

Major lung resection through uniportal video-thoracoscopy: First experience in Tunisia

Les résections pulmonaires majeures par vidéothoroscopie uniportale: Une première en Tunisie

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SUMMARY

Introduction: Several major thoracic procedures, like lung resections, are nowadays performed through minimally invasive approach. Uniportal Video-thoracoscopy is nowadays a valid approach offering results as good as those with the classic Multiportal video-thoracoscopy.

Aims: To report and to evaluate the first series of major lung resection through Uniportal Video-thoracoscopy in Tunisia.

Methods: A descriptive and retrospective study of cases of anatomical lung resection performed in a single university hospital through a approach, over a period of three years (January 2019 to April 2022).

Results: Fifteen patients are included in our series The median age is 62 years. Indication for lung resection was mainly for non-small cell lung cancer (86% of cases). The median size of pulmonary lesion was 24 mm. The median value of the Forced Expiratory Volume in one second was 78%. Lobectomy was performed in 86% of cases, and mainly lower lobectomy (80%). The median operating time was 120 min. There were three cases of conversion. The median length of drainage was 3 days and the median length of hospital stay was 3 days. Specific complications were found in 4 cases.

Conclusion: Uniportal Video-thoracoscopy is a valid approach for major lung resection. Outcome is similar or even better to multiportal video-thoracoscopy according to recent metanalysis. More complex procedures are nowadays performed with this minimally invasive approach.

KEYWORDS

lung resection -
outcomes – Uniportal
- videothoracoscopy

RÉSUMÉ

Introduction : Plusieurs interventions thoraciques majeures, comme les résections pulmonaires, sont aujourd'hui réalisées par une approche mini-invasive. La vidéo-thoroscopie Uniportale est aujourd'hui une approche valable offrant des résultats aussi bons que ceux de la vidéo-thoroscopie classique Multiportale.

Buts : Rappporter et évaluer la première série de résections pulmonaires majeures par vidéo-thoroscopie Uniportale en Tunisie.

Méthodes : Il s'agit d'une étude rétrospective et descriptive des cas de résections pulmonaires majeures par vidéo-thoroscopie Uniportale réalisées dans le service de chirurgie thoracique et cardiovasculaire sur une période allant de janvier 2019 à avril 2022.

Résultats : Quinze patients étaient inclus dans notre série. L'âge médian était de 62 ans. L'indication de la résection pulmonaire était principalement le cancer pulmonaire non à petites cellules (86% des cas). La taille médiane de la lésion pulmonaire était de 24 mm. La valeur médiane du Volume Expiratoire Maximal en une seconde était de 78%. Une lobectomie était réalisée dans 86% des cas, et principalement la lobectomie inférieure (80%). La durée médiane de l'opération était de 120 minutes. Il y avait trois cas de conversion. La durée médiane de drainage était de 3 jours et la durée médiane d'hospitalisation de 3 jours. Des complications spécifiques étaient retrouvées dans 4 cas.

Conclusion : Etant donné que la voie uniportale a prouvé son efficacité, son fiable taux de morbidité et de mortalité, des interventions plus complexes telles que des résections-anastomoses bronchiques et vasculaires pourraient être réalisées.

MOTS-CLÉS

résections
pulmonaires
– résultats-
vidéothoroscopie-
uniportale

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INTRODUCTION

Minimally invasive techniques for lung resection are in a dynamic progression since several years with a single purpose: ensuring the same outcome with less complications. Uniportal video thoracoscopy (U-VATS) is nowadays a valid surgical approach offering lower morbidity compared to the classic Multiportal video thoracoscopy (M-VATS), with comparable results (1, 2). The first case of lung resection through this approach was performed in 2019.

The aims of this study are to report and to evaluate the first series of major lung resection through Uniportal Video-thoracoscopy in Tunisia.

PATIENTS AND METHODS

A descriptive retrospective study of cases of anatomical lung resections performed in thoracic department of Habib Bourguiba university hospital, Sfax, Tunisia, through a U-VATS approach, over a period of three years (January 2019 to April 2022). We have included in this study only cases of major lung resections (lobar and sublobar resections) through a single utility incision (1) (figure 1). The patient is placed in a lateral position. Surgeons are in front of the patient and all instruments are introduced through this unique incision (figure 2).



Figure 1. Utility incision



Figure 2. installation in uniportal videothoracoscopy

Patients operated through a multiportal approach, and cases of non-major lung resections were not included in this study.

Medical observations were extracted from the local data base. Collected information concerned profile and medical history of patients, per operative data and post-operative results.

RESULTS

Fifteen patients are included in our series with 12 men and 3 women. The median age is 62 years (Q25- 75%: 50 y – 69 y). Medical history and profile of our patients were summarized in table 1. Indication for lung resection was mainly for non-small cell lung cancer (86%, 13 cases). The median size of pulmonary lesion was 24 mm (Q25- 75%: 14mm – 36 mm). The median value of Forced Expiratory Volume in one second (FEV1) was 78% (Q25- 75%: 62 %– 97%). Lobectomy was performed in 86% of cases, and mainly lower lobectomy (80%). The median operating time was 120 min (Q25- 75%: 105 min – 180 min). There were three cases of conversion because of bleeding, anatomic variation and intolerance of single lung ventilation. Post operative chest drainage was done with single chest tube in 53% of cases (8 cases). For the remaining cases, two chest tubes were used. All patients received an enhanced post operative recovery according to the protocol of our unit. The median length of drainage

was 3 days (Q25- 75%: 3 days, 5 days) and the median length of hospital stay was 3 days (Q25- 75%: 3 days – 8 days). Specific complications were found in 4 cases. A surgical revision was indicated in two cases for local infection of the surgical site and parietal hematoma. Table 2 summarized indications, location, resection type and post operative course.

Table 1. Patients' medical history and profile.(n=15)

	Number
Patient's gender:	
- Man	12 (80%)
- Women	3 (20%)
Age (median / years)	62 (50 – 69)
Performance Statue:	
- 0	5 (33%)
- 1	10 (67%)
Medical history:	
- Arterial hypertension	5 (33%)
- Diabetes mellitus	4 (27%)
- COPD	2 (13%)
- Asthma	5 (33%)
- Colorectal cancer	1 (7%)
- Chronic kidney failure	2 (13%)
- Active smoker	2 (13%)
- Current smoker	8 (53%)
Indication for lung resection:	
- Non-small cell lung cancer	13 (86%)
- Metastases	1 (7%)
- Bronchiectasis	1 (7%)
FEV1	78 % (62% - 97%)

COPD: Chronic Obstructive Pulmonary Disease.

Table 2. Indications, resections' types and post operativecourse.(n=15)

	Number/ percentage
Type of resection:	
- Lobectomy	13 (86%)
- Bi lobectomy	1 (7%)
- Segmentectomy	1 (7%)
Location:	
- Left lower lobectomy	5 (33%)
- Left basal Pyramid	1 (7%)
- Right lower lobectomy	5 (33%)
- Inferior bi lobectomy	1 (7%)
- Right upper lobectomy	2 (13%)
- Middle lobectomy	1 (7%)
Operating time (median/min)	120 (105– 180)
Number of chest tube:	
- 1	8 (53%)
- 2	7 (47%)
Length of drainage (median / day)	3 (3– 5)
Length of hospital stay (median / day)	3 (3– 8)
Post operative complication:	4 (27%)
- Prolonged air leak	2 (13%)
- Infection of surgical site	1 (7%)
- Parietal hematoma	1 (7%)

DISCUSSION

Thoracoscopy has been desced for the first time by Hans ChristianJacobaeusin 1910 with an intent to treat pleural adhesions (2). He used a double port approach. By 1920, there were more interest on the Uniportal approach mainly by Cutler, Davidson, Friedel and Drash(2). Since then, thoracoscopy was limited for some pleural intervention and exploration. The emergence of modern thoracoscopy was boosted by technological developments mainly in anesthesia, improvements in cameras and displays and the invention of linear staplers (2).With the first major pulmonary resection performed in 1992(3), Video Assisted Thoracic Surgeryregained its place for several thoracic procedures as a safe approach with equivalent benefits compared to the classic open thoracotomy. Uniportal approach is firstly reported for a sympathectomy in 2000 (2). At the beginning, this approach was reserved for minor procedure like the treatment of pneumothorax or wedge resection, until 2011, when Gonzales et al published the first cases of lobectomy (4). At the beginning, only lower lobectomies were performed. By the time, and with more experience, cases of upper lobectomies, segmentectomies, and even bronchial or vascular sleeve lobectomies, or carinal reconstruction are now reported in the literature (2, 5).The spread of this technique was worldwide, and was facilitated by social networks, video platforms and demonstrations, training sessions, master classes and other tools. A 2020 metanalysis showed similar results between U-VATS and M-VATS regarding operating time, blood loss, number of resected lymph nodes, conversion rate, drainage duration, length of post-operative stay and pain within the first 24 hours (1). Previous meta-analysis and reviews showed that U-VATS offered less pain, shorter operating time, a reduction in blood loss, and shorter length of post-operative stay (6, 7).

In Tunisia, the first cases of thoracoscopic major lung resection were reported in 2013(8). M-VATS approach is exclusively the used approach in different departments in Tunisia. As the spread of U-VATS approach was very fast through the world, we performed the first lobectomy through a single incision for a lung cancer in September 2018. Like reported in the literature, lower lobectomy was the most frequent resection performed, as we were beginning with this technique.

Nowadays, all our thoracoscopic procedures are done exclusively with this approach, including lung cancer resections, pleural diseases, infectious diseases and even more challenging cases like locally advanced lung cancers and sleeve resections (9, 10). Recently, several robotic assisted procedure are performed through a single utility incision, with some special specifics for these techniques (11).

The limits of this study are the retrospective type and the small size of the studied population. A prospective and multicentric study must be conducted to evaluate the results of this approach.

CONCLUSION

Recent publications showed that U-VATS is a valid approach for major lung resections. Outcome is similar or even better to M-VATS according to recent metanalysis. More complex procedures like sleeve resection or carinal reconstructions are nowadays performed with this minimally invasive approach thanks to U-VATS.

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