


Early Experience With Video-assisted Thoracoscopic Surgery In Nigeria

Olugbenga Oluseyi Olusoji¹, Ezekiel Olayiwola Ogunleye¹, Augustine Jeremai Olugbemi², Olugbenga Olalekan Ojo², Saheed Babatunde Sanni² , Oluwaseye Francis Akerele²

¹Cardiothoracic Surgery Unit, Lagos University Teaching Hospital/College of Medicine of University of Lagos, Idi-Araba, Lagos

²Cardiothoracic Surgery Unit, Lagos University Teaching Hospital, Idi-Araba, Lagos

Correspondence to: Dr. Saheed Babatunde Sanni Email: sannisaheed@yahoo.com

Received: 15 Jan 2020; Revised: 08 Jun 2021; Accepted: 13 Jun 2021; Available online: 16 Aug 2021

Abstract

Background: Video-assisted thoracoscopic surgery (VATS) is a minimal access surgery that can be used for various diagnostic and therapeutic procedures. However, this tool is underused in our setting because of various reasons, ranging from equipment availability to expertise. **Objective:** This study aimed to review our early experience with VATS, highlighting the clinical attributes, outcomes, and challenges in our setting. **Methods:** This was a retrospective study of patients who underwent VATS between November 2015 and May 2019. Patients' demographics, clinical presentation, diagnosis, procedural success, complications, and length of hospital stay were analyzed. **Results:** The study included 25 patients (mean age, 41.26±12.78 years). The most common preoperative diagnosis was right catamenial pleural effusion. The conversion rate was 20%, and the average length of hospital stay was 3.4

days. **Conclusion:** The scope of VATS is very narrow in our setting. Only one center in Nigeria has reported their experience. Our early experience showed good success rate and minimal complications albeit longer hospital stay. The identified limitations to use of VATS include lack of investment in procurement of appropriate equipment and expertise, which need to be overcome.

Keywords: VATS, Thoracoscopy, Effusion, Endometriosis, Air leak

Ann Afr Surg. 2021; 18(4): 215-219

DOI: <http://dx.doi.org/10.4314/aas.v18i4.5>

Conflict of interest: None

Funding: None

© 2021 Author. This work is licensed under the Creative Commons Attribution 4.0 International License.

Introduction

Thoracoscopy, by definition, refers to the technique of inserting an optical tool through a trocar in the thoracic cavity for diagnostic or therapeutic purposes, while video-assisted thoracoscopic surgery (VATS) conventionally refers to the more elaborate thoracoscopic surgical procedure performed by (thoracic) surgeons in a completely anesthetized and double-lumen-ventilated patient (1).

It is indicated, whenever the expertise is available, as an

alternative approach to many diagnostic and therapeutic thoracic procedures. These have, however, been extended into performing major pulmonary, esophageal, and other mediastinal structures resections (2). Its main advantages are early postoperative recovery time, short hospital stay, less postoperative pain, and cosmesis. For a few years now, this approach has undergone a series of modifications and is still currently evolving. However, the application of these innovative thoracic

techniques is limited in our setting, as it has only been reported by one center in Nigeria. They operated 25 patients by VATS over a 5-year period (2008–2013), representing less than 10% of cases seen over that period (2). There are no robust local data available. This study was aimed at presenting our institution data and reviewing our early experience with VATS, highlighting the various pathologies amenable to VATS intervention, the technical challenges of the procedure, the clinical attributes of the patients, and the complications, duration of hospital stay, average costs of the intervention, and eventual outcome. in our setting within the period under review.

Materials and methods

This is a retrospective analysis of patients who had VATS at our center between November 2015 and May 2019. All procedures were done under general anesthesia in lateral decubitus position (operated side up) with lung isolation via a double-lumen endotracheal tube. The three-port technique was used for the first 15 cases. The trocars were placed at the 8th intercostal space (ICS), mid-axillary line, for the camera port (with 12-mm threaded trocar) and the other two ports were placed in the 5th ICS anteriorly and posteriorly under vision based on the convenience of the surgeon and areas of pathology. For the other cases, the two-port technique was used, with the camera port placed as above and the second port was placed in the 5th ICS usually anteriorly, just medial to the anterior axillary line. This port can be extended if necessary, and an incision retractor was placed for workspace creation. Biopsies were taken from suspicious areas and sent for histology. This site is also used for conversion to minithoracotomy if necessary. The reasons for conversion to thoracotomy were documented. Postoperative pain management was achieved, with satisfactory outcome, with paracetamol and non-steroidal anti-inflammatory drugs for a few days. Patients' demographics, clinical presentation, diagnosis, procedural success, complications, length of hospital stay, and follow-up data were studied. Data were then analyzed using Statistical Package for the Social Sciences version 22 (IBM Corp., Armonk, NY, USA). Descriptive statistics were presented as means,

percentages, and figures. The Student's t-test was used to compare continuous variables, and the χ^2 or Fisher's exact test for categorical variables. A p-value <0.05 was considered statistically significant.

Results

Twenty-five patients (mean age, 41.26±12.78 years; age range, 22–65 years) underwent VATS between November 2015 and May 2019. Most patients were within the age group of 31–40 years (Table 1). The male/female ratio was 1:11.5. The most common preoperative diagnoses were right catamenial pleural effusion (first episode) (24%) and right malignancy-associated pleural effusion (8%). The average surgery duration was 150 minutes (range, 90–280 minutes). Procedures performed were effusion drainage, lung parenchymal tumor and/or pleural biopsy, mechanical pleurodesis, decortication, and bronchopleural fistula closure. There were more right-sided procedures than left-sided procedures, as there were more pathologies on the right. Histologic diagnoses were largely thoracic endometriosis (40%), adenocarcinoma (16%), and inflammation (24%) (Table 1). The complication rate was 12% (Table 1), and the procedure conversion rate was 20% (Table 2). More than 92% of the patients had satisfactory clinical status after a minimum follow-up period of approximately 6 months. The average length of hospital stay was 3.4 days (range, 2–9 days). Those who had conversion to the open procedure had significantly longer hospital stay (5.8 days, p=0.01) (Table 1). There was no mortality.

Discussion

When VATS was first introduced to clinical practice, it was limited to diagnostic procedures of short duration and limited extension. Most surgeons were unfamiliar with the technique and available equipment. Increased familiarity with thoracoscopic techniques, as with laparoscopic techniques, has enabled surgeons to perform almost any major thoracic surgical procedure in a minimally invasive manner.

VATS, a minimal access technique, is meant to eliminate several disadvantages of thoracotomy such as

long and painful thoracotomy wounds, long-term musculoskeletal deformities postoperatively, etc.

Table 1. Patient characteristics, histological diagnosis, and complications (n=25)

Sex, n (%)	
Male	2 (8.0)
Female	23 (92.0)
Histological diagnosis, n (%)	
Adenocarcinoma	4 (16)
Adenosquamous carcinoma	1 (4)
Spindle cell tumor	1 (4)
Thoracic endometriosis	10 (40)
Hematoma	1 (4)
Inflammatory	6 (24)
N/A	2 (8)
Complications, n (%)	3 (12.0)
Air leak+lung collapse	2 (8)
Empyema thoracis	1 (4)
Nil	22 (88)
Age (years)	
Mean	41.26±12.78
Range	22–65
Duration of hospital stay (days)	
Overall	
Mean	3.44
Range	2–9
VATS	
Mean	2.88
Range	2–9
Minithoracotomy (converted)	
Mean	5.8
Range	4–8*

* $p=0.01$; N/A, not available

Table 2. Procedures done by VATS (n=25)

Decortication	2 (8)
Effusion drainage and pleurodesis	1 (4)
Lung/tumor biopsy	2 (8)
Pleural biopsy and pleurodesis	7 (28)
Pleural biopsy	2 (8)
Effusion drainage and pleural biopsy	5 (20)
Hematoma evacuation	1 (4)
Adhesiolysis and pleural biopsy ^a	1 (4)
Decortication ^a	1 (4)
Effusion drainage and pleurodesis ^a	2 (8)
Closure of fistula ^a	1 (4)*
Total	25 (100)

* $p=0.01$; ^aCases converted to open procedure using minithoracotomy access.

Conventional VATS were performed initially via three to four ports of access, and then it progressed to using

only two ports of access after considerable experience with the former. This has rapidly evolved into a uniportal or single-portal access described as uniportal video-assisted thoracic surgery (units), which was popularized by Dr. Diego Gonzalez-Rivas of Spain (3–5). We used the three-port technique in our first 15 cases and the two-port technique for the later ones after improved experience. VATS has been widely validated in recent years with rapid development in technology (6). Despite the extent of advancement in VATS, only one center in Nigeria has published work on VATS, and it was mainly used for diagnostic purposes and very few therapeutic procedures (2).

In a large series, VATS has a mortality rate of 0.07–0.5%, a nonfatal complication rate of 4.2–10.9%, and a conversion rate of 12.4% (7). In our limited series, there was no mortality, as most of the patients were relatively young, with ages <45 years and with good pulmonary reserve. The complication rate was 12% (Table 1). These were mainly air leaks and pleural space infections. This is not unexpected when compared with other established centers with a large volume, as cited above. The operation time ranged from 95 to 480 minutes. Earlier cases had longer operation times. This, however, started to decrease as more cases were done. Our conversion rate of 20% is also not unconnected with the level of our expertise and experience and also partially from adapting laparoscopic instruments because standard VATS instruments/equipment are not available in our center. Indications for conversion in our cases range from hemorrhage control, repair significant air leak on the table, and occasional technical difficulty in maneuvering available instrumentation to complete procedure.

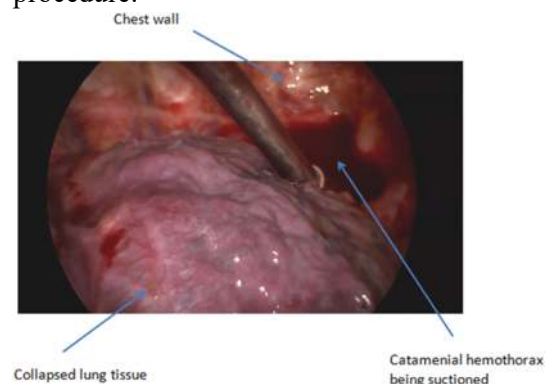


Figure 1. Intraoperative image of pleural space

Solely diagnostic procedures were 16%, diagnostic and therapeutic procedures combined were 48%, and solely therapeutic procedures were 36%. Catamenial pneumothorax and effusion, which are “rare” types of recurring secondary spontaneous pneumothorax and pleural collection in women during menstruation are associated with thoracic endometriosis (Figure 1).

VATS has been a useful method for diagnosing and treating such thoracic endometriosis (7). A significant number of our patients had thoracic endometriosis, and diagnoses were aided by VATS (Table 1). This underscores the fact that thoracic endometriosis may not be as uncommon as has been described in our setting. This “rarity” may be due to reduced suspicion and unavailability of a diagnostic facility for confirmation.

The benefits of thoracoscopy led to greater patient satisfaction at a lower cost (as has been the experience with laparoscopic surgery) and shorter hospital stay. This view is supported by Lawal et al. in their review of the experience of thoracoscopy vs. thoracotomy at a community hospital (8) and has also been affirmed by another study (9). In our experience, the average hospital stay was approximately 2.8 days for patients who had VATS. This was significantly different from those who had thoracotomy after conversion, who had an average hospital stay of 5.8 days ($p=0.01$) (Table 1). The overall cost of VATS is slightly cheaper when than that of thoracotomy, which is mainly due to shorter hospital stay and early resumption of normal activities. Our facility is a government hospital in a developing country, and the usual average cost of this procedure - including admissions, consumables, investigations, and medications - in our institution ranges from \$1200 to \$1700. This cost is above the reach of most of our patient due to lower socioeconomic status. This is one of the reasons for reduced cases for the 4-year period under review. Most patients had to be encouraged and counseled, and occasionally, funds were raised for them to be able to do the procedure rather than settling for closed-tube drainage to relieve symptoms. Health insurance schemes that are meant to relieve these expenses on patients are practically not available or are predominantly inefficient where a semblance of it is available (10).

In other resource-constrained developing African countries similar to ours, non-availability of facilities for VATS due to inadequate funding was also noted to slow down the progress of thoracic surgeries (11).

In conclusion, the scope of VATS in our setting is still very narrow despite the huge benefits of this surgical option. Investment in skill acquisition and training of thoracic surgeons in a dedicated center for such minimally invasive surgeries along with regular invitation of experts for demonstrations and skills transfer/update is necessary. These, coupled with adequate funding for gadgets and equipment and support for indigent patients, will lead to remarkable improvement in the near future.

References

1. Loddenkemper R. Medical thoracoscopy. Historical perspective. In: Beamis JF, Mathur PN, Mehta AC, eds. *Interventional pulmonary medicine. Lung biology in health and disease*. New York: Marcel Dekker; 2004: 411–429.
2. Falase BA, Majekodunmi AA, Ismail S, et al. Video-assisted thoracic surgery in a Nigerian teaching hospital: experience and challenges. *Niger J Clin Pract*. 2016; 19: 233-6.
3. Gonzalez D, Paradela M, Garcia J, et al. Single-port video-assisted thoracoscopic lobectomy. *Interact Cardiovasc Thorac Surg*. 2011; 12: 514-5.
4. Gonzalez-Rivas D, Paradela M, Fernandez R, et al. Uniportal video-assisted thoracoscopic lobectomy: two years of experience. *Ann Thorac Surg*. 2013; 95: 426-32.
5. Mineo TC, Ambrogi V. A glance at the history of uniportal video-assisted thoracic surgery. *J Vis Surg*. 2017; 3: 157. Erratum in: *J Vis Surg*. 2018; 4: 112.
6. Zhu M, Fu XN, Chen X. Lobectomy by video-assisted thoracoscopic surgery (VATS) for early stage of non-small cell lung cancer. *Front Med*. 2011; 5(1): 53-60.
7. Nezhat C, Lindheim SR, Backhus L. Thoracic endometriosis syndrome: a review of diagnosis and management. *JSL J Soc Laparoendosc Surg*. 2019; 23(3): e2019.00029.
8. Lawal TA, Gosemann Jan-H, Kuebler JF, et al. Thoracoscopy versus thoracotomy improves midterm musculoskeletal status and cosmesis in infants and children. *Ann Thorac Surg*. 2009; 87: 224-8.
9. Park BJ, Zhang H, Rusch VW, et al. Video-assisted thoracic surgery does not reduce the incidence of postoperative atrial fibrillation after pulmonary lobectomy. *J Thorac Cardiovasc Surg*. 2007; 133: 775-9.
10. Carapinha JL, Ross-Degnan D, Desta AT, et al. Health insurance systems in five Sub-Saharan African countries:

Medicine benefits and data for decision making. Health Policy 2011; 99(3): 193-202.

11. Fadelelmoula TE, Abdalla MM, Hussein HS. Challenges and outcome of thoracic surgery in a resource constrained developing African country. Curr Respir Med Rev. 2017; 13(4): 1-2.