African Journal of Tropical Medicine and Biomedical Research (AJTMBR)

The Journal is the Official Publication of the College of Health Sciences, Delta State University, Abraka, Nigeria.

ISSN: 2141-6397

Vol. 8, No. 1, June 2025

Uniportal Video Assisted Thoracoscopic Bullectomy for Recurrent Spontaneous Pneumothorax – A first experience case report in a private hospital

Anumenechi N[1], Yahaya BA[2], Alioke II[3] & Suleman KA[4]

ABSTRACT

Introduction: Spontaneous pneumothorax has several causes; one important cause is lung bullae. Bullae classically occur at the apices of the lungs, and can rupture causing pneumothorax. Resection of these bullae is indicated to prevent recurrence.

Case report: A 25 years old man presented with recurrent breathlessness and cough. Clinical and radiological evaluation revealed a left pneumothorax, for which he had a chest tube insertion. A chest CT scan revealed bilateral lung bullae. He had a repeat pneumothorax after 2 weeks necessitating a repeat chest tube insertion and bullectomy. Surgery was done using the uniportal video assisted thoracoscopic approach which is a relatively novel approach to our institution. He was discharged after 4 days on admission.

Discussion: The clinical presentation of ruptured bulla causing pneumothorax are typical, as our patient was a young man, with sudden symptoms. Uniportal VATS gave the expected advantage over open surgery, as he was discharged home after 4 days, pain was less and cosmetic appeal of the scar was better.

Conclusion: Spontaneous pneumothorax from lung bullae can be safely resected surgically by the uniportal VATS approach in our environment

Keywords: Pneumothorax, Lung bullae, Bullectomy, Uniportal Video-Assisted Thoracoscopic Surgery

[1]Cardiothoracic Unit, Department of Surgery, National Hospital, Abuja. 2. Vinca Hospital, Kubwa, Abuja P.M.B 425, Department Of Surgery , National Hospital, Abuja, Nigeria, Email: cardio_dr@yahoo.com Phone Number: +2348067795916
[2]Cardiothoracic Unit, Department of Surgery, National Hospital, Abuja, Email: yahayababaadamu@gmail.com
[3]Cardiothoracic Unit, Department of Surgery, Federal Medical Center, Abuja, Email: aliokeinchrist@yahoo.com
[4]Cardiothoracic Unit, Department of Surgery, National Hospital, Abuja, Email: kaskakeem@gmail.com

Corresponding author: *Ndubuisi Anumenechi, Cardiothoracic Unit, Department of Surgery, National Hospital, Abuja. 2. Vinca Hospital, Kubwa, Abuja, P.M.B 425, Department Of Surgery , National Hospital, Abuja, Nigeria, Email: cardio_dr@yahoo.com, Phone Number: +2348067795916*

INTRODUCTION

Spontaneous pneumothorax is caused by a variety of pathologies. An important pathology is lung bulla, which gradually increase in size over many years.1 Lung bullae can be unilateral or bilateral. As much as video assisted thoracoscopic surgery (VATS) skills are useful, they requires a learning curve for mastery just like any other motor skill[2]. The usual pathway of skill progression is from open thoracotomy, to three-ports VATS, [3] two-ports VATS, [4] and then to uniportal VATS.[5] Diagnostic procedures and

simple therapeutic cases[6] are usually chosen for such transition in the early stages of the skills curve. Bullectomy is one of the procedures in the learning curve of VATS before advancement to more complex cases.

We report our first experience with uniportal VATS bullectomy in a young man who presented with clinical features of recurrent left sided pneumothorax who eventually went on to have uniportal vats bullectomy following two previous tube thoracostomies in a center where uniportal surgery was not a routine process.

Case-report

A 25-year-old man presented three years ago, with a one day history of sudden left sided chest pain, cough, and difficulty with breathing. Chest pain was of moderate severity, worsened with breathing, but not associated with exertion, was non radiating and there was no significant relieving factor. Cough was dry and breathlessness was of sudden onset and at rest. There was no fever, no weight loss, no preceding history of chest trauma, no drenching night sweats, and no previous history of having chronic cough, or contact with any patient coughing chronically. There was no history of cigarette smoking. He was an office worker, with no history suggestive of exposure to industrial fumes or dust.

Physical examination revealed a young man of average height, he was not pale, afebrile, acyanosed, saturating 95% in room air. Respiratory rate was 30cpm, with right tracheal deviation, reduced left chest expansion, hyperresonant percussion notes and reduced air entry on the left side.

A clinical diagnosis of left tension pneumothorax was made. He came with a chest Xray from the referring hospital which showed hyperlucent left pleural space with absent lung markings and separation of the visceral from the parietal pleura, in keeping with the left pneumothorax (Fig 1). Informed consent was taken, and an emergency left chest tube was inserted, with relief of symptoms. He subsequently had a chest CT scan which revealed expanded left lung, with the chest tube in-situ, but with bilateral apical lung bullae (Fig 2) (Fig 3)

Following clinical improvement and left lung re-expansion, the chest tube was removed, and he was counselled on the need for surgical excision of the bullae, he however wanted some time to decide about surgery.

Two weeks following discharge from hospital, he represented with similar symptoms. A left chest tube was reinserted, and he was again counselled on the need for bullectomy, this time around he consented.

Preoperative laboratory investigations were all within normal limits. Informed consent was taken. Surgery was done under general anaesthesia with one-lung ventilation via a double lumen endotracheal tube, with routine invasive and non-invasive monitoring. He was placed in the right lateral decubitus position, the left hemithorax was prepared routinely and sterile drapes applied, and setup for VATS was made. A 6 cm incision was made in the left 5th left intercostal space, in the mid axillary line. The incision was developed into the left pleural space, the left lung was collapsed, a 10 mm, 30 degrees telescope was inserted into the pleural space to examine the space and check for adhesions. Adhesions were minimal, then a wound protector was placed in the wound (Fig 4) and the telescope reintroduced. Intraoperative findings were flimsy pleural adhesions and left upper lobe apical bullae (Fig 5), normal mediastinal and diaphragmatic pleura. The bulla was attached to the apex of the left lung,

it measured about 10cm in diameter. Adhesiolysis was done with blunt dissection, and use of energy devices as needed. A bullectomy was done with a 30mm EndoGIA stapler (Fig 6), with two reloads. An air leak test was done and the lung was re-expanded. A single size 24 chest tube was placed, and the chest was closed in layers following routine protocol. There was mild air leak which stopped on the second post operative day, and the chest tube was removed on the third post operative day. Post extubation chest Xray showed complete lung expansion (Fig 7), and he was discharged home on the 4th day after surgery.

Follow-up chest CT scan at 30 days (Fig 8) post op were satisfactory. Scar was also satisfactory (Fig 9) .

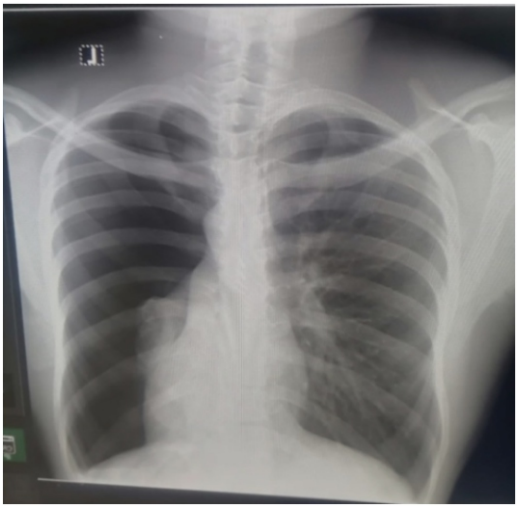

Figure 1: Left pneumothorax

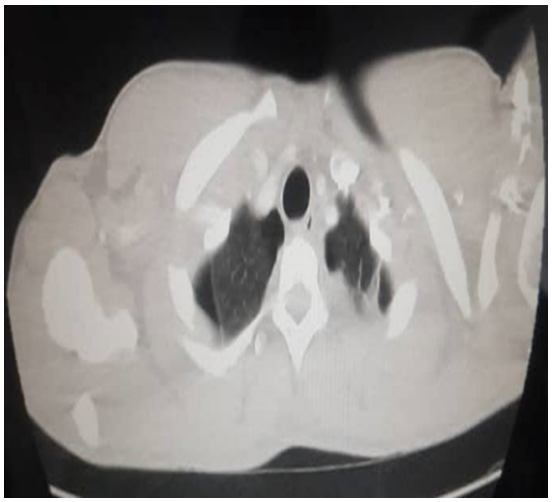

Figure 2: Preop chest CT scan axial showing bilateral apical bullae

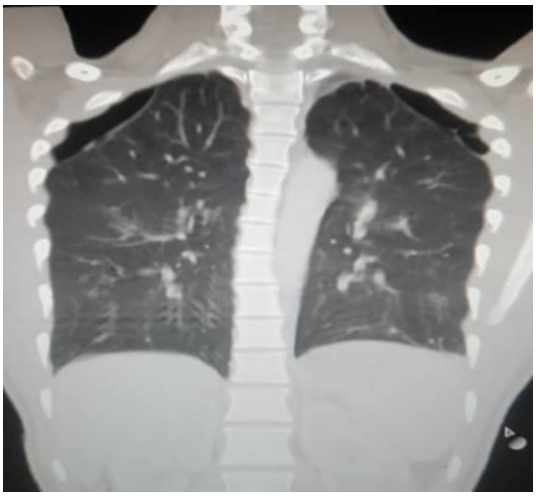

Figure 3: Preop chest CT scan coronal showing bilateral apical bullae

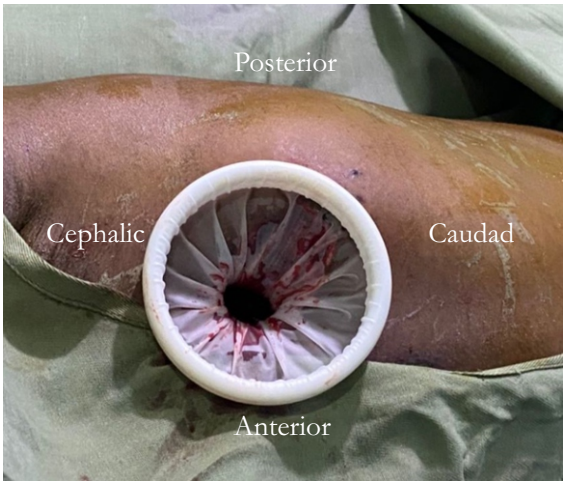

Figure 4: wound protector in-situ

Figure 5: Bulla at apex of left lung

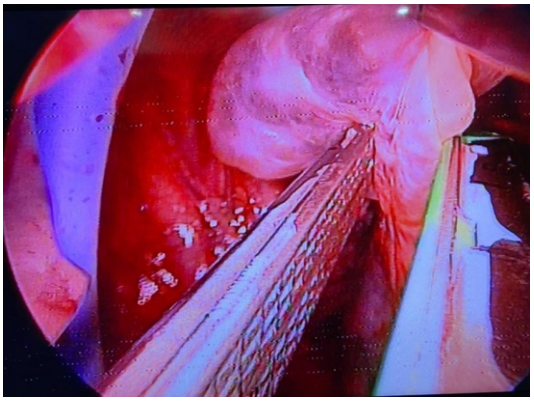

Figure 6: EndoGIA stapler in place at base of bulla

Figure 7: Post-op chest xray showing fully expanded left lung

Figure 8: Post op CT scan post left bullectomy reveals good apex of left lung

Figure 9: Scar at 30 days

DISCUSSION

Pneumothorax is the presence of air in the pleural cavity. It is a common pathology in surgical practice.[7] Spectrum of the disease can range from small pneumothorax without symptoms, to massive with life threatening features of hypotension, cyanosis in tension pneumothorax.

Incidence has been calculated to range from 5.8-16.7 cases per 100,000 persons per year depending on the type of pneumothorax, sex and age.[8] Primary spontaneous pneumothorax is commoner in the younger age group between 20-40 years while secondary spontaneous is commoner in elderly age group 60-70 years.[9] It is more common in men.

There are several causes of pneumothorax. They can be traumatic, iatrogenic, spontaneous or catamenial, and spontaneous pneumothorax is further divided into primary or secondary.[10] In this discussion and in relation to the case presented, this is a case of spontaneous pneumothorax, the primary spontaneous type caused by bullae. Bullae are defined as air filled sacs in the lungs that are more than 1cm in diameter.[11] They are not always symptomatic, as a study in cadavers showed that about one third (33.8%) of the population had small bullae in the lungs.[12] The true incidence in the living population may be under estimated. When bullae rupture, they present with breathlessness and acute pain like in this patient. Secondary spontaneous pneumothorax present more insidiously with other pulmonary symptoms before the respiratory difficulty sets in.

In this index case, there was recurrent sudden symptom of chest pain, breathlessness warranting him coming to the hospital a second time within 2 weeks for treatment. Presentation in our case is typical to the usual presentation of ruptured bulla with pneumothorax. However, there was no pulsus paradoxus, hypotension or elevated jugular venous pressure. We think this is because he was aware of his condition following the previous episode of pneumothorax , so he presented to the hospital early, and had quick intervention. Chest x-ray findings were in keeping with pneumothorax, and was sufficient for initial chest tube insertion. However, a CT scan was requested because the x-ray showed features that made us suspect that there were underlining pathologies most likely bullae which were eventually confirmed.

Treatment for small asymptomatic pneumothorax can be active watchful non-operative follow-up, then drainage for larger cases followed by treatment of any diagnosed underlying cause. Drainage can be by needle aspiration in small symptomatic cases or chest tube insertion in larger pneumothoraxes.

Treatment of underlying cause of pneumothorax and pleurodesis is indicated for first episode of pneumothorax in some group of high-risk patients. These high-risk patients are those in which recurrence is associated with significant risk , examples are airline pilots, scuba divers, people residing in remote places without access to quick surgical care, also those that have contralateral lung disease. [13]

Our patient had an obvious ruptured bullae and it was bilateral, we had to operate to prevent a third occurrence of pneumothorax.

Thoracotomy with resection and suture ligation of the bulla was the previous surgical option for bullectomy. This was associated with significant morbidity. However, with advancement of video assisted thoracoscopy surgery, surgeries are now done with minimally invasive techniques[1,7].
Resection of a lung bulla is relatively a simple

procedure for many thoracic surgeons, and is usually one of the first therapeutic procedures most thoracic surgeon achieve via VATS approach. A uniportal technique is usually acceptable, however, two ports or three ports can be used based on surgeon's experience. In this index case, we were able to achieve our goal with a uniportal technique. It is important to ensure that the staple line is placed on healthy lung tissue to avoid air leak.

CONCLUSION

Spontaneous pneumothorax from lung bullae can be safely resected by the uniportal VATS approach in our environment

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https://doi.org/10.4314/ ajtmbr.v8i1.13