect and the best way to handle the ever-increasing number of deaths resulting from guns. Emergency services must also examine their response to such an environment. Contrary to television medical shows, the presence of a bullet in the
soft tissues, in and of itself, is not an absolute indication for surgery. Operations are required to repair underlying injured structures, not specifically to remove the bullet, unless it is near an important structure and may cause trouble if it migrates. In certain cases, however, the bullet must be removed. These exceptions are related to the nature of the ammunition. For this reason it is important to have information about the type of gun and bullet that caused the injury.

Trauma due to these ammunitions is generally divided into penetrating or blunt trauma. Penetrating trauma refers to gunshot wounds, stab wounds, and injury from projectiles. Blunt trauma can include assaults, motor vehicle accidents, falls, explosions, and other force mechanisms. A shotgun/buckshot injury causes a great deal of damage to underlying soft tissue, and numerous pellets and foreign debris are lodged in the tissues. Most importantly, wadding is part of the ammunition and often becomes lodged in the soft tissues along with the pellets. Shotgun/buckshot injuries warrant exploration to remove dead tissue, to remove as many of the pellets as possible, to remove the wadding, and to wash out the wound. If such exploration is not done, the risk for serious infection is high. It may be tempting to try to remove a single bullet that on radiographs does not seem too deeply embedded in the tissues. If the bullet cannot be easily palpated in the superficial skin, removal is not recommended.3

**GSW to FACE & NECK**

Gunshot wounds to the face and neck are often troublesome. Since face and neck have excellent circulation, bleeding is often heavy. In addition, the airway can become obstructed by blood, teeth, and swelling. Manual pressure should be applied to a bleeding wound and leave the victim in the upright position. Direct pressure should be strong enough to stop the bleeding. Pressure over a large area as should be avoided as it can compromise blood flow to the brain or shift the trachea causing an airway obstruction. Emergency Medical Services often times place a cervical collar and back-board to immobilize a gunshot victim by protocol. However, the incidence of spinal cord injury caused by movement is exceedingly rare and therefore time should not be wasted with immobilization of the victim. Paralysis following gunshot wounds happens instantaneously when the bullet rips through the spinal cord. It generally does not occur with moving fractures or other means.

Removal of bullet is always more difficult than thought, and this causes risk injury to surrounding structures. It is usually best to leave the bullet alone. Over time, the bullet will either be walled off by the body and stay in place, causing no subsequent problems, or gradually work its way to the surface. Once the bullet can be felt directly under the skin, it can be removed easily with local anesthetics.4

Hereby, we present a similar case, where the patient is still alive with bullet and pellets embedded in the body

**CASE REPORT**

A 39 year-old male patient presented to Outpatient department, KGMU, Lucknow with complain of rigidity in neck, difficulty in jaw movement early in the morning after sleep and a palpable metal in the right posterior region of mouth since 3 months. On the physical examination, the palpable metal was a linear metal and was approximately 2.5 cm in dimension in size. No any hyperemia or changing of color inspected on the surface of the mucosa. Furthermore, examinations of the other systems were normal. Patient was advised extra oral radiograph. Orthopantomograph view revealed a linear radio opaque material in the front of right mandibular ramus nearing the TMJ region (Fig.1). Lateral and PA was also taken and it revealed similar findings (Fig.2). The detailed case
history was taken and the patient revealed that he had a bullet injury in the neck 1yr back. The patient was shot from the back and he had bleeding and lost conscious for three days. Because of no immediate medical assistance the bullet was not removed and left behind and patient survived the injury. The thorough physical examination of the patient revealed a dark black round spot on the left posterior neck region (Fig.3). To identify the cause of neck rigidity and to see any other tissue damage a CT scan for patient was advised which revealed a 2.5 cm long bullet noted to lie between the right zygomatic arch and coronoid process of mandible obscuring the deep head of temporalis muscle by the pronounced streak artifact produced by the metal (Fig.4). Underlying coronoid process shows indentation along the external aspect, while inner cortex shows irregularities with tiny high density fragments displaced and trapped into lateral pterygoid and longus colli muscle on the right side (Fig.5). The constrictor and masseter muscle appeared normal. Carotid and parapharyngeal spaces appeared normal. No evidence of aneurysm formation in carotid space and temporal space. All the sinuses and cribriform plates appeared normal.

So, bullet is still lying between right zygomatic arch and coronoid process of mandible with fragments trapped in neck musculature. The presence of metal bullet in coronoid region was the cause of difficulty in mouth opening. The patient had no other complain except rigidity of neck because of which the patient had to turn around completely to see sideways. The patient was not willing for any surgical intervention and was willing to stay with the bullet and pellets in the neck. The patient is still under follow up of 6 months yearly.

DISCUSSION

Gunshot injuries are major problems worldwide from the human, medical, and economic perspectives.5 Gunshots into the air in the midst of crowds during celebrations should totally be discouraged to avoid this type of injuries during celebrations. Live bullets should not be used where gunshot must be fired as part of celebrations and shooting must be directed away from the gathering. In order to better understand the damage inflicted to the body by bullets, it is important to understand the different components of wounding. Bullets cause damage from both direct and indirect mechanisms. The direct mechanisms include the cutting from the original bullet and fragments passing through flesh. This is the main cause of damage from low velocity bullets. Indirect mechanisms include stretch and displacement of flesh from the bullet cavitation effect. This is mainly seen with medium to high velocity weapons.

There are 3 main components of wounding with gunshot wounds.

1. Penetration: refers to the flesh which is destroyed or disrupted by the passing projectile.6

2. Cavitation: consists of a “shock-wave” like effect. Temporary cavitation can be up to 10 times the diameter of a medium to high velocity bullet. The permanent cavitation is the hole left by the bullet itself. Damage will depend on the elasticity of the organ or tissue. Muscle, blood vessels, lung and bowel are relatively elastic and therefore have a less permanent cavitation effect. Liver and brain on the other hand are relatively inelastic and cavitation becomes permanent resulting in significant damage.

3. Fragmentation: Projectile fragments or secondary fragments such as bone are sent off and create their own paths through flesh. This is a major cause of tissue disruption with high velocity bullets.7
Management of gunshot wounds

The basic treatment of gunshot wounds depends on the area(s) struck. Generally, gunshot wounds should be covered by a dry dressing or a clear transparent dressing if available. Manual pressure should be applied if the wound is bleeding. Once at a definitive care center, the wound should be cleaned, edges are debrided and the dressings changed daily. A gunshot is never sutured closed as the infection rate is very high. Bullets drag clothing into the wound and along the bullet track. Since clothing is of course not sterile, the wound is prone to infection if closed. Open wounds almost never get infected. The basic rules have to be followed in the gunshot injury like any other emergency situation i.e. ABCDE rule. The rule is described in detail in Table1.

Aggressive medical management is indicated for all gunshot wound patients. Tetanus prophylaxis is required, especially if immunization status is unknown.

Moreover, broad-spectrum antibiotics should be started immediately, regardless of injury location and without delaying treatment for wound culture, which has limited utility in this setting. Migration of retained missiles, which has been reported in the brain, blood vessels, and body cavities, presents an extremely challenging clinical problem.

CONCLUSION

A gunshot wound to is a complex injury, and treatment remains controversial. Treatment depends on the physician's ability to understand mechanism of injury, principles of medical management, diagnostic imaging, and surgical options. Antibiotics are an important component of treatment and should be continued for a minimum of 7 days in cases of wounds that both perforate the body and injure the spine.

REFERENCES
Figure 1: Orthopantomograph revealing radioopaque linear matter at TMJ region.

Figure 2: Lateral view of the patient showing similar finding as of OPG.

Figure 3: Patient photograph showing black area on the neck revealing entry of bullet.

Figure 4: Computed tomography of the patient confirming the bullet.

Figure 5: Computed tomography revealing numerous pellets in the musculature of neck.

Table 1: Describing in detail about ABCDE rules to be followed during gunshot injury.

<table>
<thead>
<tr>
<th>Basic</th>
<th>Evaluation</th>
<th>Action to be performed</th>
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<tbody>
<tr>
<td>A: Airway</td>
<td>Assess the airway</td>
<td>Open the mouth and clear the airway</td>
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<tr>
<td></td>
<td>Look, listen, and feel</td>
<td>Remove any foreign bodies if present</td>
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<td></td>
<td>Use head tilt-chin lift or jaw thrust maneuver</td>
<td>Use head tilt-chin lift or jaw thrust maneuver if cervical spine injury is suspected.</td>
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<tr>
<td>B: Breathing</td>
<td>Assess breathing</td>
<td>Provide assisted respirations if the patient is not breathing</td>
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<td></td>
<td>Is the chest rising &amp; falling?</td>
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<tr>
<td>C: Circulation</td>
<td>Check pulses at the wrist, neck, or groin</td>
<td>Start CPR if you don’t feel a pulse</td>
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<tr>
<td>D: Disability and neurological deficit.</td>
<td>Is the victim able to talk? Or move extremities?</td>
<td>Prevent neurological injury by making sure not to unnecessarily move the patient, especially don’t turn the head.</td>
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<tr>
<td>E: Exposure</td>
<td>Look for all stab wounds and gunshot wounds in armpits, groins, etc</td>
<td>Direct pressure if bleeding wound Do not remove impaled objects.</td>
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