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SURGICAL CHARACTERISTICS OF STAGE I-IIA NON-SMALL CELL LUNG CANCER

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ABSTRACT

Objectives: To describe surgical characteristics of stage I-IIA non-small cell lung cancer.

Subjects and methods: An uncontrolled intervention study on 83 patients diagnosed with stage I - IIa non-small cell lung cancer who underwent thoracoscopy at Military Hospital 175 from January 2015 to December 2020.

Results: The average surgical time in the study was 137.5 minutes and the blood loss was not much. Small incisions have an average length of 2.95cm, high aesthetics and low postoperative pain (5.92 days). The patient had a tumor that pulled the visceral pleura 62/83 (74.7%); 21/83 (25.3%) patients with tumors located in parenchyma; 6/83 (7.2%) patients had lung adhesions to the chest wall. There were 2 (2.4%) patients with bleeding complications that required conversion to open surgery; After surgery, there were 7 complications including 1 (1.2%) pneumonia; 1 (1.2%) empyema caused by green pus bacilli; 5 (6.0%) cases of gas leak lasting more than 7 days.

Conclusion: Tumor characteristics in surgery include features of tugging visceral pleura, tumor located in parenchyma, lung sticking to chest wall. Common complications include bleeding. Complications after surgery include pneumonia, empyema caused by green pus bacilli, prolonged gas.

Keywords: Non-small cell lung cancer, surgery.

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1. INTRODUCTION

Primary lung cancer is the most cause leading to cancer death in men and the third in women, and is the reason of cancer death in adults. According to the statistics of GLOBOCAN 2018, in Vietnam, lung cancer ranks second only after liver cancer with an age-standardized incidence rate in both sexes of 21.7; The disease wass common in men with an age-standardized incidence rate in men of 35.4 and 11.1 in women. It is estimated that each year there are about 23,000 new cases and approximately 21,000 deaths [1]. Surgery is considered an effective treatment for non-small cell lung cancer, especially now that laparoscopic surgery is widely applied. In Vietnam, laparoscopic surgery was first conducted in 1996 at Binh Dan Hospital. Since then, thoracic surgery has been applied in many major hospitals in our country such as Cho Ray Hospital, Viet Duc Hospital, Hospital 108, Central K Hospital, Military Hospital 175, Hospital of University of Medicine and Pharmacy, Ho Chi Minh City. This study aims to: *"To describe surgical characteristics of stage I-IIA non-small cell lung cancer".*

2. SUBJECTS AND METHODS

2.1. Subjects

Including 83 patients diagnosed with stage I - IIa non-small cell lung cancer who underwent thoracoscopic surgery at K hospital from 01/2015 to 12/2020.

Criteria of selection:

- Patients treated at the Department of Thoracic Surgery, Military Hospital 175, were diagnosed with lung cancer at stages Ia, Ib and IIa based on clinical, CT, brain MRI, and needle biopsy with histopathological diagnosis. Preoperatively, non-small cell lung cancer underwent laparoscopic total lobectomy and systemic lymph node dissection.

- Determining the stage of non-small cell lung cancer before surgery was mainly based on chest CT with contrast and according to the UICC or AJCC 2009 classification.

- There are histopathological results after surgery as NSCLC.

- Patients received laparoscopic treatment alone or surgery combined with chemotherapy according to the agreed standard protocol at K Hospital.

- Having a full range of tests, heart, liver and kidney function within allowable limits, good blood clotting function, lung ventilation function.

- Having a good overall health index to be eligible for surgery with Karnofsky ≥ 80, or PS index = 0 - 1.

- New patient coming to treatment for the first time.

- Patients over 18 years old agreed to participate in the study.

Criteria of exclusion:

- The patient had received preoperative chemotherapy and radiation because the assessment of tumor size and lymph nodes will no longer be accurate.

- Post-operative patients had histopathological results as small cell carcinoma, or some other rare types.

- Patients with ventilation dysfunction, weak physical condition, laparoscopic surgery can

only cut lung segments, atypical resection, no regional lymph node dissection.

2.2. Methods

Study design: Non-controlled intervention study.

Study parameters:

- Type of surgery: total laparoscopic surgery or conversion to open surgery;
- Reason for switching to open surgery;
- Incision length (cm): measure the length of the largest incision;
- Total surgery time (minutes): from the time of skin incision to the end of surgery.
- Time of lobectomy (minutes): from the time of skin incision to the time of removing the lobe of the lung from the thorax.
- Time of lymph node dissection (minute): counted from the time the lobe was removed to the end of surgery.
- Surgical accidents and complications.

2.3. Statistically analysis: The collected data was entered and processed on the SPSS 22.0 biomedical statistical software.

3. RESULTS

Table 1. Type of surgery and conversion to open surgery

Medical history	Patients (n=83)	Proportion (%)
Full laparoscopic surgery	81	97.6
Switch to open surgery	2	2.4
Bleeding	2	2.4

Comment: Most of the patients in our study had laparoscopic surgery successfully 81/83 (97.6%) only 2 patients had to be converted to open surgery due to intraoperative bleeding.

Table 2. Surgical characteristics

Characteristics	Mean ± SD (Min-max)
Surgery time (minutes)	137.47 ± 34.01 (85-250)
Incision length (cm)	2.95 ± 0.52 (2.5-5.0)

Comment: The average surgical time in our study was 137.47 ± 34.01 minutes (85 – 250); The average incision length in our study was 2.95 ± 0.52 cm (2.5 – 5).

Table 3. Lung cancer characteristics in surgery

Characteristics	Patients (n=83)	Proportion (%)
Lungs stick to chest wall	6	7.2
The tumor in the parenchyma	21	25.3
Tumor pulls visceral pleura	62	74.7

Comments: In our study, patients often had tumors that pulled the visceral pleura 62/83 (74.7%); 21/83 (25.3%) patients with tumors located in parenchyma; 6/83 (7.2%) patients had lung adhesions to the chest wall.

Table 4. Nodal characteristics in surgery

Nodal characteristics		Mean ± SD (Min-max)	
N1 group		5.99 ± 2.03 (3-11)	
N2 group		1.94 ± 1.70 (2-7)	
Total		7.93 ± 3.12 (3-16)	
Nodal size	**n (%)**		
	≤ 10mm	**11-15 mm**	**16-20 mm**
N1 group (n=83)	73 (88.0)	9 (10.8)	1 (1.2)
N2 group (n=83)	83 (100)	0 (0.0)	0 (0.0)

Comment: The average number of lymph nodes in our surgery was: group 1: 5.99 ± 2.03 (3 – 11); group 2: 1.94 ± 1.70 (2 – 7); Total: 7.93 ± 3.12 (3 – 16).

In lymph node dissection, group N1, obtained 83/83 patients and group N2 obtained 83/83; Most of the dredged lymph nodes are ≤ 10mm in size N1 group (87.8%); group N2 (100%); Group N1 lymph nodes have 9/83 (10.8%), size 11-15 mm, 1 (1.2%) size 16-20 mm. After surgery 29/83 (34.9%) of patients with positive lymph node pathology were all N1 group, N2 group were all negative.

Table 5. Stage of disease in surgery

Stage	Patients (n=83)	Proportion (%)
Stage IA (T1aN0; T1bN0)	38	45.8
Stage IB (T2aN0)	16	19.3
Stage IIA (T1aN1; T1bN1; T2aN1)	29	34.9

Comment: In our study after surgery, there were 38/83 (45.8%) patients with stage IA; 16/83 (19.3%) patients stage IB; 29/83 (34.9%) patients with stage IIA.

Table 6. Accidents and surgical complications

Accidents, complications	Patients (n=83)	Proportion (%)
Bleeding	2	2.4
Respiratory failure	0	0
bronchial apical fistula	0	0
Pneumonia	1	1.2
Empyema	1	1.2
Gas leak lasting more than 7 days	5	6.0
Death	1	1.2

Comments: During surgery, we encountered 2 (2.4%) patients with bleeding complications that required conversion to open surgery; After surgery, we encountered 7 cases of complications, of which 1 (1.2%) cases of pneumonia; 1 (1.2%) case of empyema caused by green pus bacillus (this patient died after 4 months); 5 (6.0%) cases of gas leak lasting more than 7 days.

4. DISCUSSION

The surgical time depends heavily on the intraoperative injury (tumor size, lung adhesion status, interlobular fissure condition, ...), surgical instruments and facilities, experience and skill of the surgeon and the method of operation. Due to the method of performing surgery, the time of the authors' surgery varies greatly.

The average surgical time in our study was 137.47 ± 34.01 (85 – 250) minutes. Compared with other authors' surgery time: Our surgery time is equivalent to that of Swanson S. J.; Tomaszek S. C.; Tran Minh Bao Luan and is not significantly shorter than Loscertales J. Kirby T. J. Vu Huu Vinh [2], [3], [4], [5], [6]. However, our surgical time was much shorter

when compared with that of authors Nguyen Hoang Binh Srisomboon C. Ohtsuka T. This may be because the authors performed surgery through the trocar hole with a small incision of 1cm, after resection. The new author's new lung lobe widened the incision to remove the tumor containing the lobe; We perform surgery with trocar hole and small incision of 2.5-5cm from the beginning, making it easier to operate and convenient in using multiple instruments at the same time through a small 2.5-5cm incision. Moreover, patients at an early stage should have small lymph nodes and fewer lymph nodes, so that lymph node dissection is convenient and faster.

Our surgery was performed with 1 small incision with the average incision length in our study being 2.95 ± 0.52 (2 – 4). Of the 83 patients studied, there were two cases that had to be converted to open surgery due to bleeding, we still included them in the study group because the patient was undergoing laparoscopic surgery when he was converted to open surgery and we measured the length of the incision before surgery. Compared with the incision length of some authors [2], [4], [7]: The length of the small incisions of the authors also varies greatly depending on the surgeon's ability and level of operation. Technical difficulties need many tools to manipulate the tumor size at the same time to get the lobe containing the tumor out of the chest... but the surgeon will decide the length of the small incision and the endoscopic technique completely or assisted endoscopical surgery. According to the current definition of laparoscopic lobectomy and lymphadenectomy, the European Society of Thoracic Surgery (ESTS) [8] and the technique was applied in our study: Endoscopic surgery. complete laparoscopy when performing surgery with two 10mm trocars and 1 small incision varying from 2 -4 cm; do not use a rib ball tool, this is the most important factor; View completely through the screen for lobectomy and lymph node dissection; Arteriovenous and bronchial resection individually during lobectomy. Supportive laparoscopic surgery when performing surgery such as on small incisions 4 - 8cm long, using a rib ball tool; The surgeon can both look at the screen in combination with the direct view to manipulate.

In our 83 cases, there was a case that had to be converted to open surgery due to bleeding. In these two cases, there was a case of tearing of the right superior pulmonary vein due to lymph node attachment to the vein and a case of tearing the axillary artery of the left lobe 1 and 2 of the left lung during lymph node dissection. We did not stop the bleeding by using compression gauze for 15 minutes.

In our study, patients often had tumors that pulled the visceral pleura 62/83 (74.7%); 21/83 (25.3%) patients with tumor in parenchyma; 6/83 (7.2%) patients had lung adhesions to the chest wall. Author Tran Minh Bao Luan showed that the condition of sticky lung was 33.9%; The state of adhesion of the interlobular groove is 12.8%, this rate is higher in our study, possibly because the author chose patients at a later stage [5].

5. CONCLUSION

The average surgical time in the study was 137.5 minutes and the blood loss was not much. Small incisions have an average length of 2.95cm, high aesthetics and low postoperative pain (5.92 days).

The patient had a tumor that pulled the visceral

pleura 62/83 (74.7%); 21/83 (25.3%) patients with tumors in parenchyma; 6/83 (7.2%) patients had lung adhesions to the chest wall.

There were 2 (2.4%) patients with bleeding complications that required conversion to open surgery; After surgery, there were 7 complications including 1 (1.2%) pneumonia; 1 (1.2%) empyema caused by green pus bacilli; 5 (6.0%) cases of gas leak lasting more than 7 days.

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