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EDITORIAL ARTICLE

THE NEW LUNG CANCER STAGING SYSTEM

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INTRODUCTION

Definition of the stage is an essential part of the approach to patients with cancer, and it has led to the development of a universally accepted stage classification systems for most tumors. The mostly widely used staging system is TNM classification. The T descriptor defines the extent of the primary tumor, the N descriptor the extent of involvement of regional lymph nodes (LNs), and the M descriptor the extent of spread to distant sites.

There were evident limitations of the previous TNM classification of lung cancer (LC) published in 1997. It was based on a selected population of patients who had undergone surgical treatment, but did not represent the entire population of patients with LC. Patients selected were based on what was essentially a single institution series (so it was not international), included a limited number of patients (so that many subgroups were quite small) and spanned a long time frame. These limitations were taken in consideration in the development of a new LC staging.

A new LC staging system has been developed by the International Association for the Study of Lung Cancer (IASLC) in 2009 for the definitions of the TNM descriptors and the stage grouping for non small cell lung cancer (NSCLC). This new system was accepted for edition by The Union Internationale Contre le Cancer (UICC) and the American Joint Committee on Cancer (AJCC) which serve as the official bodies that define, periodically review, and refine the TNM stage classification systems. The staging system is based solely on the anatomic extent of disease. Other factors, such as clinical symptoms or molecular biological characterization of the tumor, have not been included. Small cell lung cancer and carcinoid tumor staging are not addressed in this article.

TYPES OF STAGING ASSESSMENTS

The method of staging has a major impact on the prognostic implications of the stage classification. The two most commonly encountered types of stage assessment are clinical staging (the stage determined using all information available prior to any treatment) and pathologic staging (determined after a resection has been carried out). The extent of clinical staging can vary from a clinical evaluation alone (history and physical examination) to extensive imaging (CT/PET scans) or invasive staging techniques.

It must be emphasized that a surgical staging procedure (such as mediastinoscopy) is still part of clinical staging because surgical resection as a treatment has not taken place. Clinical stage is denoted by the prefix "c" and pathologic stage by the prefix "p." The types of staging assessments are shown in Table 1.

Table 1. Types of Staging Assessments.

C	Clinical	Prior to initiation of any treatment, using any and all information available (e.g. including mediastinoscopy).
P	Pathologic	After resection, based on pathologic assessment.
Y	Restaging	After part or all of the treatment has been given.
R	Recurrence	Stage at time of a recurrence.
A	Autopsy	Stage as determined by autopsy.

*(Published in CHEST 136:260–271 in July, 2009).

NEW DEFINITIONS FOR T, N, M DESCRIPTORS

The new definitions of TNM descriptors are detailed in Table 2. For the T component, tumor size was found to have prognostic relevance, and its analysis led to recommendations to subclassify T1 tumors into T1a (< or = 2 cm) and T1b (>2 - < or = 3 cm) and T2 tumors into T2a (>3 - < or = 5 cm) and T2b (>5 - < or = 7 cm), and to reclassify T2 tumors > 7 cm into T3. Furthermore, with additional nodules in the same lobe as the primary tumors, T4 tumors would be reclassified as T3; with additional nodules in another ipsilateral lobe, M1 as T4; and with pleural dissemination, T4 as M1. There were no changes in the N category. In the M category, M1 was recommended to be subclassified into M1a (contralateral lung nodules and pleural dissemination) and M1b (distant metastasis).

Stage grouping: For TNM staging, NSCLC is divided into 4 stages, with further subdivision of stages I-III into A and B subtypes. The changes for the new stage grouping were to upstage T2bN0M0 from stage IB to stage IIA, and to downstage T2aN1M0 from stage IIB to stage IIA and T4N0-N1M0 from stage IIIB to stage IIIA. The proposed changes better differentiate tumors of different prognoses. The new stage grouping is shown in Table 3. Illustrations providing a graphic representation of the TNM categories and subcategories included within each stage group are shown in (Figs. 1-3).

The overall 5-year survival rates by clinical stage for the new IASLC stage grouping were IA 50%, IB 43%, IIA 36%, IIB 25%, IIIA 19%, IIIB 7% and IV 2%. The corresponding 5-year survival rates for their pathological counterparts were IA 73%, IB 68%, IIA 46%, IIB 36%, IIIA 24%, IIIB 9% and IV 13%.

CONCLUSION

The changes of new LC staging system emphasize the prognostic relevance of tumor size much more than previously. The system assigns tumors with additional nodules in the same lobe of the primary tumor and in another ipsilateral lobe a classification that is more in agreement with their prognosis. The new LC staging reconcile the classification of pleural dissemination with both its real prognosis and clinical practice. Also metastatic disease was separate into two prognostic groups. Therefore these new changes better differentiate tumors with different prognoses, which is one of the objectives of TNM classification.

Table 2. Definitions for T, N, M Descriptors*.

Descriptors		Definitions	Subgroups
T		**Primary tumor**	
T0		No primary tumor	
T1		Tumor ≤ 3 cm,† surrounded by lung or visceral pleura, not more proximal than the lobar bronchus	
	T1a	Tumor ≤ 2 cm†	T1a
	T1b	Tumor >2 but ≤ 3 cm†	T1b
T2		Tumor > 3 but ≤ 7 cm† or tumor with any of the following‡: Invades visceral pleura, involves main bronchus ≥ 2 cm distal to the carina, atelectasis/obstructive pneumonia extending to hilum but not involving the entire lung.	
	T2a	Tumor >3 but ≤ 5 cm†	T2a
	T2b	Tumor >5 but ≤ 7 cm†	T2b
T3		Tumor >7 cm;	$T3_{>7}$
		or directly invading chest wall, diaphragm, phrenic nerve, mediastinal pleura, or parietal pericardium;	$T3_{Inv}$
		or tumor in the main bronchus <2 cm distal to the carina§;	$T3_{Centr}$
		or atelectasis/obstructive pneumonitis of entire lung;	$T3_{Centr}$
		or separate tumor nodules in the same lobe	$T3_{Satell}$
T4		Tumor of any size with invasion of heart, great vessels, trachea, recurrent laryngeal nerve, esophagus, vertebral body, or carina;	$T4_{Inv}$
		or separate tumor nodules in a different ipsilateral lobe	$T4_{Ipsi\ Nod}$
N		**Regional lymph nodes**	
N0		No regional lymph node metastasis	
N1		Metastasis in ipsilateral peribronchial and/or perihilar lymph nodes and intrapulmonary nodes, including involvement by direct extension	
N2		Metastasis in ipsilateral mediastinal and/or subcarinal lymph nodes	
N3		Metastasis in contralateral mediastinal, contralateral hilar, ipsilateral or contralateral scalene, or supraclavicular lymph nodes	
M		**Distant metastasis**	
M0		No distant metastasis	
M1a		Separate tumor nodules in a contralateral lobe;	$M1a_{Contr\ Nod}$
		or tumor with pleural nodules or malignant pleural dissemination‖	$M1a_{\ Pl\ Dissem}$
M1b		Distant metastasis present	M1b
Special situations			
TX, NX, MX		T, N, or M status not able to be assessed	
Tis		Focus of in situ cancer	Tis
T1§		Superficial spreading tumor of any size but confined to the wall of the trachea or mainstem bronchus	$T1_{SS}$

†In the greatest dimension.
‡T2 tumors with these features are classified as T2a if ≤5 cm.
§The uncommon superficial spreading tumor in central airways is classified as T1.
‖Pleural effusions are excluded that are cytologically negative, nonbloody, transudative, and clinically judged not to be due to cancer.

*(Published in CHEST 136:260–271 in July, 2009).

Table 3. Stage groups according to TNM descriptor and subgroups.*

Stage Groups	T	N	M
Ia	T1a,b	N0	M0
Ib	T2a	N0	M0
IIa	T1a,b	N1	M0
	T2a	N1	M0
	T2b	N0	M0
IIb	T2b	N1	M0
	T3	N0	M0
IIIa	T1-3	N2	M0
	T3	N1	M0
	T4	N0,1	M0
IIIb	T4	N2	M0
	T1-4	N3	M0
IV	Tany	Nany	M1a,b

*(Published in CHEST 136:260–271 in July, 2009).

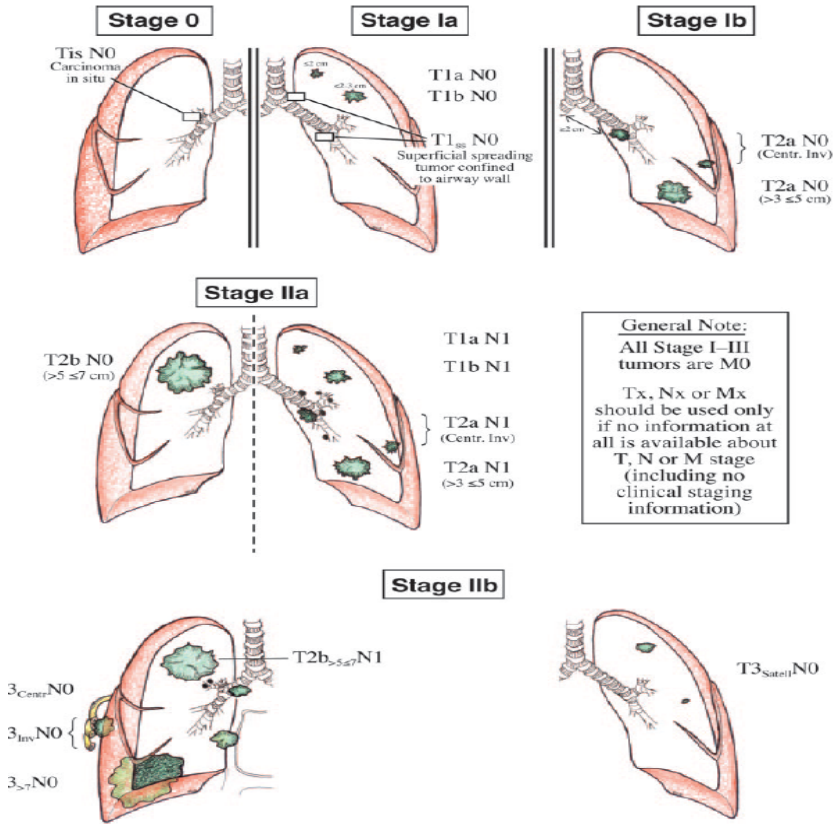

Fig 1. Graphic illustration of stages 0, I, and II.

*(Published in CHEST 136:260–271 in July, 2009).

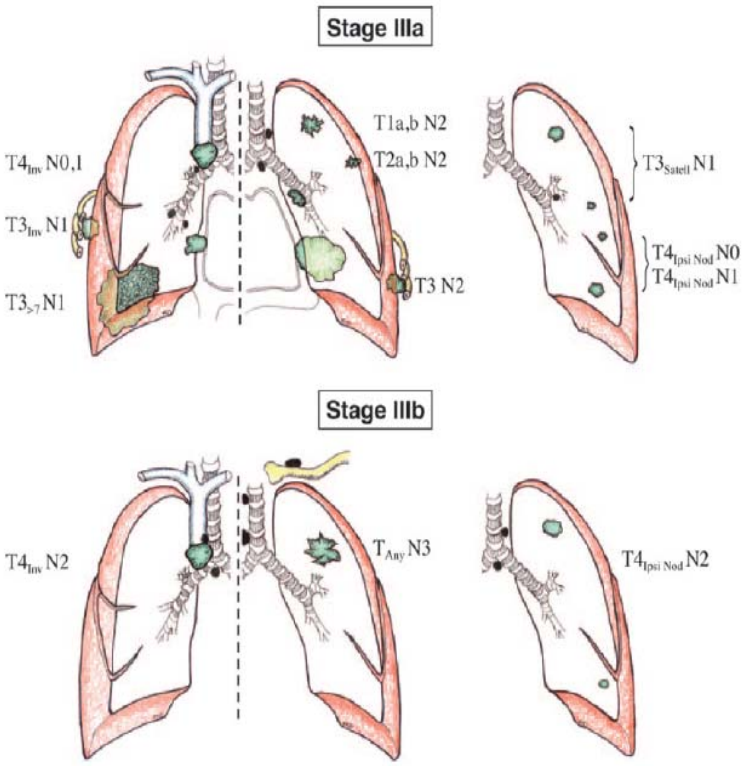

Fig 2. Graphic illustration of stage III.

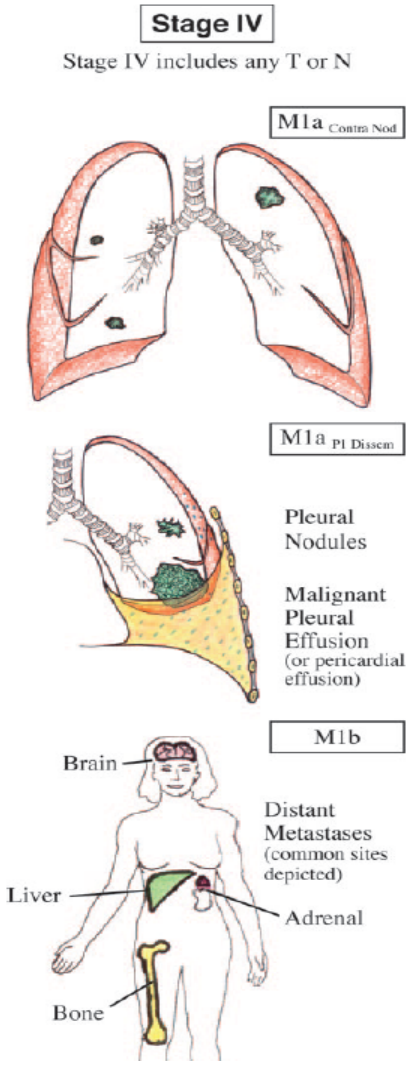

Fig 3. Graphic illustration of stage IV.

*(Published in CHEST 136:260–271 in July, 2009).