Chest CT in the Staging of Lung Cancer

Preoperative staging of lung cancer patients has been warmly embraced with each new imaging and investigative radiologic device. Computed tomography (CT), which has the capability of clearly defining the mediastinal anatomy and of visualizing individual lymph nodes, was no exception. It was hoped that patients with negative CT results would all be resectable, whereas patients with enlarged hilar and mediastinal lymph nodes on CT could be considered to have metastatic spread of carcinoma and would not have to be subjected to the risk and cost of surgical exploration. This initial enthusiasm must be tempered. Prospective studies have shown significant numbers of patients who, by CT examination, have normal (<1.0 cm) hilar/mediastinal lymph nodes proven to be invaded by tumor on histologic examination (false negative). A second group of lung cancer patients raises more disturbing questions about the staging role of chest CT. Controlled studies have demonstrated that there is a significant number of patients with CT findings of enlarged (>1.0 cm) hilar/mediastinal lymph nodes pathologically shown to be free of tumor (false positive). This means that CT identification of enlarged hilar/mediastinal lymph nodes is not diagnostic of advanced stage disease. CT, therefore, adds an extra cost without contributing to the management plan. These points are nicely reiterated and extended in the comprehensive study by McKenna et al in this issue of Chest (see page 206).

The notion that routine use of CT would provide useful preoperative information about the mediastinal anatomy to help the surgeon decide whether to perform mediastinoscopy has not proven to be viable or cost effective. CT may allow for nonoperative staging via fine needle aspiration, under direct guidance, of enlarged hilar/mediastinal nodes.

Magnetic resonance imaging (MR) has recently become available. Like CT, MR has the capability of anatomic visualization of mediastinal anatomy. MR also has the exciting theoretic capability of tissue typing. Clinical diagnostic and staging studies will be necessary before MR can be incorporated into the assessment of lung cancer and reliance can be placed on MR findings.

It is not possible at this time to stage patients with lung cancer solely on the basis of the radiologic presence or absence of enlarged hilar/mediastinal lymph nodes. The determining diagnostic procedure must be mediastinoscopy or thoracotomy in the absence of biopsy-proven metastatic spread of lung cancer.

Routine ordering of chest CT for staging purposes should be discouraged. The indications for this procedure should be determined by consultation among the clinician, the radiologist and the surgeon.

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Clinical Value of the Gram-stain Smear of Respiratory Secretions

In a previous editorial in this journal, we discussed the question of what was the optimal approach to identifying the cause of a lower respiratory tract infection (LRTI). We concluded that the question of how and when to obtain lower respiratory tract secretions (LRTS) is, and will remain, a source of debate, disagreement, and uncertainty until studies become available which answer the question of which approach leads to the best clinical outcome.

In the May issue of Chest, Geckler et al report comparing the clinical value, in the initial management of pneumonia, of expectorated sputum (ES) and transtracheal aspiration (TTA) (see page 631). Although this study involves a relatively large, homogeneous group of patients with community-acquired pneumonia, and, therefore, had the potential to evaluate TTA versus ES in terms of ultimate clinical outcome, the authors did not set up the study to do so. Their study was designed only to evaluate the value of Gram-stain smears of TTA and ES in selecting initial antibiotic therapy. They used the TTA culture results as the standard for determining the true cause of LRTI and selecting appropriate antibiotic therapy.

Although we feel that this is an important study because it provides new prospective data on Gram smear analyses of secretions obtained from the most commonly used noninvasive (ES) and invasive (TTA) techniques for obtaining LRTS, we would like to offer an alternative interpretation of the authors’ results and voice some methodologic concerns about the manner in which the TTA specimens were obtained and analyzed.

The authors’ main conclusion from this study was that TTA is not necessary for the initial management of most patients with pneumonia since TTA provided no diagnostic advantage over ES in determining the cause of pneumonia and is potentially associated with morbidity. They based this conclusion on their findings that in approximately 50 percent of the cases the Gram-stain smear analysis of both the TTA and ES was inaccurate and led to the selection of inappropriate antibiotic therapy. We disagree with their conclusion and offer an alternative interpretation: one cannot rely on the ES Gram-stain analysis to determine the cause of LRTI and, therefore, when this information is considered vital, TTA culture results (which provide accurate information within 24 to 48 hours) are very important. The fact that it may take 24 to 48 hours for the results of TTA culture to be available in no way negates their value. This information would allow the initial antibiotic regimen selected to be appropriately adjusted early in the clinical course in a manner analogous to the use of positive blood cultures in the septic, bacteremic patient.

In addition, we believe that there were limitations in the manner in which the TTA specimens were obtained and evaluated. Since the use of intermittent hand-held syringe suction during TTA often causes difficulty in obtaining a specimen, this may explain why non-bacteriostatic saline solution had to be administered in 25 of their cases. Because we experienced this same problem a number of years ago, we now use only a continuous suction technique. The use of saline solution not only diluted the TTA specimen (thus making bacteria more difficult to find by Gram-stain smear analysis), but also may have potentially made the results of the Gram smear less accurate in predicting the results of culture since even sterile saline free of bacteriostatic agents may kill organisms such as H influenzae and S pneumoniae unless specimens are cultured rapidly. We also believe that the authors’ criteria for eliminating over 50 percent of the TTA’s from their analysis is of questionable validity. Transtracheal aspiration Gram-stain smears were considered acceptable for analysis only if areas of purulence devoid of buccal squamous epithelial cells were present. We believe this criterion to be invalid for the following reasons: 1) it has previously been shown that squamous epithelial cells of lower respiratory tract origin are frequently present in a properly obtained, uncontaminated TTA specimen and they cannot be distinguished from buccal squamous epithelial cells by light microscopy, and 2) the absence of purulence (ie, lack of polymorphonuclear leukocytes) should also not be used as a criterion to eliminate TTA specimens since, in cases where no LRTI is present or the causative organism is a virus, Mycoplasma, or Legionella species, these cells may be lacking. For the above reasons we question the validity of the authors’ findings that the TTA Gram-stain analysis is inaccurate 50 percent of the time.

However, we do not believe that these concerns