Upcoming Changes in Lung Cancer Staging in the Forthcoming Eighth Edition of the TNM Classification: What Radiologists Need to Know

* Changes have been incorporated in the now-published 8th edition

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• None
Objective

To make radiologists cognizant of the key changes and updates in the new TNM classification in the AJCC Cancer Staging Manual 8th edition to be used in day-to-day interpretation of lung carcinoma imaging
AJCC Cancer Staging Manual

- American Joint Committee on Cancer (AJCC) publishes TNM staging system in AJCC Cancer Staging Manual periodically about every 7 years
- The changes are mostly made on the basis of new scientific data on tumor features affecting prognosis in lung cancer
- Previous 7th edition was from year 2009
- New update is 8th edition, recently published
Lung Cancer Staging Project

• International Association for the Study of Lung Cancer (IASLC) performed a study of 77,156 evaluable patients diagnosed with lung cancer between 1999-2010

• Based on this study, several papers were published with proposed updates to the TNM staging for the next edition of the AJCC Cancer Staging Manual (now published)
Primary tumor measurements and adjacent structures involved by tumor
T Subgroups: T1

Previously only two sub-classifications T1a and T1b in 7th edition
But now T1a, T1b, and T1c with increment of 1 cm for each T1 stage

≤1 cm: T1a

1-2 cm: T1b

2-3 cm: T1c

Adenocarcinoma
0.9 cm, T1a by size

Non-small-cell lung carcinoma
1.8 cm, T1b by size
T Subgroups: T2

Previously T2 described tumors 3-7 cm (T2a 3-5cm, T2b 5-7 cm)
Now T2a is 3-4 cm, T2b is 4-5 cm

3-4 cm: T2a
4-5 cm: T2b

Adenocarcinoma
4.6 cm, T2b by size
T Subgroups: T3 and T4

Previously T3 described tumors > 7 cm
Now T3 is 5-7 cm, T4 is > 7 cm

5-7 cm: T3
> 7 cm: T4

Poorly differentiated carcinoma with focal squamous features
5.2 cm, T3 by size
Bronchial involvement

Previously, involvement of main bronchus within 2 cm of carina used to be classified as T3

Now bronchial involvement is staged as T2 regardless of distance from carina

Necrotic 9.7 cm primary lung cancer
Bronchial invasion would be T2
But size indicates T4
Also has contralateral (N3) nodal disease
Atelectasis/pneumonitis

Previously total atelectasis of a lobe was T3 and partial atelectasis was T2

Now partial or total atelectasis is staged as T2

Small cell carcinoma
Total atelectasis of right upper lobe (previously T3)
Now T2
Diaphragm

Previously, involvement of the diaphragm was staged as T3

Now diaphragm involvement is staged as T4

Primary lung cancer
diaphragmatic invasion = T4
(also T4 by size at 8.1 cm)
Mediastinal pleural involvement

Previously existed as a T3 descriptor, but was difficult to determine clinically and was seldom used

Now removed as a descriptor

Poorly differentiated 5.2 cm carcinoma with focal squamous features
Invading mediastinum (no longer staging feature)
T3 by size
Pleural invasion

• Visceral pleural invasion is categorized as T2

Spiculated primary lung cancer with visceral pleural tethering T2 (no change from 7th to 8th editions)
T3 Descriptors

- Invasion of parietal pericardium, parietal pleura, or chest wall
- Additional tumor nodules in the same lobe of primary tumor
- These descriptors were the same in the 7th edition

Pancoast tumor
5.5 cm adenocarcinoma
T3 by chest wall invasion (also T3 by size)
Satellite nodule in same lobe is T3 by both editions
T: Major Changes between the 7th and 8th editions of the AJCC Cancer Staging Manual

- Further subclassify T by size
  - Previously only two subclassifications T1a and T1b
  - But now T1a, T1b, and T1c with increment of 1 cm for each T1 stage
- Bronchial involvement
  - Previously involvement of main bronchus within 2 cm of carina used to be T3
  - Now bronchial involvement is staged as T2 regardless of distance from carina
- Atelectasis/pneumonitis
  - Previously total atelectasis was T3 and partial atelectasis was T2
  - Now partial or total atelectasis both are staged as T2
- Diaphragm
  - Previously involvement of the diaphragm was staged as T3
  - Now diaphragm involvement is staged as T4
- Mediastinal pleural invasion
  - Previously existed as a T3 descriptor, but was difficult to determine clinically and was seldom used
  - Now removed as a descriptor
Nodal involvement with metastatic disease
N: Major Changes

• Site classification
  – Classify by location, unchanged since previous edition

• Quantification is NEW (# of sites and lymph nodes)
  – Previously not addressed
  – Now need to record number of metastatic lymph nodes/stations and classify using new descriptors

Regional Lymph Nodes (N)

- NX Regional lymph nodes cannot be assessed
- N0 No regional lymph node metastases
- N1 Metastasis in ipsilateral peribronchial and/or ipsilateral hilar lymph nodes and intrapulmonary nodes, including involvement by direct extension
- N2 Metastasis in ipsilateral mediastinal and/or subcarinal lymph node(s)
- N3 Metastasis in contralateral mediastinal, contralateral hilar, ipsilateral or contralateral scalene, or supraclavicular lymph node(s)
Single right hilar lymph node involvement in a right lower lobe carcinoma is classified as N1a by new classification

(Previously it was classified as N1)
Two N1 stations from a right lower lobe carcinoma, making this N1b according to new nodal classification

(Previously it was N1)
Single N2 site with single N1 site is now classified as N2a2 according to new classification

(Previously it was classified as N2)
Single N2 node station without involving N1, is now classified as N2a1 in new classification

(Previously it was classified as N2)
Contralateral hilar lymphadenopathy from right lower lobe carcinoma with ipsilateral hilar lymphadenopathy - N3 in both classifications
8th edition – Summary of Nodal Changes

• N0: No nodes involved
• N1a: Single station
• N1b: Multiple stations
• N2a
  – N2a1: “skip metastasis” meaning N2 involvement without involving N1 station/s
  – N2a2: Single N2 station with N1
• N2b: Multiple N2 stations
• N3: Contralateral hilar/mediastinal, or isilateral or contralateral supraclavicular/scalene
Metastasis
M staging: Summary of changes in 8th Edition

• Intrathoracic metastasis (no change between 7th/8th editions)
  – Nodule in same lobe: T3
  – Nodule in ipsilateral lung, different lobe: T4
  – Nodule in contralateral lung: M1a
  – Malignant pleural or pericardial effusion: M1a

• Extrathoracic metastasis
  – Previously, M1b described any extra-thoracic metastasis
  – Now, these are separated into
    • Single metastatic lesion in brain, liver, bone, distant lymph node or peritoneum, skin, adrenal: M1b
    • Multiple metastatic lesions in any of the above organs: M1c
Contralateral lung nodule
M1a in both editions
Malignant pleural effusion
M1a

Malignant pleural and pericardial effusions
M1a
Single metastasis in left cerebellum is M1b by new (8th) edition

(Previously single or multiple distant metastatic lesions were classified as M1b, so this would have also have been M1b)
Multiple brain metastases M1c according to new classification (previously would have been M1b)

Multiple liver metastases M1c according to new classification (previously would have been M1b)
Summary: Major Changes between the 7\textsuperscript{th} and 8\textsuperscript{th} editions of the AJCC Cancer Staging Manual

- **T**
  - Classified T1 further by size
    - T1a, T1b, and T1c with increment of 1 cm for each T1 stage
  - Bronchial involvement: T2 regardless of distance from carina
  - Atelectasis/pneumonitis, partial or total: T2
  - Diaphragm involvement: T4
  - Mediastinal pleural invasion: removed as a descriptor

- **N**
  - Still N1, N2, N3 by location
  - Also quantify number of nodes/stations involved

- **M**
  - Intrathoracic metastasis: M1a
  - Single extrathoracic metastasis: M1b
  - Multiple extrathoracic metastases: M1c
References


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