Journal of Kathmandu Medical College, Vol. 7, No. 2, Issue 24, Apr.-Jun., 2018

From sixth to seventh edition of tumor, node, metastasis: Stage migration in lung cancer at a tertiary care hospital in Nepal

Acharya SC[1], Karn A[2]

[1]Sandhya Chapagain Acharya, Associate Professor; [2]Ambuj Karn, Assistant Professor; Department of Clinical Oncology, National Academy of Medical Sciences, Bir Hospital, Kathmandu, Nepal,

Abstract

Background: Lung cancer is the leading cause of cancer related morbidity and mortality accounting for 15.4 % of total cancer in Nepal. With revision of the Lung cancer staging system by International Association for the Study of Lung Cancer and adoption of seventh edition of staging system by American Joint Committee on Cancer in 2010, the application of seventh edition of staging system has significant impact on stage of disease which ultimately defines treatment strategy and overall prognosis.

Objective: To improve stage precision by adapting new staging system, this will directly reflect on disease treatment, survival and prognosis.

Methodology: Medical records of 151 patients with lung cancer attending Oncology Department, between 2015 and 2016 were retrospectively reclassified using both sixth and seventh editions of staging system. Data were collected compared and managed using Statistical Package for Social Sciences. Ethical clearance was obtained from Institutional Review Board.

Results: Stage migration was seen in 15.23 % of total cases. Seven percent of cases staged down from IIIB to IIIA. Four percent were staged up from IIIB to IV. Remaining were down staged from T4 to T3 and T3 to T2 due to sub categorization of tumor by size in seventh edition.

Conclusions: There was downstage from IIIB to IIIA and upstage from IIIB to IV because of revised staging system. Thus, it is essential to have detailed radiological staging and routine pleural fluid cytology before initiation of treatment, which will further help to stage accurately and treat properly. This carries direct impact on prognosis and survival.

Key words: IASLC; Lung cancer; Stage migration; Staging

INTRODUCTION

Lung cancer has been the leading cause of cancer death for decades worldwide. Survival rates have remained dismal and have shown little improvement. According to Globocan 2012, Lung cancer was the most common cancer worldwide contributing 13% of the total new cases diagnosed and contributed nearly 26% of Lung cancer in both the sexes worldwide. Lung cancer is responsible for 1.3 million deaths worldwide annually, and is the most common cause of cancer-related death in men and the second most common in women[1]. In Nepal, Lung cancer accounts for 15.4% of total cancer as per the Hospital Based Cancer Registry (HBCR) for both genders[2].

Staging of Lung cancer is of paramount importance as treatment choices are often highly complex involving multimodality approach and options largely depend on the stage of the disease. The purpose of this study was to improve the stage precision that could guide treatment options, prognosticate and ultimately lead to better survival[3,4].

Address for correspondence

Dr. Sandhya C. Acharya
Associate Professor
Department of Clinical Oncology
Bir Hospital, NAMS
Kathmandu
E-mail: sandhyachap@gmail.com

METHODOLOGY

The medical records of 151 patients with lung cancer attending Department of Clinical Oncology, National Academy of Medical Sciences(NAMS), Bir Hospital, Nepal, between 2015 and 2016 were retrospectively reclassified using both 6th and 7th editions of Tumor,

Node, Metastasis (TNM) staging system. Data were collected and comparison between TNM-6 and TNM-7 was conducted and managed using statistical packages SPSS. The ethical clearance was obtained from the Institutional Review Board (IRB) of NAMS.

RESULTS

The total patients in the different stage with TNM-7 observed were IB 2(1%), IIA 6(4%), IIB 8(5%), IIIA 59(39%), IIIB 24(16%), and IV 52 (34%). Stage migration was seen in 15.23 % of the total cases. Distribution according to TNM-6; stage IA, n=0; stage IB, n=3(1.98%); stage IIA, n=2(1.32%); stage IIB, n=8(5.29%); stage IIIA, 43(28.47%); stage IIIB, 48(31.78%); Stage IV, 47(31.12%). After reclassification with TNM-7; stage IA, 0; stage IB, 2(1.32%); stage IIA, 6(3.97%); stage IIB, 8(5.29%); stage IIIA,59(39.07%); stage IIIB, 24(15.68%); stage IV, 52(34.43%) (Table 1). Most prominent was downstage from IIIB to IIIA which accounts for 7% of all the cases. This downstage was due to tumor size >7cm and a separate tumor nodule in the same lobe which elaborates T3 of the TNM-7. Next prominent stage migration noticed was due to categorization of positive pleural fluid cytology as M1a TNM-7. This categorization accounted for 4% of upstaging to IV from IIIB that might increase further. All the patients who presented with pleural effusion had not undergone cytological evaluation because in most of these cases T4 disease was due to invasion and or satellite nodule along with the pleural effusion, and effusion was ignored as per TNM-6. The numbers of patients in all stage subgroups using the previous (TNM-6) and the new (TNM-7) staging system are listed in Table 2. Among total 34 patients out of which nine presented with effusion, 16(47%) had undergone cytological evaluation, 9(26%) had positive and 7(21%) had negative cytology. The remaining patients 18(53%) who had not undergone cytological evaluation of effusion may have significantly contributed to this migration. Rest of the patients 9.27% (14) were down staged from T4 to T3 and T3 to T2, and 3.97% (6) upstaged from T2 to T3 which was due to the sub categorization of the tumor by size. Male preponderance was observed with 63% of the cases and 37% were female. The mean age group was 63.93 years with the youngest being 31 years and the eldest being 83 years of age.

DISCUSSION

With the revision of Lung cancer staging system by International Association for the Study of Lung Cancer(IASLC) and adoption of TNM-7 edition of staging system by AJCC in 2010, various authors have tried to evaluate the percentages of patients those will upstage or downstage using both staging system. Lung cancer staging assesses the anatomical extension of the tumor; this is critical for choosing a therapy and provides information on prognosis[3, 4]. Although TNM classification is an internationally agreed system, it has gradually evolved through its different editions over time. Therefore, it is important when reviewing reports of treatment or prognosis to be aware that the criteria used in the TNM system have varied over time, sometimes fairly substantially, according to the different editions[5]. As in each edition of the TNM staging system, that used from 2010 January 1 (TNM-7) made significant changes to the schema that is used for Non-Small Cell Lung Cancer (NSCLC), Small Cell Lung Cancer (SCLC) and Broncho-pulmonary carcinoid tumors. The revisions were based on a detailed analysis and consensus process by AJCC and UICC that looked at the overall survival of 81,015 patients[6].

Table 1: Comparison of stage distribution and migration in TNM 6 to TNM 7.The number of IIIB cases in TNM 7 decreased to 24 (15.89%) from 46 (30.46%) in TNM 6 as this has been upstaged to stage IV and downstage to Stage IIIA

TNM 6			TNM 7		
Stage	**%**	**N**	**Stage**	**%**	**N**
Stage IA	--	0	Stage IA	--	0
Stage IB	1.98	3	Stage IB	1.32	2
Stage IIA	1.32	2	Stage IIA	3.97	6
Stage IIB	5.29	8	Stage IIB	5.29	8
Stage IIIA	28.47	43	Stage IIIA	39.07	59
Stage IIIB	31.78	48	Stage IIIB	15.89	24
Stage IV	31.12	47	Stage IV	34.43	52
Total	**100**	**151**	**100**		**151**

Table 2: Total number of patient in all stage using both the TNM 6 and TNM 7

TNM 6			TNM 7		
Stage	**N**	**% of 151**	**Stage**	**n**	**% of 151**
I	**3**	1.98	I	**2**	1.32
T1N0 (IA)	0		T1aN0 (IA)	0	
T2N0 (IB)	3		T1bN0(IA)	0	
			T2aN0(IB)	2	
II	**10**	6.62	II	**14**	9.27
T1N1 (IIA)	2		T1aN1(IIA)	1	
T2N1(IIB)	4		T1bN1(IIA)	1	
T3N0(IIB)	4		T2aN1(IIA)	2	
			T2bN0(IIA)	2	
			T2bN1(IIB)	5	
			T3N0(IIB)	3	
IIIA	**43**	28.47	IIIA	**59**	39.07
T1N2	0		T1aN2	0	
T2N2	7		T1bN2	0	
T3N1	10		T2aN2	7	
T3N2	26		T2bN2	2	
			T3N1	8	
			T3N2	30	
			T4N0	3	
			T4N1	9	
IIIB	**48**	31.78	IIIB	**24**	15.89
T4N0	4		T4N2	17	
T4N1	10		AnyTN3	7	
T4N2	27				
T4N3	8				
IV	47	31.12	IV	**52**	34.43
Any T			Any T		
Any N			Any N		
M (+)			M1a	15	
			M1b	37	
Total	**151**	**100 %**		**151**	**100%**

These changes have been reviewed in detail, including an extensive presentation of prognostic data for both TNM-6 and TNM-7, looking at both individuals T, N and M descriptors, and at overall stage groups[7].

We observed that TNM-6 to TNM-7 resulted migration in stage IIIB to IV by 4% followed by T2 to T3 by 3.97%. Only 47% of the patients were evaluated and staged with pleural fluid cytology which would significantly contribute to this upstage migration to IV, as observed in another study resulting in the net migration of 1 out of 6 cases, to a higher stage in 70% of them, with substantial changes in 5 year survival rate for stages I and IIIB[8].

Fifty-three percentage of the patients in this review, with radiology evidence of pleural effusion had not undergone cytology testing, they could have potentially contributed to the upstage migration with TNM-7 which carries overall poor prognosis, which highlights the need of detail radiological and cytological staging. The new TNM-7 classification has many advantages; however, limitations remain. Problems with routine radiologic staging of NSCLC have not been addressed and issues related to histologic subtypes are not reflected[9].

Evaluation showed that 89.40% of the total cases were in locally advanced stage (III & IV) at the time of presentation. So significant proportion of patients we see in our practice are candidates for the definitive concurrent chemo radiotherapy and a small fraction are eligible for the surgery, in contrast to the observation made by the authors in various surgical series with early stage disease. They also concluded that TNM-7 is a more accurate predictor of prognosis in stage I operated

patients than the old classification and superior in defining different prognostic groups than TNM-6 [10, 11]. In contrast to our findings where we have very less early stage patient with 1.32% of the total lung cancer patient reviewed.

Further restaging with TNM-7: 2 cases would to stage I; 1 case from IB would move to IIA; 4 cases from IIB would move to IIA; 12 cases would move from IIIB to IIIA. 5 cases would move from IIIB to IV. In this translational adaptation from TNM-6 to TNM-7 staging, we observed 23 out of the 151 analyzed cases change their staging, corresponding to 15.23% as observed in other series[12,13,14]. The TNM-7 appeared to be superior in defining stage-specific survival groups especially between stage IIA vs. stage IIB and stage IIIB vs. stage IV. This will result in better separation of survival curves among stage-specific Non-small cell lung cancer[14].

CONCLUSIONS

The TNM-7 has shifted 15.23% of the patient to a higher or lower stage, which needs consideration for new stage specific treatment options in few of these cases. Our findings are in consistence with the studies at other centers as there is stage migration because of revised TNM classification. This is a single institutional review with very few surgical patients, so this might not address all the lung cancer patients. However, our findings support the change in TNM-7, emphasizing the more accurate distribution in different sub-stage and hence their prognostication. Thus, we recommend to have detailed radiological staging and a routine pleural fluid cytology before initiation of the treatment as per the TNM-7 schema because stage of the disease along with performance status and co morbidity determines the intent of treatment and hence the prognosis.

REFERENCES

1. Ferlay J, Soerjomataram I, Ervik M, Dikshit R, Eser S, Mathers C, et al. GLOBOCAN 2012 v1.0, Cancer Incidence and Mortality Worldwide: IARC Cancer Base No. 11 [Internet]. Lyon, France: International Agency for Research on Cancer; 2013[accessed on 1st March 2017]. Available from: http://globocan.iarc.fr. [DOI] [PUBMED][FULLTEXT]
2. B.P. Koirala Memorial Cancer Hospital. Annual report 2011. Bharatpur: B P Koirala Memorial Cancer Hospital; 2011.
3. American Joint Committee on Cancer. What is Cancer Staging?. Chicago, USA:American Joint Committee on Cancer[Internet]; 2010[accessed on 1st March 2017]; Chicago, USA. Available from: http://www.cancerstaging.org/mission/whatis.htm [FULLTEXT]
4. Rami-Porta R, Crowley JJ, Goldstraw P. The revised TNM staging system for lung cancer. Ann Thorac Cardiovasc Surg. 2009;15(1):4–9. [PUBMED]
5. American Joint Committee on Cancer. Past Editions of the AJCC Cancer Staging. Chicago, USA: American Joint Committee on Cancer; 2008.
6. Guerra AD. New TNM Classification for Lung Cancer - Part I: The changes. Doctors Lounge [Internet]; 2010[Assessed on 14 March 2017] Available at: http://www.doctorslounge.com/index.php/articles/page/340 [FULLTEXT]
7. Guerra AD. New TNM Classification for Lung Cancer - Part II: A review. Doctors Lounge [Internet]; 2010[Assessed on 14th March 2017]. Available at:http://www.doctorslounge.com/index.php/articles/page/342 [FULLTEXT]
8. Van Meerbeeck J P, Chansky K, Goldstraw P. The impact of stage migration on survival after resection in the UICC 7 TNM classification of lung cancer. J Clin Oncol. 2010;28:15s.[FULLTEXT]
9. Nair A, Klusmann MJ, Jogeevaran KH, Grubnic S, Green SJ, Vlahos I. Revision to the TNM Staging of Non-Small Cell Lung Cancer: Rational, Clinicoradiological Implications and persistent limitations. Radiographics.2011;31(1):215-38. [DOI]
10. Bergmana P, Brodinib D, Lewensohnc R, Petrisc LD. Validation of the 7th TNM classification for non-small cell lung cancer: A retrospective analysis on prognostic implications for operated node-negative cases. Acta Oncologica. 2013;52(6):1189-94. [PUBMED]
11. Wang J, Wu N, Zheng Q, Feng Y, Yan S, Lv C, et al. Evaluation of edition of the TNM classification for lung cancer at a single institution. J Can Res Clin Oncol. 2014;140(7):1189-95. [PUBMED]
12. Carvalho L, Cardoso E, Nunes H, Baptista V, Gomes A, Couceiro P. The IASLC lung cancer staging project. Comparing the current 6(th) TNM edition with the proposed 7(th) edition. Rev Port Pneumol. 2009;15(1):67-76. [PUBMED]
13. Lee M, Lee SW, Shim SS, Ryu YJ, Kim Y. Impact of the New International Association for the Study of Lung Cancer Staging System in Non-Small Cell Lung Cancer: With Comparision to the Union for International Cancer Control 6th Tumor, Node, Metastasis Edition. J Korean Soc Radiol. 2014;70(4):261-8. [FULLTEXT]
14. Klikovits T, End A, Riedl G, Stiebler M, Dekan G, Klepetko W. Effects of reclassification from the TNM-6 into the TNM-7 staging system in bronchoplastic resection for non-small cell lung cancer. Interact CadioVasc Thorac Surg.2011;13(1):29-34. [DOI]