Pattern of Clinical Presentation, Staging and Surgical Treatment of Lung cancer in 250 Consecutive Patients.

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Abstract

Introduction: GLOBOCAN 2022 showed lung cancer to be leading cancer in Nepal accounting for about 11% (2431) of all new cancer cases and about 15% (2207) of all cancer deaths. We reviewed the pattern, clinical presentation, stage and multimodality treatment of lung cancer results in Nepal.

Methods: Two hundred fifty consecutive patients with clinical stages of I-IIIA, who were considered for lung resectional surgery were studied. Bronchoscopy and Computed Tomography were used for diagnosis and staging.

Results: Surgery alone was done in 36% cases, rest of the patients (64%) underwent multimodality approach. Lobectomy, bilobectomy, pneumonectomy, sub lobar resection and sleeve resection were done in 85.6%, 4%, 6.4%, 2% and 2% respectively. Final histology revealed squamous cell carcinoma, adeno carcinoma, and others in 72.4%, 18.4%, 9.2% respectively. Final pathological report showed stage I, II, and III in 14.8%, 30% and 55.2% cases. Thirty-day mortality was observed in 1.6% of cases. Air leak was most common post operative complication (8.4%).

Conclusion: Squamous cell carcinoma still remains the commonest pathological variant of lung cancer in Nepal. Lobectomy remains the most commonly performed surgical procedure.

Keywords: *lung cancer, squamous cell cancer, lobectomy*

Introduction

Lung cancer is leading cause of cancer related death globally with almost 2.5 million new cases and over 1.8 million deaths worldwide. As per GLOBOCAN 2022 statistics, in Nepal lung cancer accounts for about 11% (2431) of all new cancer cases and about 15% (2207) of all cancer deaths.[1] Lung cancer mortality rates have placed a significant strain on public health both globally and in Nepal.

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Broadly lung cancer is classified as small cell (SCLC) and non-small cell carcinoma (NSCLC) (adeno carcinoma, squamous cell carcinoma, large cell carcinoma).[2] Signs and symptoms of lung cancer depends on stage of disease. Most patients are smokers and tobacco chewers and present with chest pain, cough, hemoptysis and shortness of breath.[3]

Staging is done using bronchoscopy, Computed Tomography (CT), Positron Emission Tomography (PET) and Magnetic Resonance Imaging (MRI) of brain. Surgery remains mainstay of treatment in patients with NSCLC of stage I, II and some patients with stage IIIA disease. SCLC is rarely treated by surgery and managed with chemo radiotherapy.[4]

Only few studies related to lung cancer are available from Nepal. We aimed to analyze patterns of presentation, diagnosis, histological types, surgical resections and early post operative complications from a tertiary care center in Nepal.

Material and method

Study design and study population

This was a single centered, retrospective study conducted in the department of thoracic surgery, B.P. Koirala memorial cancer hospital (BPKMCH) from 2001 to 2019. Ethical approval was taken from the Institutional Review Committee of BPKMCH. This study includes two hundred fifty consecutive lung cancer patients who underwent surgical treatment. Clinical staging was done on the grounds of clinical examination, CT chest,abdomen and bronchoscopic findings. Any ipsilateral mediastinal nodes more than 1 cm along short axis were considered as N2 disease. Mediastinoscopy and PET scan were utilized only in few cases. Staging was done as per UICC 7th edition.

Fitness for surgery

Patients were taken for surgery only when the following conditions were met:

1. ECOG: 0-2
2. SPO2 at room air > 90%
3. Baseline FEV1 > 75%
4. Predicted post op FEV1 > 40% (using spirometry)
5. Desaturation by < 4% after brisk 6-minute walk test or after 20 sit-ups
6. Left ventricular ejection fraction > 60%

Treatment Approach

Patients were conventionally approached using postero-lateral or antero-lateral thoracotomy through 5th intercostal space. Selected patients with cT1-2 underwent Video assisted Thoraci Surgery (VATS) lobectomy. Nodes were either sampled randomly, systematically sampled or completely dissected. In random sampling, only suspected (on visual and tactile inspection) were randomly sampled. In systematic sampling, at least three mediastinal stations were sampled. During complete mediastinal nodal dissection, levels 1, 2R, 3, 4R, 7, 8, 9, 10-13 were excised for right sided tumors. For left sided tumors, levels 5, 6, 7-13 were excised.

After R0 resection, post operative adjuvant treatment was rarely used (before year 2010). After R1/ R2 resection, patient received adjuvant radiation/ chemoradiation.

Since year 2010, after R0 resection all the patients above pIB and selected pIB with poor prognostic factors received platinum-based chemotherapy. Some patients with pN2 received post operative radiation as well, which depended upon the judgement by clinical oncologist.

Table 1. Symptoms		
Symptoms	N	%
Cough	232	93
Chest pain	154	62
Shortness of breath	146	58
Hemoptysis	146	58

Patients with cN2 disease received 2-3 cycles of platinum-based chemotherapy.

Table 2. Types of treatment		
Types	n	%
S*	90	36
S-CT†	82	32.8
CT-S-CT	50	20
S-CT-RT‡	10	4.0
S-RT-CT	7	2.8
CT-S-CTRT	3	1.2
CT-S	2	0.8
S-RT§	2	0.8
Concurrent CTRT-S-CT	2	0.8
CT-RT-S	1	0.4
RT-S-CT	1	0.4
* Surgery; † chemotherapy; ‡ chemoradiation; §radiation.		

After completion of chemotherapy, re-investigation was done and if there was either a response or no progression of disease, patient was taken for surgery. One patient, who had superior sulcus tumor, received preoperative radiation.

Statistical analysis was done using SPSS 26.0

Results

This study comprised of 250 consecutive patients, among them 48% (n=121) were male and 52% (n=129) were female. The average age of the patients was 59 years, ranging from 18 to 76 years. Most of the patients were smoker 84% (n=211) and cough being most common symptoms 93% (n=232). Our 3 patients (1.2%) were asymptomatic (Table 1).

Among 250 patients 72.4% (n=181) were diagnosed as SCC and 70.8% (n=177) were of clinical stage IIIa as per cUICC (7ed). Most of our patients underwent lobectomy 85.6% (n=214). Complete Mediastinal nodal dissection, systematic sampling and random sampling were done in 151 (60.4%), 7 (2.8%) and 92 (36.8%), respectively. The most common postoperative complication was air leak 8.4% (n=21) which was for more than 5 days. Average post operative hospital stay

Table 3. Pathological Types of lung cancer.		
Types	n	%
Squamous cell ca	181	72.4
Adenocarcinoma	46	18.4
Adenosquamous	5	2.0
Atypical carcinoid	4	1.6
Large cell	3	1.2
Small cell carcinoma	3	1.2
Mucoepidermoid	2	0.8
Adenocarcinoma with neuroendocrine differentiation	2	0.8
Liposarcoma	1	0.4
Synovial sarcoma	1	0.4
Large cell with neuroendocrine differentiation	1	0.4
Poorly diff carcinoma	1	0.4

was 11 days. Post-operative mortality occurred in 1.6% of cases.

The treatment approach, final histopathology, final pathological staging, and post operative complication have been shown in Tables 2-6.

Table 4. Final Pathological staging of lung cancer (UICC 7th ed).

Stage	n	%
Ia	14	5.6
Ib	23	9.2
IIa	29	11.6
IIb	46	18.4
IIIa	138	55.2

Table 5. Surgical Procedures.

Surgery	n	(%)
Lobectomy	214	85.6
Pneumonectomy	16	6.4
Bilobectomy	10	4.0
Sleeve resection or bronchoplasty	5	2.0
Wedge resection	3	1.2
Segmentectomy	2	0.8

Discussion

Globally adenocarcinoma is the most prevalent subtype of NSCLC.[1] Smoking is an established carcinogen for lung cancer and 85% of patients are found to be smokers.[5] There has been a tremendous improvement in diagnostic work up for lung cancer. Besides, CT, PET-CT and MRI brain must be done for a proper staging. Prior to any surgical intervention, mediastinal staging is required. Endobronchial ultrasound (EBUS), endoscopic ultrasound (EUS) and mediastinoscopy are the recommended options for mediastinal nodal biopsy. Sensitivity and specificity of EBUS and EUS are 88% and almost 100%, respectively. EBUS and EUS are less invasive techniques hence, they have almost replaced mediastinoscopy as it is associated with fatal complications like bleeding and mediastinitis.[6]

Table 6. Post operative complications.

Complications	n	%
Air leak > 5 days	21	8.4
Chest infection	19	7.6
Arrythmias	13	5.2
Atelectasis	10	4
Pneumonia	8	3.2
Wound infection	7	2.8
In-hospital mortality	4	1.6
Empyema	2	0.8
Hemothorax	2	0.8
Broncho pleural fistula	1	0.4
Ventilatory support > 72 hours	1	0.4
DVT	1	0.4
Hoarseness of voice (recurrent laryngeal nerve injury)	1	0.4
Respiratory failure	1	0.4

Only few articles regarding lung cancer have been published in Nepal. A study was done at Tribhuvan Teaching hospital in Nepal about histological types of lung cancer and its relation with smoking. The study found that SCC was the most common type (73.3%) and 89% of the patients were smoker.[7] In our study, 85% of patients were smokers and the common presenting complaint was cough (93%).

Surgery remains the standard treatment for NSCLC in early stages (I-II) and some of patients with stage IIIA. Resection rates have improved due to early detection by screening HRCT. For stage IIIA disease, treatment modality is generally definitive chemoradiation. But in selected cases after neoadjuvant chemo or chemoradiation, surgery still remains a recommended procedure.[8]

In a study done by Sun et al. 78.4% patient underwent lobectomy which is in consistent to our findings (86%). In our study, Surgery alone was utilized in 36% of the patients.

Our study revealed few important findings, namely SCC was the commonest histological type (71.6%), final pathological stage IIIa was leading stage (55%) and lobectomy was most common surgical procedure (86%).

Earlier we had analyzed surgical results of 157 patients with NSCLC. SCC was found in 74%, final stage IIIA in 50%.[3]

In a study done by Ziarnik et al. around 8% of the patient suffered from air leak which was for more than 5 days, which was similar to our findings.[9] The mortality in our study was 1.6%, which is in acceptable range.

There were some patients who did not have NSCLC in final histology. SCLC was diagnosed in 3 patients (1.2%).

Our study highlights the need for some screening program to detect lung cancer in early stages. Proper mediastinal nodal staging and metastatic work up should also be incorporated in proper staging of the patient which provide better treatment and assess outcome of the patients.

The limitations of our study are its retrospective nature, small sample size and single centered study.

Conclusion: Our study is first in Nepal to present prevalence, pattern of lung cancer patients who are considered for surgery. Lobectomy still remains the standard surgical procedure. Pathological stage IIIA is still the most common pathological stage.

References

1. Bray F, Laversanne M, Sung H, Ferlay J, Siegel RL, Soerjomataram I, et al. Global cancer statistics 2022: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA Cancer J Clin. 2024;74(3):229–63.

2. Abbas AE. Surgical Management of Lung Cancer: History, Evolution, and Modern Advances. Curr Oncol Rep 2018; 20: 98.

3. Thakur B, Yonghui D, Devkota M, Poudel B, Baral P. Surgical results of non-small cell lung cancer in Nepal. JNMA J Nepal Med Assoc. 2014;52(196).

4. Manerikar A, Querrey M, Cerier E, et al. Comparative Effectiveness of Surgical Approaches for Lung Cancer. Journal of Surgical Research 2021; 263: 274–284.

5. Warren GW, Cummings KM. Tobacco and lung cancer: Risks, trends, and outcomes in patients with cancer. Am Soc Clin Oncol Educ Book.2013;(33):359–64.

6. Sehgal IS, Dhooria S, Aggarwal AN, et al. Endosonography Versus Mediastinoscopy in Mediastinal Staging of Lung Cancer: Systematic review and meta-analysis. Ann Thorac Surg 2016; 102: 1747–1755.

7. Shrestha HG. Lung Cancer in Nepal - Histological Typing and its Relations with Smoking. J Nepal Med Assoc. 2003; 26: 1–8.

8. Sun D, Hu J, Li X, et al. Real-world surgical treatment patterns and clinical outcomes in patients

with stages IA–IIIA non-small cell lung cancer: a retrospective multicentric observational study involving 11,958 patients. J Cancer Res Clin Oncol 2023; 149: 8213–8223.

9. Ziarnik E, Grogan EL. Post lobectomy Early Complications. Thoracic Surg Clin. 2015; Aug:25(3):355–364.