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 13 28 69 ,  
 52.4 , 가 8 , 가 5 . (n=5),  
 (n=4), Boerhaave (n=1), (n=1), (n=1), (n=1)  
 가  
 : 11 가 ,  
 (n=10), (n=7), (n=6), (n=4),  
 (n=4), (n=4), (n=2), (n=2)  
 76.9% (10/13)  
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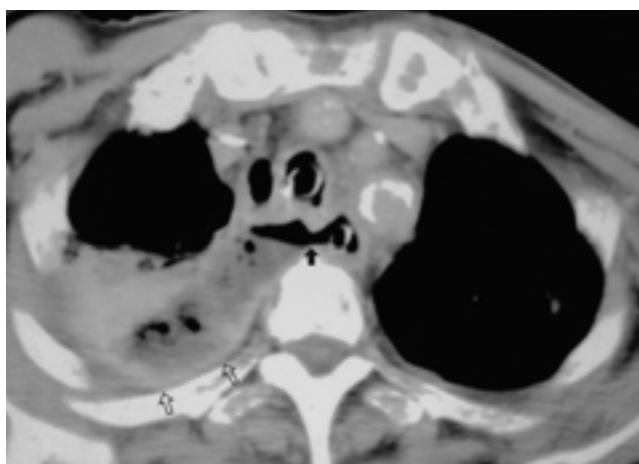
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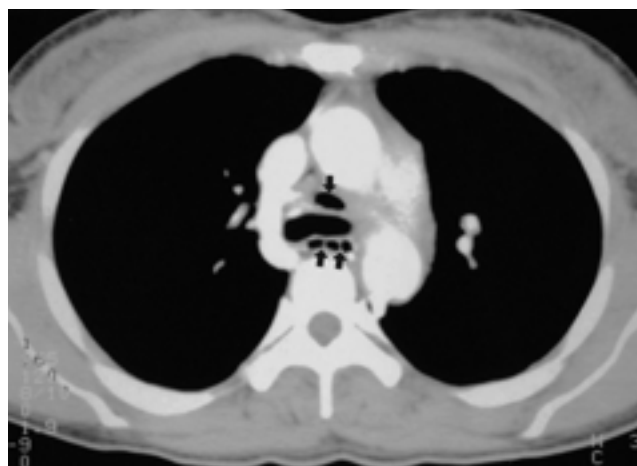
CT , 5 CT  
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(n=5), (n=4), Boerhaave (n=1),  
(n=1), (n=1), (n=1)  
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Plus 4 (Siemens Medical System, Erlangen, Germany)  
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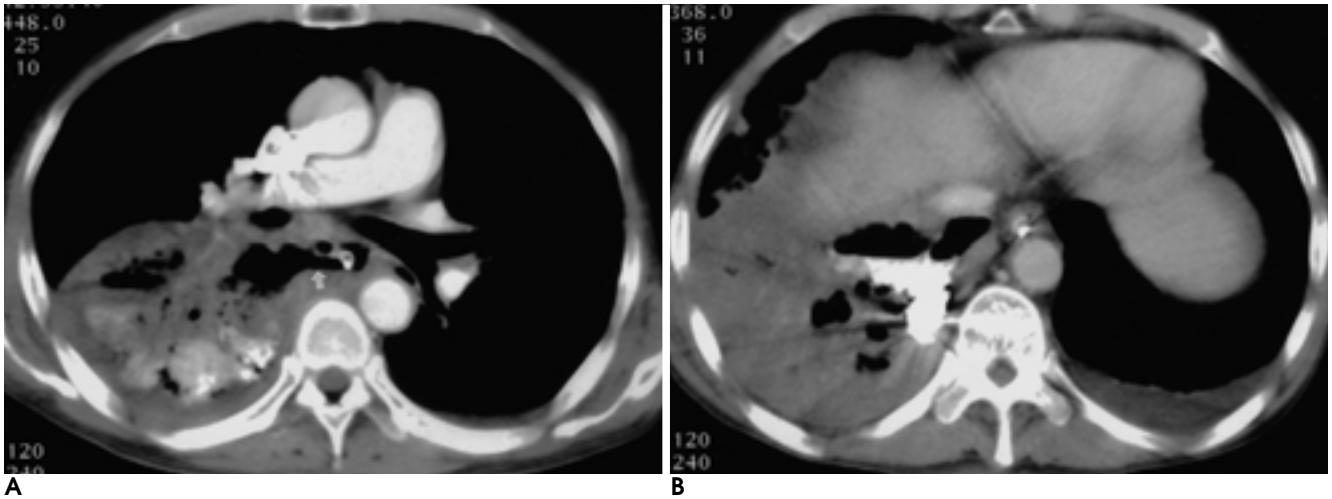


**Fig. 1.** Idiopathic esophageal perforation in a 69-year-old man. Enhanced CT scan at thoracic inlet level shows discontinuity in esophageal wall and extraluminal air (arrow) extending from esophageal lumen. Associated pulmonary consolidation and pleural empyema (open arrows) are also noted. We predicted that perforation site was upper esophagus. Upper esophageal perforation was confirmed by esophagography (not shown).

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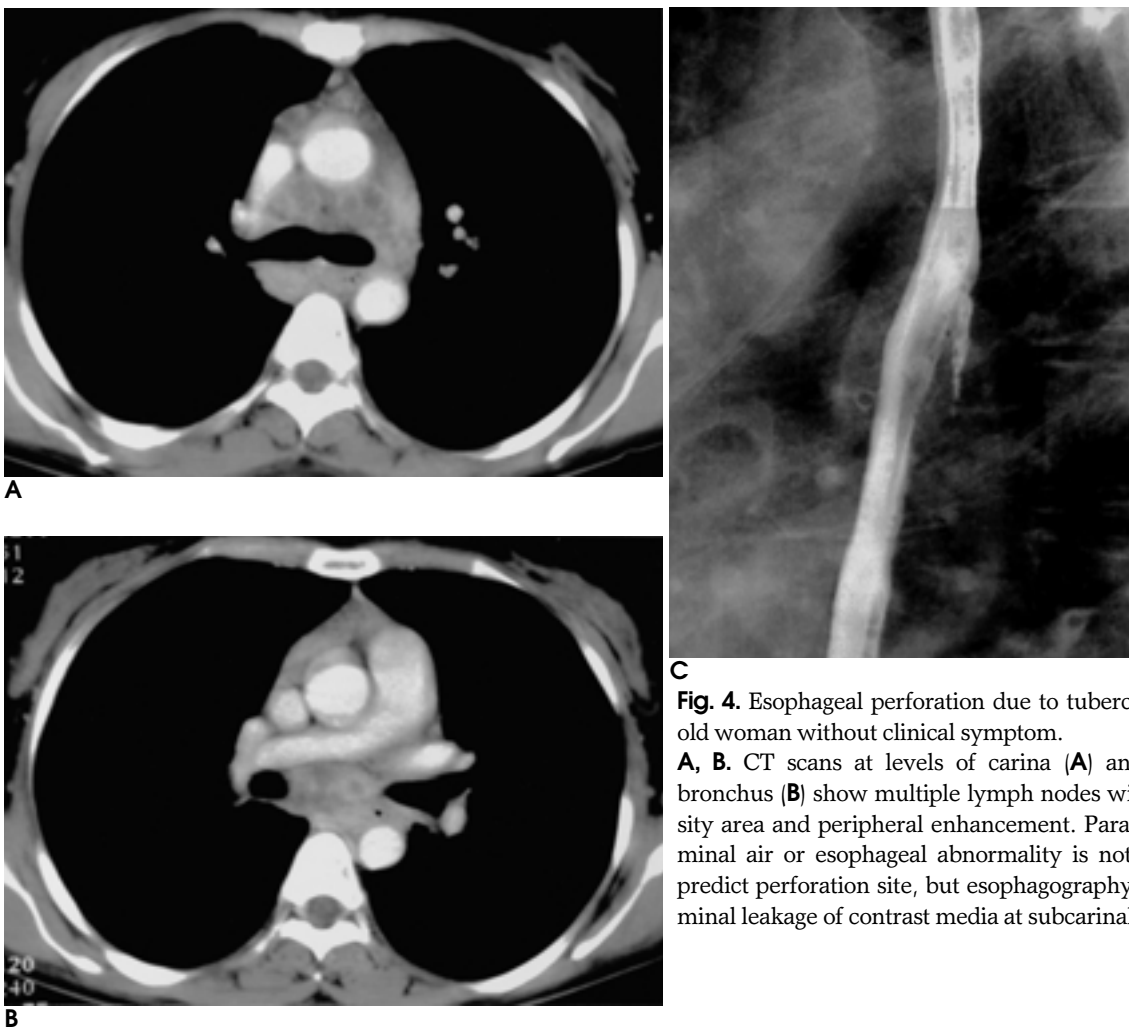
**Fig. 2.** Esophageal perforation due to foreign body in a 38-year-old woman. CT scan at carinal level shows small amount of extraluminal air around airway and esophagus (arrows). Predicted perforation site was lower esophagus and confirmed by esophagography (not shown).



**Fig. 3.** Esophageal perforation due to esophageal carcinoma in a 64-year-old man. CT was performed after esophagography. Leaked barium was shown as high-attenuation in right lower lobe on CT scans.

**A.** CT scan at left upper lobar bronchus level shows disruption in lower esophageal wall (white arrow) and free communication between esophageal lumen and abscess in right lower lobe. Small pleural effusion is also noted in right side.

**B.** CT scan at diaphragm level shows consolidation in right lower lobe and left pleural effusion. Predicted perforation site was lower esophagus and confirmed by esophagography (not shown).



**Fig. 4.** Esophageal perforation due to tuberculosis in a 28-year-old woman without clinical symptom.

**A, B.** CT scans at levels of carina (**A**) and left upper lobar bronchus (**B**) show multiple lymph nodes with central low-density area and peripheral enhancement. Paraesophageal extraluminal air or esophageal abnormality is not noted. We didn't predict perforation site, but esophagography (**C**) shows extraluminal leakage of contrast media at subcarinal level.

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76.9 % (10/13) , 2 ,  
90.9 % (10/11) 가가 가 (21).  
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(9, 10).  
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(9, 11). 4  
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13 . 2  
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## CT Findings of Esophageal Perforation<sup>1</sup>

Jeong-Nam Heo, M.D., Yo Won Choi, M.D., Seok Chol Jeon, M.D.,  
Choong Ki Park, M.D., Chang Kok Hahm, M.D.

*<sup>1</sup>Department of Diagnostic Radiology, College of Medicine, Hanyang University*

**Purpose:** To determine which CT findings are useful for the early diagnosis of esophageal perforation, and on the basis of these findings, to assess the accuracy of prediction of the perforation site.

**Materials and Methods:** A review of medical records indicated that between January 1995 and December 2001, 36 patients with esophageal perforation were admitted to our hospital. Thirteen of these [M:F = 8:5; age: 28 - 69 (mean, 52.4) years], who had undergone CT chest scanning, were included in this study. The causes of esophageal perforation were trauma ( $n=5$ ), infectious diseases ( $n=4$ ), Boerhaave syndrome ( $n=1$ ), lung cancer ( $n=1$ ), esophageal cancer ( $n=1$ ), and idiopathic ( $n=1$ ). Two chest radiologists unaware of the clinical findings reviewed the CT scans and predicted whether the upper or lower esophagus was perforated.

**Results:** The most common CT finding was extraluminal air at the posterior mediastinum ( $n=11$ ), while other findings included pulmonary consolidation ( $n=10$ ), pleural effusion ( $n=7$ ), discontinuity of the esophageal wall ( $n=6$ ) and subcutaneous emphysema ( $n=4$ ), fluid collection around the esophagus ( $n=4$ ), esophageal wall thickening ( $n=4$ ), pneumothorax ( $n=2$ ), and lung abscess ( $n=2$ ). The perforation site was accurately predicted in 76.9% of cases (10/13).

**Conclusion:** The CT findings which help the diagnosis of esophageal perforation, and prediction of the sites at which it occurs, are extraluminal air or fluid collection, focal defect of the esophageal wall, and esophageal wall thickening.

**Index words :** Esophagus, abnormalities  
Esophagus, CT  
Esophagus, perforation

Address reprint requests to : Yo Won Choi, M.D., Department of Diagnostic Radiology, College of Medicine, Hanyang University,  
17 Haengdang-dong, Seongdong-gu, Seoul 133-792, Korea.  
Tel. 82-2-2290-9161 Fax. 82-2-2293-2111