



## Thoracic Gunshot Wound: A Case Report and Management using One Lung Ventilation at a Rural Emergency Department

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### Abstract

Gunshot injuries or ballistic injuries cause huge casualties worldwide, most commonly used in personal conflicts. The extent of damage caused depends on the type firearm, bullet used, velocity & trajectory. Management can range from observation and local wound care to urgent surgical intervention. We report a case of a 19 year male patient with thoracic gunshot injury sustained over the left side of chest and presented in state of shock, hypoxia with altered mental status and his successful management using ATLS protocols and one lung ventilation using single lumen tube intubation, fluid resuscitation, ICD insertion and other supportive measures.

**Keywords:** Thoracic gunshot wound; One lung ventilation; Traumatic hemopneumothorax; ICD placement

### Introduction

Gunshot injuries occur when someone is shot by a projectile object from a firearm. Thoracic gunshot injury is amongst the most fatal form of chest injury leading to high number of deaths worldwide. Campbell et al. [1] found 94% patients with penetrating thoracic injury die before reaching the hospital. Immediate management of these patients is the most important for survival of these patients. Clinical presentation may differ and so does the treatment plan. The risk of injury to heart, greater blood vessels and the lungs should be evaluated immediately in all patients and surgical intervention should never be delayed.

### Objective

Managing a gunshot injury to left lung in ED by one lung ventilation using a single lumen tube.

### Methodology

ATLS guidelines, one lung ventilation, ICD placement. One Lung Ventilation (OLV) is the term used in thoracic anaesthesia to describe the ability to ventilate one of a patient's lungs, allowing the other one to collapse [2].

There are 3 indications for OLV:

1. Improving surgical access
2. Lung protection\*\*
3. Intensive Care ventilation

Techniques for OLV - There are 3 devices that can be inserted to achieve one lung ventilation:

1. Double lumen tubes
2. A bronchial blocker
3. Endobronchial intubation, with standard Endo tracheal tube\*\*

The quickest and easiest way to isolate an individual lung is to introduce a standard endotracheal tube into one of the main bronchi. When more specialist equipment is not readily at hand or in order to isolate a lung in an emergency this may represent the most appropriate technique.

\*\* Indication and technique used in this case.

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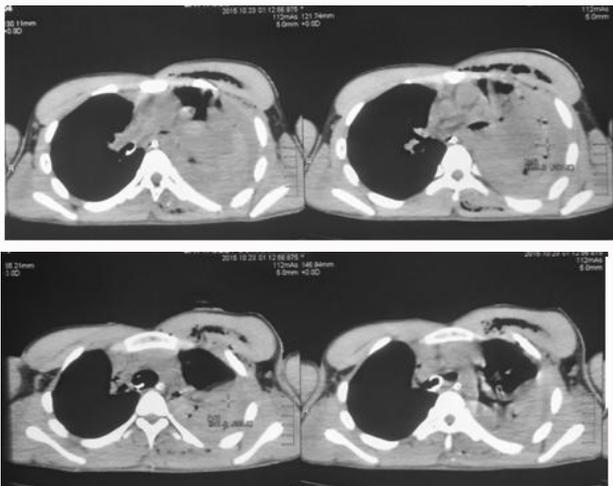


Figure 1: Shows CT scan chest with ET in right main bronchus, hemopneumothorax left lung (Day-1).



Figure 2: Showing ET in right main bronchus, ICD in left lung (Day-1).

One Lung Ventilation (OLV) is not frequently used in the emergency department & there is little evidence supporting its use. There are lot of controversies with the tube size selection, methods of insertion, isolation and confirmation, optimization of FiO<sub>2</sub> before and during OLV [3].

### Case Presentation

A 19 years old male patient was brought to ED with alleged history of firearm injury over left side of chest, having sustained 30 min before arrival. On examination patient was found to be stuporous, hypoxic, hypotensive, tachycardic with signs of hypovolemic shock. A 0.5 cm × 0.5 cm firearm entry wound was found on posterior aspect of left side of chest below the scapula with blood oozing from the wound. Exit wound was over 3<sup>rd</sup> and 4<sup>th</sup> intercostal space on left side of chest lateral to the sternum. Examination revealed trachea was central, diminished breath sound on left side with few audible rales, rest examination was normal. Case managed as per ATLS guidelines, assisted breathing with Ambu-bag followed by RSI, as blood was spurting from the wound site, the ET was inserted further and pushed into the right main bronchus and the placement was confirmed bedside by auscultation, waveform capnography and one lung ventilation was given to prevent the unaffected lung from getting contaminated with blood.



Figure 3: Showing ET tube *in-situ* (corrected position), ICD in left lung (Day-2).



Figure 4: Showing ICD in left lung (Day-8).

He was resuscitated with IV fluids, CT chest revealed Hemopneumothorax and ET in right main bronchus (Figure 1), thus ICD was placed on left side of chest with 400 ml of blood drained (Figure 2). Patient received antifibrinolytic to control bleeding. He was further treated with antibiotics and other supportive care. The ET tube was repositioned 4 h later (Figure 3). He responded well to resuscitation and his ICU stay was uneventful, extubated on 4<sup>th</sup> day (Figure 4) and had a near complete recovery.

### Conclusion

Successful management of thoracic gunshot injury depends on identification of danger signs, proper resuscitative measures, timely intervention and use of one lung ventilation in patient where only one lung is affected and to protect the normal lung. Immediate ICD placement, volume restoration and blood transfusion whenever necessary. Use of antifibrinolytics, antibiotics, analgesics forms the mainstay of supportive care [4]. We found that in this case the recovery was good without any adverse effect on the diseased lung with the use of one lung ventilation. This method of blindly intubating one lung can be adopted for an isolated injury to left lung where right lung is unaffected & may provide better outcomes in centres located peripherally or lacking advanced interventional procedures.

### References

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