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RESEARCH ARTICLE

Thoracoscopy in a country with limited resources in sub-Saharan Africa: a first series of cases from Togo

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ABSTRACT

Objectives: Video-assisted thoracoscopic surgery is experiencing significant growth nowadays. However, in Africa, it is slow to develop. The objectives of this study were to describe the indications and results of thoracoscopy in low and incomes country as Togo.

Materials and Methods: A retrospective descriptive cross-sectional study was conducted on patients who underwent exploration and therapeutic procedures by video-assisted surgery from June 2019 to November 2020 and from January 2022 to September 2023 (39 months) in Lomé.

Results: Sixteen patients underwent thoracoscopy during the study period. The mean age was 46.06 +/- 23 years. Patients over 45 years old represented 56.2%. The male-to-female ratio was 2.2. Six patients underwent preoperative pleural biopsies. Videothoracoscopy was diagnostic in 10 patients and therapeutic in 6 patients. It was performed under general anesthesia with or without selective intubation in the majority of cases (14/16). Two ports were used in the majority of cases (8/16). Biopsies were performed in 11 patients and intraoperative pleural talc pleurodesis in 4 patients. Pleural debridement was performed in 2 patients. Conversion to thoracotomy was done in 5 patients. The average drainage duration was 4 days. The average length of hospital stay was 5 days. Morbidity and mortality were marked by one case of bronchopleural fistula.

Conclusion: Video-assisted thoracoscopic surgery is in its early stages in Togo. Preliminary results are encouraging for its development in Togo.

Keywords: Videothoracoscopy, Togo.

Introduction:

"Video-assisted thoracic surgery (VATS) and thoracoscopy have emerged as highly effective techniques in the field of thoracic oncology, revolutionizing surgical outcomes and patient care worldwide[1]. These minimally invasive procedures offer reduced postoperative pain, shorter hospital stays, and faster recovery times compared to traditional open surgeries. Despite their established benefits, the adoption of VATS and thoracoscopy has been slow in many developing countries, particularly in Africa[2-4].

In Togo, a West African nation with a developing healthcare infrastructure, the practice of thoracic surgery has only recently begun to gain traction, with its inception dating back less than a decade[5]. The limited availability of resources, including advanced surgical equipment and specialized training, has posed challenges to the widespread implementation of these innovative surgical techniques.

Recognizing the importance of introducing and documenting the practice of video-assisted surgery in Togo, we have undertaken this study. Our objective is to provide a comprehensive overview of VATS procedures in the country, including indications, surgical outcomes, and the effectiveness of diagnostic thoracoscopy. By shedding light on the current landscape of thoracic surgery in Togo, we aim to contribute valuable insights that can inform future advancements and improve patient care in the region.

Materials and Methods:

We conducted a retrospective descriptive cross-sectional study on patients undergoing thoracic video surgery from June 2019 to November 2020 and from January 2022 to September 2023, totaling 39 months, in the surgical departments of Lomé. VATS was performed using both analog and digital equipment with high-resolution display on an HD, 4K screen. The optics were either 30°/5mm/30mm or 0°/10mm/30mm from STORZ, and the instrumentation consisted of conventional endoscopic forceps used in laparoscopy. Trocars were 5 and 10 mm in size and were not specific to thoracic surgery. Pleurodesis was exclusively chemical, based on talc spray, which was instilled under visual control intraoperatively in the absence of clear signs of infectious lesions and tumor history. No frozen section examination was performed. In case of atypical lung resection, we used automatic staplers ENDOGIA or ECHELON of 45, 60, or 80 mm. All patients were drained, and drain removal was performed upon satisfactory radio clinical evolution.

Results:

Sixteen patients underwent thoracoscopy during the study period, representing a frequency of 1.2 thoracoscopy per quarter. The average age of patients was 46.06 +/- 23 years, with a range from 10 to 85 years. We observed a male predominance (11 cases) with a sex ratio of 2.2. The medical and surgical history of patients included one patient with dermato-fibrosarcoma of Darrier, one case of lymphoma, one case of multiple myeloma, one patient with a brain tumor, one case of recurrent pleurisy, one case of recurrent pneumothorax, and comorbidities such as diabetes, hypertension, smoking, sequelae of stroke, and ischemic heart disease (1 case). Six patients underwent percutaneous biopsy before their referral for

thoracoscopy, revealing one case of adenocarcinoma and indeterminate results for the other 5 cases. Patients were mainly referred by internists and pneumologists **(Table I).**

Table I: Physicians referring patients for thoracoscopy.

Treating Physician	Number of Patients
Plastic Surgeon	1
Internist	4
Neurosurgeon	1
Pediatric Oncologist	1
Pneumologist	5
ICU physician	1
Not specified	3
Total	16

Preoperative diagnoses involved pleural involvement in 15 patients and parenchymal involvement in 2 patients. Patients were primarily referred by pneumologists **(Table II).**

Table II: Distribution of patients according to diagnosis.

Diagnosis	Number of Patients
Exudative pleurisy	3
Metastatic pleurisy	2
Recurrent pleurisy	2
Multiloculated empyema	2
Clotted hemothorax	1
Lung mass + pleurisy	1
Pulmonary nodule	1
Undetermined pleurisy	1
Multiseptated pleurisy	1
Multiloculated parapneumonic pleurisy	1
Catamenial pneumothorax	1
Total	16

Thoracoscopy was performed for diagnostic purposes in 10 patients and for therapeutic purposes in 06 patients. The surgical procedure was conducted under general anesthesia with selective intubation in 08 patients, under general anesthesia with normal intubation in 06 patients. Local anesthesia with sedation was administered to 02 patients.

Regarding the surgical technique, thoracoscopy was conducted through 02 ports (including an optical port and an operative port) in 08 patients, and through 03 ports in 05 patients. A single port accommodating both the optical and operative channels was sufficient in 03 patients.

Pleural biopsy was performed in 11 patients. This biopsy was combined with talc pleurodesis in 04 patients. Pleural debridement for loculated parapneumonic empyema was carried out in 02 patients. Two patients underwent biopsies outside the pleura, namely a diaphragmatic biopsy and an excision biopsy of a lung nodule. Two atypical pulmonary resections associated with pleural talcage were performed.

The histopathological results obtained from the biopsy specimens are summarized in **Table III**.

Table III: Distribution of histopathological results from thoracoscopic biopsies

Histopathological Result	Number of Patients
Bronchial adenocarcinoma	2
Pulmonary adenocarcinoma	2
Bullous dystrophy	1
Lymphoma metastasis	1
Myeloma metastasis	1
Nonspecific pleuritis	2
Pleural tuberculosis	2
Undetermined	2
Total	13

During the procedure, 05 patients underwent conversion to thoracotomy due to bleeding, severe pleuropulmonary adhesions, pulmonary laceration, diaphragmatic suture, and bullae resection.

The average drainage duration was 3 ± 1 days for patients who did not undergo conversion compared to 5 days for patients who underwent conversion. Postoperative pain was reduced in cases where thoracoscopy was not converted (3.17 versus 5.5). Morbidity and mortality were marked by a single case of bronchopleural fistula in a bedridden patient with a history of ischemic heart disease and stroke. This patient underwent pleuropulmonary debridement and died in the third month postoperatively due to paroxysmal arrhythmia.

Discussion:

Thoracic surgery is still in its infancy in Togo[5], however, despite having only one surgeon and the absence of a multidisciplinary team, the results are encouraging. Conversely, video surgery is still in its early stages, as in other surgical specialties[6]. Like the beginning of any new technique, it faces some difficulties such as the availability of equipment and mastering the technique; it requires a learning curve that must be maintained by recruiting suitable patients. However, the frequency of these interventions and the low rate of

referrals from other specialists hinder the development of the technique. Many authors believe there is underutilization of the technique in Africa[3,4]. Another aspect is the high cost of equipment and equipment maintenance. These main difficulties have been reported in the Caribbean[7].

Despite these challenges, it has primarily contributed to diagnosis, with pleural involvement representing the majority of thoracoscopy indications in Togo (15/16 cases), similar to findings by Marwane in Morocco, where 79.8% of cases involved pleural conditions[8].

The main objective in these cases is the complete and direct exploration of the pleural cavity, allowing for biopsy of small lesions inaccessible to blind or imaging-guided percutaneous biopsies. Thoracoscopy enables obtaining broad and targeted samples of suspicious lesions, as illustrated in **Figure 1**. Furthermore, it is possible to surgically remove benign lesions that are amenable to resection[9]. Percutaneous biopsies are less conclusive than thoracoscopic biopsies because the latter are performed with greater visual precision. Marwane found 53.8% of inconclusive percutaneous biopsies compared to 11.1% of inconclusive thoracoscopic biopsy[8]. We obtained similar results with 5 cases out of 6 inconclusive percutaneous biopsies compared to 2 out of 13 inconclusive thoracoscopic biopsies.

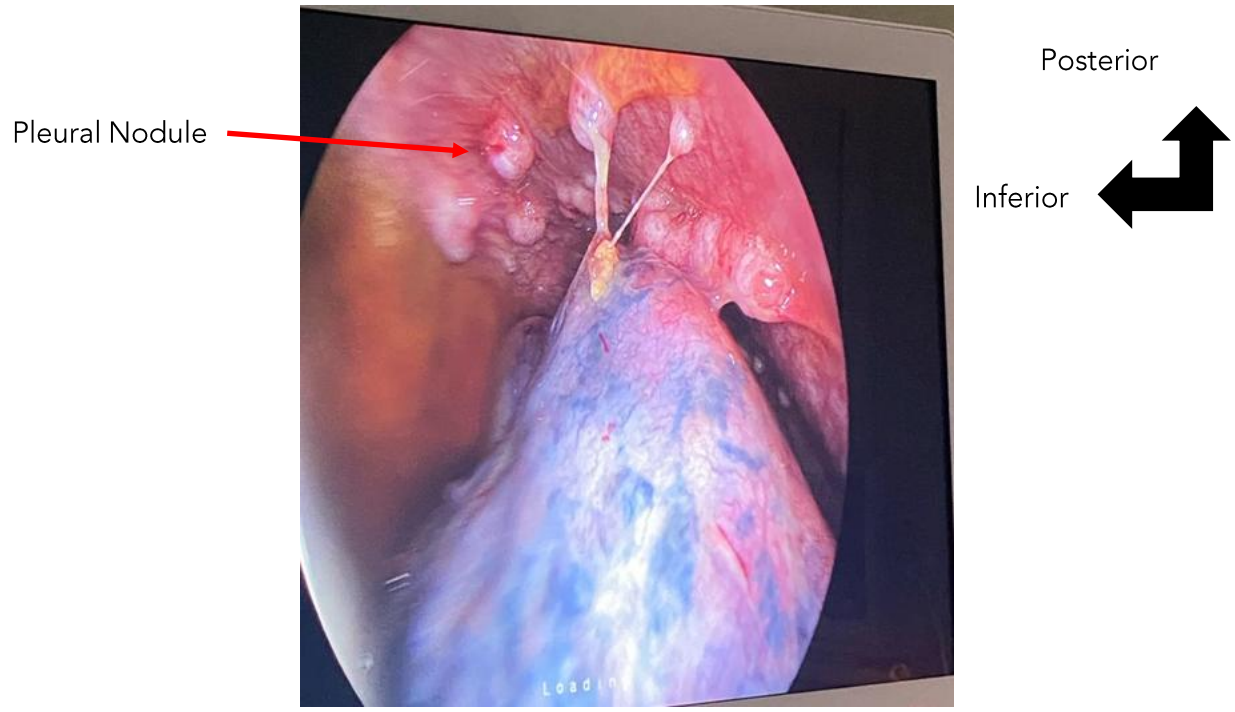

Figure 1: Intraoperative view of a video thoracoscopy. pleurisy with pleural effusion and pleural nodules can be seen.

The majority of our biopsies were performed under general anesthesia, sometimes with selective intubation. However, in two patients, we used local anesthesia to reduce discomfort during procedures. In a study involving 104 thoracoscopies, Marwane employed two local

anesthetic techniques with sedation, 102 instances of general anesthesia with 92 selective intubations, and 10 cases of standard intubations[8]. Selective intubation is not debatable when it comes to video-assisted thoracoscopic surgery.

The number of ports for the intervention depends on the operator; while the current trend is to reduce the number of ports to reduce postoperative pain, some authors have proposed using flexible fiberoptic scopes to reduce intercostal nerve compression caused by rigid optics.

The neoplastic origin of biopsies is the most common finding by authors, followed by infectious causes with variable rates[10-12]. During the same operative session in Togo, pleural biopsies were performed, and in six cases, pleural talcage was conducted, despite the absence of frozen section examination at that time. The decision to perform talcage was based on known cancer history and follow-up. However, cases of pleural tuberculosis in neoplastic pleurisies have been reported, highlighting the importance of histopathological examination, which is fortunately available in some centers in Lomé. In Africa, it is the most commonly performed therapeutic procedure by many teams[2,8].

In our experience, we conducted two atypical pulmonary resections and did not perform any major resections. However, we successfully completed two pleural empyema debridements. Our instrumentation did not allow for major procedures. Furthermore, our learning curve is still in its infancy, which explains the high conversion rate, especially when major resections are required. Conversion is more than an outcome in thoracoscopy than a failure. Currently, thoracoscopy is only conceivable in a multidisciplinary medical-surgical team with an appropriate technical platform to extend indications to complex procedures while minimizing the risk of conversion and complications. The conversion rate in 1995 ranged from 8 to 20% according to the literature[13], which was low compared to our series (25%), attributable to our average experience and limited technical platform. Causes of conversion included hemorrhagic incident, complicated adhesions requiring resection, pulmonary laceration, diaphragmatic suture, and bullae resection.

The average drainage duration in our study was 3 days, contrary to Kolschmann[14] and Barbetakis[15] who each found an average of 6 days in their studies on malignant pleurisy under thoracoscopy. The drainage duration depends on the procedure performed and the pathology.

The reduction in drainage duration varies in the literature. While some studies like Kirby report a shorter duration in VATS compared to thoracotomy (4.6 versus 6.5 days)[16], others like Shigemura found no significant difference in drainage duration between thoracotomy and thoracoscopie[19]. However, it is a consensus that thoracoscopy reduces postoperative pain compared to thoracotomy[20].

Morbidity is around 4.6% in Marwane's series[8]. We had one case of persistent bronchopleural fistula with conversion to thoracotomy in a patient. The advantages of thoracoscopy over thoracotomy are undeniable today in terms of morbidity and mortality, hospitalization duration, postoperative pain, and better aesthetic comfort. Postoperative

pain and aesthetic discomfort are major concerns for authors who have proposed technical tricks to improve patient satisfaction[21].

Conclusion

Thoracoscopy represents an indisputable gain in the diagnosis of certain thoracic pathologies. It offers several advantages with increasingly extensive indications thanks to advances in video surgery instrumentation and operators' experience. Our encouraging and satisfactory results deserve further pursuit and development of video-assisted thoracic surgery in Togo.

Conflict of Interest:

None

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