Editor’s Note: Authors are invited to respond to Correspondence that cites their previously published work. Those responses appear after the related letter. In cases where there is no response, the author of the original article declined to respond or did not reply to our invitation.

The Value of CT Scan-Guided Biopsy in Evaluation of Ground-Glass Opacity

To the Editor:

We read with interest the article by Dr Chang and colleagues in CHEST (January 2013) about the management of ground-glass opacities (GGOs). Their data indicate that the strategy of long-term follow-up and selective surgery was appropriate. However, we do not entirely agree with their ideas. We offer a third choice of CT scan-guided biopsy to solve the long-standing issue.

Previous studies have shown that a solid component of GGOs is a remarkable characteristic of malignancy. However, it is difficult to identify GGOs without a solid component. We congratulate the authors for the diagnosis of 11 cases of malignant GGOs, but was there other malignant neoplasm in the remaining follow-ups? Other investigators have reported that the malignancy rate of GGOs without a solid component is 18%. It should be noted that the rate of malignant GGOs in the study by Chang et al was only 10% (11 of 122).

In the evaluation of GGOs, benign lesions usually resolved partially or completely by CT scan recheck 3 months later. In our practice, when the nature of GGOs, especially those with a relatively large size, is still uncertain at 3 months, CT scan-guided biopsy is recommended to patients. In our experience, the success rate of biopsy is relatively high when the diameter of a GGO is >7 mm. Our biopsy cases all produced pathologic results, which were consistent with the subsequent results of surgical specimens. All these cases were adenocarcinoma or bronchioloalveolar carcinoma. In a study by Kim et al, CT scan-guided biopsy was also reported as effective in giving value to the nature of GGO, with a sensitivity of 93% and an accuracy of 91%. Therefore, we recommend that after a short-term follow-up, CT scan-guided biopsy be given as a choice for the evaluation of GGO with a relatively large diameter.

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Response

To the Editor:

We thank Drs Liu and Liang for their comments on our article in CHEST. First, they commented that the 9.0% (11 of 122) malignancy rate of pure ground-glass opacity (GGO) lung nodules in the present study was lower than the 18% reported in a previous study. In our study, tissue confirmation was performed only in the patients with growing lesions; therefore, we were unable to calculate the prevalence of primary lung cancer. We stated this as a limitation of our study. Primary lung cancer could be confirmed in a portion of patients with stable pure GGO if they underwent aggressive tissue confirmation. However, the important issue in our study is that the patients with pure GGO did not show any change in nodule size during a median follow-up of 59 months. We speculate that these stable GGO lesions can be attributed to overdiagnosis bias, even if the lesions were diagnosed as malignant on tissue confirmation.

Second, Drs Liu and Liang commented that CT scan-guided biopsy is the option for patients with lesions of a relatively large diameter when the nature of GGO is still uncertain 3 months later. However, CT scan-guided biopsy has potential limitations in the diagnosis of GGO lung nodules. The sensitivity of CT scan-guided biopsy has been reported to be about 50% to 90%, but is about 50% to 75% if indeterminate results are included. The sensitivity seems lower for pure GGO lesions (50%) than for...
mixed GGO lesions (80%). Moreover, the sensitivity is lower for smaller lesions (35%-67% for those ≤10 mm) than larger lesions.\textsuperscript{4,5} False-negative rates were reported to be about 20% to 30%.\textsuperscript{4,5} The rate of concordance between core needle and surgical biopsies in malignant and premalignant lesions was only 73%, and core biopsy failed to identify the area of invasion.\textsuperscript{5}

We recommend that persistent pure GGO lesions ≥10 mm be surgically resected for histologic examination and treatment, based on the high probability (42.9%) of growth during follow-up in our study;\textsuperscript{1} although there remains the possibility of overdiagnosis in a portion of the patients who undergo surgery. For pure GGO lesions measuring <10 mm, a strategy of long-term follow-up and selective surgery for growing lesions seems reasonable considering the low probability of growth. However, we agree that CT scan-guided biopsy could be considered in pure GGOs of ≥10 mm for which surgery is contraindicated or in patients who refuse surgery.

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**Thoracic Duct Embolization, Unexplained Thoracic Duct Occlusions, and Lymphatic Anomalies**

*To the Editor:*

I read with interest the article by Nadolski and Itkin\textsuperscript{1} in *CHEST* (January 2013) on thoracic duct embolization (TDE) for non-traumatic chylous effusion. The authors are to be applauded for approaching a difficult topic with poorly established standards and a high mortality rate. This is an important condition for chest physicians to understand and manage. Unfortunately, and despite the authors’ vast experience in the management of >160 patients with this frequently devastating disorder, the etiology of spontaneous or idiopathic chylothorax remains unexplained. What are the mechanisms for the thoracic duct undergoing obstruction in patients with no previous disease and normal MRI thoracic examinations? Up to 20% of patients with nontraumatic chylous effusions present with lymphatic anomalies (lymphatic malformations, generalized lymphatic disease [lymphangiomatosis], or Gorham-Stout disease).\textsuperscript{2} Children with massive lymphatic malformations in the neck, axilla, or groin do not develop lymphatic duct obstruction with lymphedema. We do not have information regarding compared outcomes of TDE in patients with or without associated lymphatic malformations.

It is evident that TDE will soon definitively replace surgical thoracic duct ligation (TDL) because morbidity is significantly reduced by using this technique. To better understand the benefits of this procedure, we need information about the routes of chyle recanalization after thoracic duct occlusion. Apparently, post-operative recurrent chylothorax or proximal chylous effusions are significantly reduced in patients undergoing TDE compared with those treated with TDL. This complication is common in patients with generalized lymphatic anomalies undergoing TDL. Are lymphatic-venous communications more easily opened and better functioning after TDE?

Nontraumatic chylothorax in children aged <10 years remains an unsolved problem. Because successful TDE has been reported in the treatment of post-cardiac surgery chylothorax in small children,\textsuperscript{2} there are optimistic expectations of TDE improving the mortality rate in the pediatric population affected by pulmonary or disseminated lymphangiomatosis.\textsuperscript{3} We encourage pediatric interventional radiologists and thoracic surgeons involved in the management of children with chylothorax in the context of life-threatening lymphatic anomalies to develop and promote noninvasive techniques in the management of these patients.

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