in lymph nodes may determine prognosis. They also speculate that a positive marker may indicate the need for systemic chemotherapy or radiotherapy. Such data promise the potential for preoperative tissue/gene-based risk stratification, which most certainly will have some cut-off for risk/benefit for either neoadjuvant therapy or surgery. If EUS-guided FNA-based molecular and gene expression can be used to risk-stratify patients, this would be a tremendous aid to the clinician. Currently, balancing the patient's premorbid condition with the need for either radiation, chemotherapy, or surgery vs risk stratification of the stage based on outcomes requires considerable judgment. One can only hope that improved staging and risk stratification would be coupled with more targeted therapeutic modalities.

All of us await the day when the “rosetta stone” of genetic classification vs accurate staging can be coupled with a outcomes-based therapeutic regimen that would allow matching of the patient’s therapy to the predicted risk/benefit ratio. Wallace et al have taken one of the first steps in this direction, which hopefully will lead to the needed giant leap in improving the treatment of lung cancer. Widespread availability of these new techniques coupled with prospective, randomized, multivariable outcome trials are required to determine the impact of molecular marker positivity within mediastinal lymph nodes on treatment modalities and survival.

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Transesophageal Echocardiography and Staging in Lung Cancer

A View From the Rear Window

Surgical resection is the main therapeutic procedure in the management of most cases of lung cancer. However, the feasibility of surgery as well as the choice of the proper surgical approach in the individual patient depend, among other conditions, on an accurate assessment of the extent of the tumor invasion of local structures, a process known as staging. Staging includes the assessment of the presence and extent of local spread of the tumor to adjacent structures such as the pleura, pericardium,
Transesophageal echocardiography (TEE) is a technique that utilizes the esophagus as an imaging window on the heart and great vessels. It involves the introduction of an upper endoscope fitted with an ultrasound transducer with a high power of resolution. Since intravascular catheters are not introduced, it is considered to be noninvasive. The close proximity of the esophagus to the heart and major blood vessels in the chest with no air or bone interference increases the clarity and the resolution of the echo images. In addition, TEE allows the interrogation of structures that are difficult to accurately assess from the transthoracic windows. These structures include the thoracic aorta. Thus, from a humble beginning in 1976 when Frazin and coworkers present their findings in using TEE and coworkers6 attached a single ultrasound transducer to a string, which was then swallowed to obtain M-mode images, TEE emerged as one of the indispensable tools in the practice of cardiology.6,7 TEE lent itself to intraoperative monitoring of different cardiac lesions and the assessment of surgical results,8 such that it has become part of the required training for cardiologists and cardiac anesthesiologists. Outside of the operating room, TEE is the procedure of choice in the evaluation of diseases of the heart valves (natural and prosthetic), cardiac tumors, vegetations, clots (particularly in the left atrial appendage), congenital defects, and critically ill patients when the thoracic window does not yield diagnostic quality images.9–14 It is also the procedure of choice in the diagnosis of most diseases that affect the thoracic aorta. Such diseases include dissecting aneurysm, aortic hematoma, traumatic laceration, atherosclerosis with or without intimal ulceration, mobile atheroma, or clot formation.15–18 We now have a report proposing the use of TEE in the assessment of a novel lesion that may affect the thoracic aorta.

In this issue of CHEST (see page 438), Schröder and coworkers present their findings in using TEE for the evaluation of possible tumor invasion of the wall of the thoracic aorta in patients with cancer of the left lung. They collected their material from patients who had been admitted to a large referral center over a 10-year period (from 1993 to 2003). Of 5,000 patients who were admitted to the hospital during that period of time, their report is based on 201 patients who had left lung cancer abutting the thoracic aorta. The tumor was located in the left upper lobe in 93 patients, the left lower lobe in 61 patients, and the left main bronchus in 47 patients. All of the 201 patients underwent staging with conventional CT scanning, and 6 patients underwent MRI as well. The CT scans were performed at the main center as well as at affiliated clinics, and the data were based on an analysis of the reported results. TEE was performed in all patients using available commercial equipment and a 5-MHz probe within 2 weeks after the CT scans were performed. The monoplane probe was used in 139 patients, the biplane probe was used in 47 patients, and the multiplane probe was used in 15 patients. There were no complications. The authors considered that the signs were positive for invasion of the aortic wall by echocardiography when the two distinct lines of reflection that are normally generated by the aortic wall and the adjoining pleura lost their distinction and became obliterated. Additionally, the respiratory movement of the consolidated lung along the border with the aorta is lost with tumor invasion. Disappearance of the pleural reflection alone (outer line) indicates pleural invasion that does not extend to the
aortic wall. Confirmation of the findings by CT scan and TEE was possible in 96 cases at surgery and in 1 case at autopsy. The other 114 patients were not considered to be surgical candidates due to advanced state of the disease (80 patients), advanced respiratory insufficiency (18 patients), and patient refusal of surgery (16 patients).

For the entire group, TEE findings were considered to be positive for aortic invasion in 61 patients, negative in 129 patients, and inconclusive in 11 patients, while CT scan findings were considered to be positive in 14 patients, negative in 12 patients, and inconclusive in 66 patients. In 109 patients, there was no comment at all with respect to aortic invasion by CT scanning. Of more interest are the data from the 97 patients with confirmation of a pathologic condition. Of the 12 patients with definite aortic invasion at surgery, 10 patients were correctly staged by TEE, 1 patient was understaged, and the staging for 1 patient was inconclusive. In contrast, CT scanning allowed correct staging in only 2 patients, 1 patient was understaged, and the staging in 9 patients was inconclusive. Of the 85 patients without aortic invasion at surgery, 79 patients were correctly identified by TEE, 2 were overcalled, and the staging in 4 patients was inconclusive. For the same group, only 4 patients received correct diagnoses by CT scanning. 6 patients were overstaged, and the staging in 79 patients was inconclusive. The authors correctly concluded that TEE is far superior to conventional CT scanning in the evaluation of the involvement of the thoracic aorta in cancer of the left lung.

This is an extremely interesting study that provides useful information in a small subset of patients in which the difference between the contiguity and invasion of the thoracic aorta by lung cancer has a direct impact on the choice of therapy. Perhaps the most pertinent finding is the ability of TEE to exclude aortic invasion with a high degree of certainty and thus to avoid denying surgery to a defined group of patients. The group of patients with a positive identification of aortic invasion by TEE is, I think, too small (12 patients) for a definitive decision. The study obviously does not deal with newer and more advanced radiologic or metabolic scanning procedures, nor with MRI.

This is, to my knowledge, the first large-scale study of its kind and should pave the way for more experience with larger groups of patients in order to further refine the techniques and define the echocardiographic criteria for aortic invasion by lung cancer. Questions of lateral resolution are expected to arise in some cases, depending on the point of contact between the tumor and the aorta, and the blind spot at which the aorta is obscured by tracheobronchial interference. Other questions arise with respect to the capacity of TEE to accurately differentiate between inflammation and tumor invasion, and the possible interference of aortic atheromas and calcium deposits with the accurate resolution of the diagnostic criteria set by the authors. These reservations notwithstanding, the ease with which TEE is performed, the quickness of the procedure, the mobility of the equipment, and the relatively low cost make the view from the rear window, as suggested by the authors, an attractive alternative, or an addition, to what is currently available. I hope it stands the test of time.

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Statins in the Medical Management of Postoperative Coronary Artery Bypass

This issue of CHEST (see page 455) contains an article by Khandheria et al that describes an experience at the University of Michigan concerning the incorporation of statins in the medical management of postoperative coronary artery bypass patients. The authors do an excellent job of describing the basic science that supports the incorporation of statins into the postoperative medical regimen of patients who have undergone coronary bypass grafting. There appears to be little doubt that statins are associated with improved outcomes in these patients. The evidence appears to be undeniable that statins are associated with improved outcomes in these patients. The authors quite rightly point out that their protocol was “passive.” The incorporation of statins into the postoperative management of patients depended upon an educational effort to be followed by a change in practice patterns, which in retrospect did not achieve compliance at the level the authors had hoped.

The surgeons involved in this group of patients had concerns about statin therapy, in that they believed that hepatic dysfunction following surgery was relatively common, and they did not want to compound that with the addition of statins. The authors’ study documented that liver function study results did not significantly deteriorate in patients placed on statins, which is likely reasonable evidence that the concerns about initiating statin therapy are probably overly cautious.

The net benefit accrued to patients by putting them on statins probably outweighs to a significant degree the potential for complications associated with statins. The authors mention in their article that they are making efforts to overcome the resistance to the incorporation of statins into their postoperative management. It will be interesting to follow their efforts.

We have taken another approach to this problem. We have made initiations of statins “semiautomatic” following coronary artery bypass surgery. This approach has necessitated that the caregivers do something “active” in order to discontinue statins. This approach has resulted in >90% compliance with the recommendations that patients be receiving a statin drug at the time of discharge. We do not have data to document what percentage of our patients are receiving statins at 6 months. It may be improper to conclude that our approach to the management of these patients while in the hospital results in better long-term compliance. It does suggest, however, that a more active approach to the initiation of statins is more productive in getting patients discharged receiving this important medicine.

This article points out a very interesting problem in the delivery of medical care in general. Guidelines have been put together for almost every illness and medical condition imaginable, and they contain the very best evidence available about the management of patients with the various problems that they target.

Achieving compliance with guidelines has presented an extremely challenging problem in a gen-