

## Case Report

# A case of accidentally triggered shotgun injury in a hunter

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### ABSTRACT

The shotgun is used for bird hunting in rural areas of India. Its accuracy is usually 30 metres. Accidental injuries due to shotgun pellets are not very common. Shotgun has the tendency to disperse into pellets after hitting an object tangentially or after travelling a certain distance. These pellets are made of lead but steel, tungsten and bismuth pellets are also used. There is no consensus in terms of removing or retaining foreign bodies such as the pellets. These pellets can travel to distant organs that are difficult to access by surgery. As a result surgical intervention in such patients can produce more harm than good. But leaving the pellets can lead to long term side effects like lead poisoning. In this report, we present a 32 years old male who suffered accidental shotgun injury from close range in spite of which the pellets got dispersed all over his body.

**Keywords:** Shotgun, Pellets, Accidental injury

### INTRODUCTION

Shotgun wounds are not as common in India as it is difficult to obtain firearms legally. But they are used for hunting purposes in rural areas of India. Most of the injuries seen in the casualty are usually a result of suicidal attempt but sometimes it can be caused accidentally.<sup>1</sup> Usually close-range shotgun injuries are detrimental than those created by handgun. As the range of fire increases, the presence of secondary projectile damage is reduced. When a shotgun is discharged during a close range shot of within 30 cm, the pellets contained in the cartridge will not have time to spread and enter the body as a single mass. As the range increases pellets may spread.<sup>2</sup> Definitive management of patient with shotgun injury is controversial and it may depend upon the site of impact and the nature of injury.

### CASE REPORT

A 32 years old male who was referred from nearby government hospital was received in our emergency department with alleged history of accidental triggering of

shotgun when he was starting on his way for hunting. He accidentally dropped the shotgun and it fell on the ground and it triggered a shot. He received a tangential impact on his right forearm by a bullet which then dispersed all over his chest and abdomen as pellets. At the time of receiving the patient, he was hemodynamically stable with tachypnea. He was conscious and oriented. On examination, his right side of the chest and upper abdomen showed multiple entry wound by pellets. On auscultation, there was diminished breath sounds in right infra axillary, mammary and infra scapular areas. Palpation of the abdomen revealed right hypochondrial, right lumbar and epigastric tenderness with guarding. Bowel sounds were sluggish. Per rectal examination revealed no bleeding and the primary impact site right forearm showed a raw area with muscles exposed along with singeing, blackening and minimal tattooing. His movements on the elbow joint was not compromised.

He was then proceeded with radiological investigations where x ray of the right forearm and right elbow revealed multiple pellets with no bony injury. X ray of the chest and abdomen showed multiple pellets.



**Figure 1: Primary impact site-right forearm.**



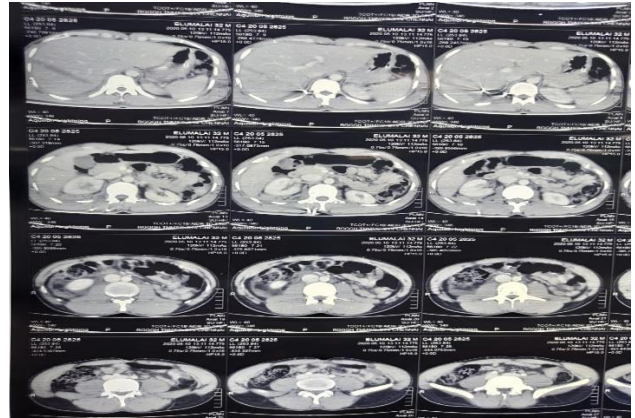
**Figure 2: Secondary impact site showing entry wound of pellets.**

Non contrast computed tomography which was done outside showed a suspected intra peritoneal foreign body (pellets) just below the pancreas which was not visualised in the films taken in our institute. Contrast enhanced computed tomography (CECT) of the abdomen and chest was done. It revealed grade III liver injury and grade III right renal injury along with hemoperitoneum. There were few focus of air pockets over the anterior and right lateral aspects of the liver which was not intra peritoneal. The laceration in liver is non-enhancing linear noted in segments VI and VII measuring 10 cm. Similar linear non enhancing lesion noted in right kidney. High attenuation metallic foreign body (pellets) noted in segment VI of liver, right posterior para renal space, anterior to right psoas at L5 level, posterior intermuscular planes, right side of eleventh thoracic vertebra.

Computed tomography (CT) of chest showed right hemopneumothorax, subcutaneous and intermuscular emphysema in right lateral chest wall, high attenuation foreign body noted in postero basal segment of lower lobe of right lung. His liver function test showed elevated liver enzymes.

Right side intercostal drainage was done using a 32 french intercostal drainage tube. Patient was on continuous nasogastric tube aspiration, on nil per oral and intravenous fluids and antibiotics with careful monitoring of abdomen for signs of peritonitis. Right forearm wound was debrided, necrotic tissues removed, wash given and saline

dressing done. Ultrasound abdomen and x-ray abdomen in erect posture done on third day was normal and bowel sounds were satisfactory. So patient was started on oral feeds. Intercostal drain was removed on the fifth day. Patient was discharged on the seventh day.



**Figure 3: CECT abdomen showing pellets with grade III liver and renal injury.**



**Figure 4: CT chest showing right sided hemothorax with implantable cardioverter-defibrillator (ICD) insitu.**



**Figure 5: X ray of the chest and right forearm showing pellets.**

## DISCUSSION

Shotguns are smooth bored weapons. It can be used to fire a single ball or slugs or a charge of slugs. The barrel is a hollow cylinder which is closed at the back end called breech end and opened at the front end called muzzle end. Its length varies from 55 to 72 cm. It may be single barrelled or double barrelled. The inside of the barrel consists of three parts: the chamber – to accommodate the cartridge, the taper – to connect the chamber to the bore, and the bore – which lies between taper and the muzzle.

Shotgun bore vary from 4 to 20. The commonly used gauges are 12, 16 and 20. When the entire barrel from breech to muzzle is of same diameter, it is called cylinder bore. If the distal 7 to 10 cm of barrel is narrow, it is called choke bore which is of varying degrees.

The choking lessens the rate of spread of shot after it leaves the muzzle, increases the explosive force and velocity. Shotguns are effective upto 30 metres.<sup>3</sup>

The shotgun cartridge consist of a case of short metal cylinder. It is rimmed which keeps the cartridge correctly in chamber and facilitates extraction. It keeps the various components in place, prevents backward escape of gases, provides waterproof container for gunpowder. It is filled from the base in the following order – percussion cap, gunpowder, a thick felt wad with cardboard disc lying in front and behind it, shot, retaining cardboard disc over which edges of cartridge cylinder walls are pressed. Wad acts as a piston and seals the bore completely to prevent the expanding gases from escaping and disturbing the shot charge and allows optimum pressure to develop. The felt wad contains grease which lubricates the bore after each firing. Some cartridges contain power piston which holds the shot inside a polythene cup which contributes to the wound at short range. Rifled slugs are single missile and are used in shotguns for big game hunting. These slugs have much greater range than pellets. The number of pellets can be estimated roughly from the markings of the retained cardboard discs. Large game (LG) - pellets 6, size 0.36; medium game (MG) – pellets 8, size 0.36; small game (SG) – pellets 10, size 0.33; buck shot – 2 to 20; birdshot - 200 to 400; and dust shot – 2000 to 3000. Pellets deform easily due to friction generated as they rub against inside of the barrel. The heat can cause melting and fusion of the pellets.<sup>4</sup>

### **Wound from shot guns**

The character of a wound depends on: the distance from which the weapon is discharged, the size of the shot, the nature of the explosive and the gun itself.<sup>5</sup>

### **Close range injuries (upto one metre)**

The wound is single, circular like contact wound. Blackening and tattooing are more extensive. The margins may be clean cut or ragged slightly. If distance is less than

30 cm, tissues surrounding the wound are singed with flame, blackened with smoke and tattooed with unburnt or partially burnt powder granules. Smoke deposit is known as smudging, fouling or blackening which can be removed by a wet cloth. Unburnt powder particles produce tattooing or stippling or peppering which sticks to the epidermis superficially which also can be removed by wiping. The hairs of the trunk and limbs around the wound are burnt. If the distance increases keratin of hair melts with flame and then solidify on cooling producing clubbed appearance. The tissues upto 30 cm along the track and around the wound may be cherry red due to absorption of carbon monoxide. There may be a wide flare or narrow rim of hyperemia or even blistering from flame. As range increases, intensity of blackening and tattooing decreases and the spread increases in a fairly regular manner. Range between 30 cm to one metre-rim of the wound is irregular and shows some scalloping like rat hole. Felt, wads or plastic cups from the cartridge may be found. Range between 60 to 90 cm produce a small, circular aperture 3 to 4 cm in diameter with irregular and lacerated edges with no burning or blackening or cherry red changes. Some tattooing is seen. The shots are scattered after entering the body and cause much damage to internal organs.<sup>6,7</sup> Other range injuries are beyond the scope of this discussion.

## CONCLUSION

Our patient suffered accidental close range shotgun injury with tangential impact on his right forearm leading to spread of pellets into the thorax and abdomen which lead to multiple injuries in the lungs, liver and kidney which was managed conservatively and the patient was under monthly follow up till COVID-19 pandemic. The pellets need not be removed from the body unless they produce symptoms that disturbs the daily day to day activities of the patient.<sup>8</sup>

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## REFERENCES

1. Suominen E, Tukiainen E. Close range shotgun and rifle injuries to the face. Clin Plast Surg. 2001;28:323-37.
2. Breitenacker R. Shotgun wound patterns. Am J Clin Pathol. 1969;52(3):258-69.
3. Reddy KSN. The Synopsis of forensic medicine and Toxicology. 28th edition. 2014;122-129.
4. Frost RE. Forensic Pathology of Firearm Wounds. 2015. Available at: <https://emedicine.medscape.com/article/1975428-overview#a2>. Accessed on: 21 October 2015.
5. Introduction to criminal investigation: processes, practices and thinking. Chapter 10: Forensic sciences. available at: <https://pressbooks.bccampus.ca/criminalinvestigation/chapter/chapter-10-forensic-sciences>.

6. Gunshot wounds- smooth bore weapons. 1969. Available at <http://m.forensicmed.webnode.com/wounds/firearms/gunshot-wounds-smooth-bore-weapons/>. Accessed on: 21 October 2015.
7. Di Maio VJM. Gunshot Wounds-Practical aspects of fire arms, ballistics, and forensic techniques. 2nd Ed CRC Press. 1999;244-54.
8. Mushtaq A. Natural history of pellets inside human body, a prospective observational study. Trauma Emerg Care. 2017;3.

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