



## Case Report

# Uniportal video-assisted thoracoscopic surgery for retained shrapnel in the thoracic cavity: An update surgical approach for removal of foreign body

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## ABSTRACT

Uniportal video-assisted thoracoscopic surgery commonly used for removal of bullet, tumours and foreign bodies in the chest cavity. However, shrapnel fragments related war can injure many organs and life-threatening condition. Furthermore, standard treatment for removal foreign bodies retained in the chest is conventional thoracotomy. Alternatively, single port video-assisted thoracoscopic surgery approach can be used in patients hemodynamically stable. In addition, retained foreign bodies after a penetrating thoracic injury remain challenge for u-VATS surgeons. Here we present A 35-year-old man presented to the emergency department with multiple shells injury associate with right site chest injury. The patient underwent surgery using uniportal video-assisted thoracoscopic surgery u-VATS without spreading of the ribs for removal of a shrapnel retained in the thoracic cavity. The postoperative course was uneventful. On the 2nd day postoperative, the patient was discharged home. The u-VATS approach could be performed by experienced u-VATS surgeons and specialized nurses for this approach. In conclusion, our study revealed that u-VATS is safe, simple and feasible for retained foreign bodies in the thoracic cavity. The u-VATS have many benefits such as decrease postoperative complication, pain and earlier return to work.

## 1. Introduction

Nowadays, single port or uniportal video-assisted thoracoscopic surgery commonly used for removal of bullet, tumours and foreign bodies in the chest cavity from European and American countries, but remain a challenge in Middle east countries. However, shrapnel fragments related war can injure many organs and life-threatening condition. Furthermore, standard treatment for removal foreign bodies retained in the chest is conventional thoracotomy. Alternatively, single port video-assisted thoracoscopic surgery approach can be used in patients hemodynamically stable. Uniportal VATS is safe and feasible technique and better outcome compared to open thoracotomy. To date, only a few cases underwent VATS approach for removal foreign bodies in the thoracic cavity [1–5]. Previously Peter et al., in 2016 reported three cases underwent two port VATS for retained foreign bodies [6]. In addition, retained foreign bodies after a penetrating thoracic injury

remain challenge for u-VATS surgeons. The u-VATS approach could be performed by experienced u-VATS surgeons and specialized trained nurses. The aim of this study was to describe successful uniportal video-assisted thoracoscopic surgery (u-VATS) for removal of retained shrapnel related war in the right hemithorax. The current study was prepared according to the SCARE 2020 guidelines [7].

## 2. Case summary

A 35-year-old man presented to the emergency department with multiple shells injury associate with right site chest injury. On arrival, the patient was in shock state, confused, and decreased air entry in the right hemithorax. After resuscitation the patient was sent for full investigation; chest Xray showed hemopneumothorax. Inter-costal chest tube inserted for the right hemithorax. Next day a CT-scan of chest showed a mild hemopneumothorax.

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Fig. 1. Extracted shrapnel related-war in the right hemithorax through a single small incision by uniportal VATS approach.

Any shell has not been found in a CT-scan. Seven days later, the patient had ongoing lower chest pain posteriorly. We decided to do u-VATS approach to search for the source of pain. In the same day, the patient was sent for surgery.

### 3. Surgical technique

The patient was sent for surgery under general anesthesia, and double-lumen endotracheal intubation was performed in the supine position. Then, the patient was positioned to the left lateral decubitus position, through a 2 cm incision in the mid-axillary line in the 5th intercostal space. There was adhesion of right diaphragm to the posterior part of chest wall. Then, we did adhesiolysis and we found a big shrapnel in between (Fig. 1). The shrapnel was extracted with grasper. The postoperative course was uneventful. On the 2nd postoperative day, the patient was discharged home.

### 4. Discussion

Overall, shrapnel related war injuries can be treated with chest tube insertion. These types of foreign bodies become harmless and encased in fibrous tissue. However, majority of foreign bodies in the chest cavity are not commonly removed unless they are jagged or pose risk of more injury. In our case chest CT have not been able to detect foreign body in the lung. Our study is similar with the study Masimiliano et al. ultrasound and chest CT scan 4 out of 5 cases has not been able to detect injuries in the diaphragm [8]. For this reason, we decided to do u-VATS approach to search for the source of pain. The u-VATS approach could be performed in hemodynamically patients by experienced u-VATS surgeons and specialized nurses for this approach. Previously, we performed a surgical challenge in a 6 months child for resection of Esophageal duplication cyst [9]. Many researchers believe that u-VATS is safe and feasible approach for removing foreign bodies compared to conventional thoracotomy.

The barriers to the widespread use of the VATS for trauma include inadequate training of cardiothoracic and vascular surgeons in minimal invasive surgeries, the large number of trauma patients in trauma centers, and the lack of thoracoscopic equipment due to financial constraints or institutional policy [10].

The uniportal video-assisted thoracoscopic surgery have many benefits such as reduce hospitalization, post-operative pain and complications [11]. On the other hand, Many published articles revealed that the VATS approach have a n excellent outcome for removal of foreign bodies in the thoracic cavity [1,4,12]. Those cases included a bullet, Kirschner wire, grenade fragment, glass fragments and sharp objects [2-4,12-14]. Our study with previously reports revealed that the u-VATS approach is less invasive, simple, easy, safe and feasible for removal foreign bodies. Moreover, many researchers performed three or two port VTAS for

removal foreign bodies and tumours we preferred the same procedure can be used in a small single incision through intercostal space.

### 5. Conclusion

In hemodynamically patients, uniportal VATS approach has proved to be an alternative approach for removal penetrating thoracic injures. Our case revealed that u-VATS is safe, simple and feasible for retained foreign bodies in the thoracic cavity. The u-VATS have many benefits such as decrease postoperative complication, pain and earlier return to work.

### Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

### Ethical approval

Ethical approval has been given by the ethics committee of our faculty.

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### Author contribution

**Rawand A. Essa:** Conception and design, execution, analysis and interpretation of data, involved in drafting the article, revised it critically for important intellectual content, read and approved the final version of the manuscript. **Sirwan K. Ahmed:** Conception and design, execution, analysis and interpretation of data, involved in drafting the article, revised it critically for important intellectual content, read and approved the final version of the manuscript.

### Registration of studies

Not applicable.

### Author agreement statement

We declare that this manuscript is original, has not been published before and is not currently being considered for publication elsewhere. We confirm that the manuscript has been read and approved by all

named authors and that there are no other persons who satisfied the criteria for authorship but are not listed. We confirm that the order of authors listed in the manuscript has been approved by all of us. We understand that the Corresponding Author is the sole contact for the Editorial process. He is responsible for communicating with the other authors about progress, submissions of revisions and final approval of proofs.

#### Data availability statement

The data underlying this article are available in the article.

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#### Declaration of competing interest

There is no conflict to be declared.

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