



Penetrating Neck Injury Due to Less Lethal Bean Bag Munition

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Abstract

Various "less lethal" weapons have been created in the last few decades to allow law enforcement officers to subdue a subject. This includes a bean bag gun. Although intended to be less lethal, many reports have shown significant harm and, in some cases, even death. We report a subclavian artery injury and vocal cord paralysis following a penetrating neck injury due to a bean bag round. A 55-year-old intubated male shot with a bean bag was brought to the emergency department, and an initial CTA showed possible subclavian artery injury. Intraoperative angiogram confirmed a grade 3 subclavian artery injury, and a stent was placed. Due to continued need for ventilator support, a tracheostomy was performed. The patient reported significant dysphagia, and an esophagram revealed silent aspiration. A PEG tube was placed for nutritional support. ENT consult revealed left vocal cord paralysis. After several weeks the patient was decannulated and discharged home. This report illuminates the underestimated possibility of severe and permanent injury induced using less lethal weapons such as the bean bag gun.

Keywords: Bean bag munition, subclavian artery injury, vocal cord paralysis, less lethal weapon

Introduction

A variety of "less lethal" weapons have been created in the last few decades in hopes of providing law enforcement officers the ability to subdue a subject without causing significant injuries.

One of these weapons is a bean bag projectile, a fabric sack filled with lead shot fired from a 12-gauge shotgun (Figure 1), or a 37 mm launcher designed to distribute its impact.¹ While this weapon is intended to be less lethal, there is the potential for significant injuries and even death. Reports have described a variety of injuries, including ocular injury, splenic laceration, subdural hematoma, and mandibular body fracture caused by bean bag munition.²⁻⁶ We describe a subclavian artery injury and vocal cord paralysis following a penetrating neck injury from a bean bag round.

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Figure 1. 18" "Less Lethal" Wilson Combat shotgun by wilsoncombat.com

Case Presentation

A 55-year-old male found firing in his house was subdued with a bean bag munitions, which upon contact penetrated the left anterior lateral neck (Figure 2). Patient was intubated on transport due to tripod positioning, tachypnea, and the use of accessory respiratory muscles. Upon arrival to the emergency department, initial vital signs were: blood pressure 139/83 mm Hg, pulse 103 beats/min, respiratory rate 16 breaths/min, and esophageal temperature 36.4°C. Physical exam revealed a 3-cm left neck wound with a hard object felt inferior. Trachea was midline. X-ray of the chest revealed a metallic foreign body to the left of the midline superimposed over the upper thoracic spine, with no pneumothorax or pleural effusion. Computed tomography (CT) of chest, abdomen, pelvis along with computed tomography angiography (CTA) of neck demonstrated possible left subclavian artery injury, approximately 1.5 cm proximal to left vertebral artery origin, with fluid within the superior mediastinum with cervical soft tissue gas. No gross

extravasation of contrast or demonstrable intimal injury/dissection was noted. No stranding or other evidence of soft tissue changes beyond the subclavian artery or in proximity to the trachea and esophagus. With radiological confirmation that there were no imminent injuries to the surrounding structures, the bean bag was removed intact with a hemostat at the bedside, and a washout was performed (Figure 3). Vascular surgery was consulted for possible left subclavian artery injury.



Figure 2. Left lateral neck wound



Figure 3. Bean bag munition after removal

Due to concern for the progression of the subclavian injury to active extravasation or rupture, vascular surgery performed an intraoperative angiogram, which revealed evidence of grade 3 subclavian artery injury 2 cm distal to the takeoff of the left vertebral artery (Figure 4). The injury was stented with a 10 x 39 mm Gore® VBX balloon expandable covered stent. Completion angiogram showed excellent flow through the subclavian artery with preservation of all branches, including the vertebral and mammary arteries.



Figure 4. Intraoperative angiogram revealing a grade 3 subclavian artery injury 2 cm distal to the takeoff of the left vertebral artery

Following six days of intubation due to soft tissue swelling in the neck, percutaneous dilatational tracheostomy (fenestrated 8 Shiley™) was performed to allow for decreased sedation and discontinuation of ventilator support. Postoperative day one, trach collar trials were initiated, and postoperative day nine, patient's tracheostomy was downsized (fenestrated 6

Shiley™). After 30 days, the patient successfully tolerated 12 hours of red capping trials without hypoxia, increased secretions, increased work of breathing, shortness of breath, and tachypnea and was successfully decannulated.

After tracheostomy placement, the patient reported significant dysphagia, and an esophagram was obtained. This revealed silent aspiration but no evidence of esophageal injury (Figure 5). A swallow study noted aspiration and dysphagia. Due to these complications, a percutaneous endoscopic gastrostomy (PEG) tube was placed for nutritional support.



Figure 5. Esophagram demonstrating silent aspiration

Postoperatively leukocytosis ($13.3 \times 10^9/L$) and erythema circumferentially around the PEG tube insertion site were noted. As a result, 4.5 grams of piperacillin-tazobactam was administered every 8 hours for three

days, and subsequently, erythema and leukocytosis resolved ($7.8 \times 10^9/L$).

Due to the continued dysphagia, ENT was consulted, and fiberoptic laryngoscopy revealed the left vocal cord in the paramedian position with a mobile right vocal cord with good apposition. Recommendations included follow-up fiber optic laryngoscopy in three months.

Discussion

Over the last several decades, less lethal means for subduing individuals have become popular among law enforcement. These include taser guns, batons, pepper spray, rubber bullets, and bean bag munitions. Although these "less lethal" munitions are commonly used, little research has been conducted on the long-term consequences of these weapons.

Many case reports have documented significant injuries caused by bean bag munitions and their sequelae. Olson et al, described 19 injuries sustained from bean bag rounds ranging from subdural hematomas requiring craniectomy and long-term care to abdominal contusions allowing for same-day discharge.⁴ Further reports have detailed pelvic injury leading to osteomyelitis and penetrating ocular trauma.^{2,5} To our knowledge, subclavian artery injury and vocal cord paralysis due to penetrating bean bag munitions have not been reported.

In our case, using bean bag munition had substantial patient repercussions. The patient underwent several major surgeries, including vascular stenting, PEG tube, and tracheostomy placement. Upon discharge, further need for therapy and clinical follow-up were required due to his vascular injury, vocal cord paralysis, dysphagia, aspiration,

and nutritional support.

This case illustrates the severe consequences even "less lethal" weapons can cause. Increased awareness is needed within medical and law enforcement communities of these injuries and their sequela. High suspicion for possible penetrating and internal injuries should be maintained when bean bag munitions are used and their resulting injuries are encountered.

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