



REMOVAL OF RETAINED INTRATHORACIC FOREIGN BODY AFTER PENETRATING CHEST TRAUMA : NEW INSIGHT

General Surgery

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ABSTRACT

Presence of foreign body in thoracic cavity is very uncommon. Most common causes for the presence of such foreign bodies are traumatic, accidental or iatrogenic. The management involves urgent identification and removal of the foreign body. Surgical extraction using thoracotomy or video-assisted thoracoscopic surgery (VATS) remains the primary management strategy. Herein, we report the case of successful removal of retained foreign body from lung after 4 years of penetrating chest trauma by thoracotomy under intraoperative ultrasonographic guidance.

KEYWORDS

Penetrating chest trauma, Retained intrathoracic foreign body, Thoracotomy, Video-assisted thoracoscopic surgery (VATS)

INTRODUCTION

Presence of foreign body in thoracic cavity is rare. Common causes for the presence of such foreign bodies are accidental, traumatic or iatrogenic [7]. So far the presence of various blunt and sharp objects in the thorax is reported. Hypodermic needles, acupuncture needles, glass particles and knife are various sharp objects and wooden pieces, retained sponges, pieces of clothing are blunt objects that are reported [1,2,5,8]. Sharp objects can cause injury to pleura, lungs, heart, major vessels, and diaphragm and can also migrate into the abdominal cavity resulting in injury to visceral organs [2]. Presence of heart and major vessels increases mortality of penetrating injury to left side chest up to 25% [4]. Leaving the blunt foreign body in the chest predispose the patient to the risk of infection in future and can even result in full-blown empyema in some of these patients [2,7,8,9]. In majority retained foreign body post chest trauma is removed immediately with VATS (video-assisted thoracoscopic surgery) or thoracotomy.

CASE REPORT

A 18 year old male patient fell from tree while plucking fruit 4 years back in June 2017 & had penetrating injury by wooden stick over left anterior chest wall in 4th intercostal space in mid clavicular line which was removed immediately by himself & took primary treatment at primary health center where dressing & suturing of chest wall wound was done. After 4 days of trauma, he suddenly developed breathlessness & left sided chest pain for which he went to tertiary health center where primary investigations were carried out. Chest X-ray posteroanterior (PA) view showed left sided hydropneumothorax with collapse consolidation of underlying lung for which emergency left sided intercostal drainage tube (ICDT) was inserted in 6th intercostal space & approximately 300 ml of hemorrhagic collection was drained. After 15 days Chest X-ray was repeated which showed resolution of pneumothorax so intercostal drainage tube was removed & patient was discharged from the hospital.

After 3-4 months of trauma, he noticed swelling over back on left side which was initially small in size for which he didn't take any treatment for 2 years. In July 2019 he noticed increase in size of swelling, associated with pain for which he went to tertiary care center where ultrasonography of swelling was done which was suggestive of abscess. Aspiration from swelling was done under ultrasonographic guidance, aspirated fluid was sent for culture & sensitivity & CB-NAAT (gene xpert) in which multiple granulomatous cells were found which suggested mycobacterial tuberculosis. For mycobacterial tuberculosis he took anti tubercular drugs for 6 months. After antitubercular treatment he had decreased complain of pain. He didn't take any treatment for next 2 years for back swelling.

Then he came to our hospital- SMIMER hospital, Surat, Gujarat on 5th July 2021 with complain of swelling over upper part of back on left side since last 4 years. On time of admission he was hemodynamically

stable, pulse-80/min, bp -120/80 mmhg, respiratory rate-16/min & air entry was decreased in left upper zone. Swelling measured approximately 3 x 3 cm² in size, located 2 cm left lateral to T6-T10 vertebra which was nontender, soft in consistency, not fixed to overlying skin. He had healed scar of sutured wound over left anterior chest wall.

We investigated him with Chest X-ray which showed blunting of left costophrenic angle suggestive of pleural effusion with no foreign body detected. On ultrasonography of thorax with local part around swelling, findings were suggestive of left sided mild to moderate pleural effusion with approximately 130-140 cc septated fluid collection seen involving superficial muscular plane of left upper paraspinal region extending superiorly into subcutaneous plane & inferiorly into deep muscular plane with likely communication with underlying pleura, suggesting possibility of presence of foreign body with associated collection.

To rule out foreign body, contrast enhanced ct scan [CECT] thorax was done which showed linear tubular structure of maximum diameter of 1.2 cm and length of 9 cm involving the left upper lung, pleura and the adjacent left paravertebral muscles at the level of left intercostal space between the 4th & 5th ribs [figure 1]. Heterogeneously enhancing soft tissue component was seen surrounding it extending along left paravertebral muscles from the level of T5-T12. Associated consolidative airspace heterogeneous opacities were seen in apico-posterior segment of left upper lobe with central cavitation & internal air-fluid level [figure 2, 3]. CT imaging features were suggestive of foreign body with associated adjacent collection extending along the left paravertebral muscles and cavitation in the apico-posterior segment of the left upper lobe of lung as described above.

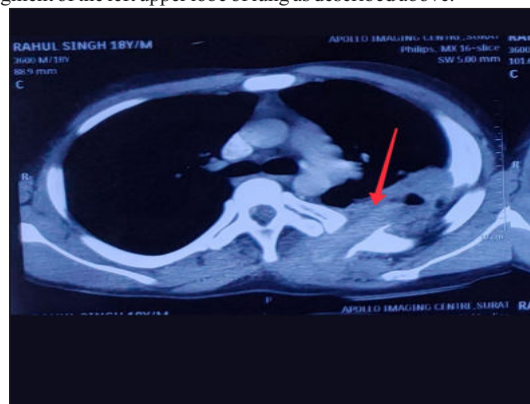


Figure 1- Axial Section Of The CT Thorax With Red Arrow Pointing To The Foreign Body In Left Upper Lung, Adjacent Pleura And Left Para-vertebral Soft Tissues.

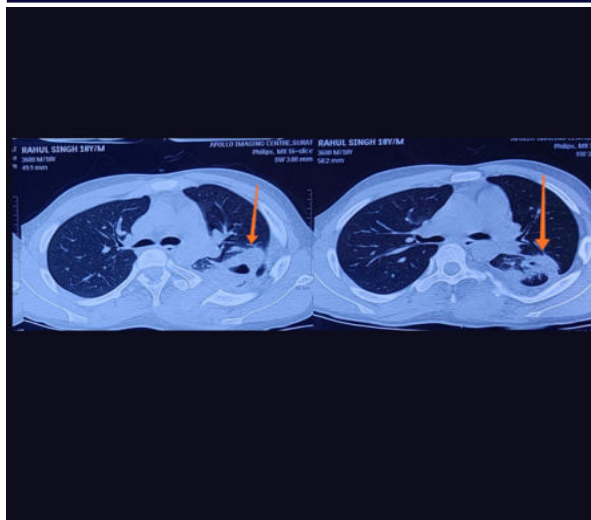


Figure 2 – Axial Section Of The CT Thorax With Yellow Arrow Showing Consolidation With Cavitation In Left Upper Lung In Lung Window Settings.

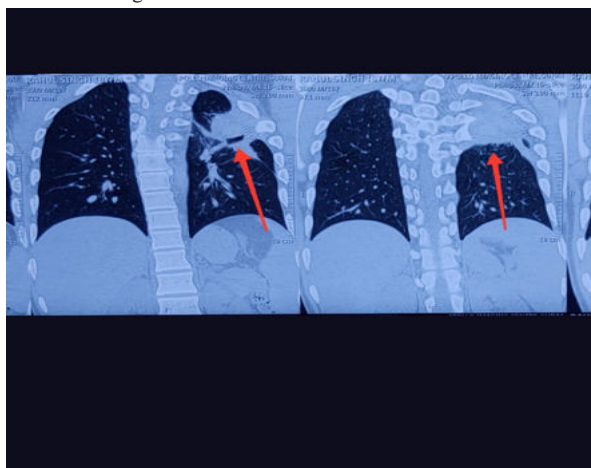


Figure 3 – Coronal Section Of The CT Thorax With Red Arrow Showing Consolidation With Cavitation In Left Upper Lung In Lung Window Settings.

After confirming Diagnosis on imaging studies, we planned video-assisted thoracoscopic surgery(VATS) for foreign Body removal. On exploration during VATS, no foreign body was visualized but foreign body sensation was felt on instrument by operative surgeon in upper mediastinum around 4th or 5th left intercostal space in paravertebral region. We tried to dissect it but due to extensive fibrosis we were unable to dissect it from surrounding structures so intraoperative decision was made to convert VATS to left posterolateral thoracotomy.

During thoracotomy all efforts were made to find foreign body but again we were only able to feel sensation of foreign body, couldn't locate its exact site so we decided to use intraoperative ultrasonography to locate foreign body. Ultrasonography was performed, hypoechoic collection was seen in left paraspinal region from 4th to 8th intercostal space in superficial muscular plane. Incision was made under ultrasonographic guidance over abscess in 4th intercostal space, whole tract was opened and around 30 cc pus was drained.

Foreign body of approximately 3 x 1 cm² size was seen on ultrasonography in left paravertebral space 3 cm lateral to vertebra in 4th intercostal space in muscular plane which was reaching upto left upper lung. Another skin incision was made exactly over the site of foreign body located by ultrasonography. Foreign body was dissected & removed from the surrounding structures. Foreign body turned out to be a wooden stick of 10.5 cm in length & 1.1 cm in width.[figure 4]. Intercostal drainage tube [ICDT] was kept. Patient was extubated. From post operative day 2, chest physiotherapy & spirometry exercises were started. ICDT was removed on post operative day 5. Patient recovery was uneventful after that.



Figure 4- 10.5 x 1.1 cm2 size wooden stick removed from left upper lung

DISCUSSION

Trauma is the leading cause of morbidity and mortality, with chest trauma accounting for 20-60% of trauma related deaths[3]. Chest trauma, especially penetrating ones are associated with higher risk due to injuries to major vessels, injury to lung causing hemo/pneumothorax, and injuries to heart leading to hemopericardium & pericardial tamponade[3]. Retained foreign bodies are usually found in the tracheobronchial tree, gastrointestinal tract, peritoneal cavity, rarely they can also be found in pleural cavity and chest wall[2,7,9]. Foreign bodies located near the vital structures like heart, lung, should be extracted as soon as possible, otherwise they penetrate and cause bleeding or damage to organs. Small, blunt and peripherally located foreign bodies may be left behind, if difficulties at extraction are anticipated[7,8]. Tube thoracostomy remains the mainstay for the treatment of traumatic injuries to the lung. The best way of extraction of foreign bodies from the pleural cavity would be either thoracotomy or videothoracotomy (VATS)[2,7]. So in our case after confirming diagnosis through imaging modality we planned to remove foreign body by VATS.

Video-assisted thoracoscopic surgery (VATS) is used mainly for management of retained haemothorax, empyema, and mediastinal or diaphragmatic exploration but it is also feasible and safe method in management of chest trauma for hemodynamically stable patients[4,6,8]. Compared to thoracotomy, VATS is reported to have less postoperative complications, better postoperative pain control, less wound and pulmonary complications, shorter time to restart normal daily activity[1,2,3]. Therefore, we first planned to remove retained foreign body in our case through VATS but when we were unable to find it out, we converted it into open thoracotomy as thoracotomy gives the surgeon excellent exposure and allows appreciation & removal of the object under direct vision.

Thoracotomy has been the standard approach for exploration after penetrating chest trauma[3,6]. Disadvantages of thoracotomy are poor cosmesis due to large incision, blood loss, post-operative pain & discomfort. The left anterolateral thoracotomy is the incision of choice for the management of patients with penetrating pulmonary or cardiac injuries who come in emergency with hemodynamic instability[4]. It allows full exposure of the anterior mediastinum, pericardium and both hemithoracic cavities[4]. The posterolateral thoracotomy gives exposure of the posterior heart and should be used in cases of left sided gunshot wound[4]. A left posterolateral thoracotomy is the incision of choice in cases of air embolism[4]. Although anterolateral thoracotomy incision is used mostly for penetrating chest trauma, we have to change incision site according to mode of injury & site of foreign body as in our case, foreign body entered through anterior chest wall but migrated posteriorly in due time, so we had planned left posterolateral thoracotomy for better visualization of it. When we couldn't remove foreign body from lung with both VATS & thoracotomy, we decided to use intraoperative ultrasonography to locate it & surprisingly we could remove it with ease without any complications.

After managing this case, we can firmly say that intraoperative localization of foreign body under ultrasonographic guidance is much

simpler, fruitful way to locate foreignbody after penetrating chest trauma than VATS or Thoracotomy. If we had planned to remove this foreignbody under ultrasonographic guidance only, we could have avoided complications and morbidity related to VATS or Thoracotomy.

CONCLUSION

In our opinion from this case, we can say that in cases of traumatic chest injuries, on time of admission in addition to FAST(focused assessment with sonography for trauma), we should also use CT scan in early stage to find out any foreign body so it won't be missed & we can avoid complications related to retained foreign body.

To remove any retained foreign body after penetrating chest trauma, before going directly into major operation like VATS or Thorocotomy we should optimize all available modalities including ultrasonographic guided removal of foreign body to decrease morbidity & complications arising out of VATS or Thoracotomy.

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