mg/d) was started, but respiratory failure developed rapidly, and the patient needed mechanical ventilatory support. Two days later, complete atrioventricular block developed, and cardiopulmonary resuscitation, including pacemaker implantation, failed to preserve her life.

**Discussion**

Respiratory tract involvement is a frequent manifestation of WG, where the lung is the most frequent and sometimes the only organ involved. The characteristic lung findings are multiple bilateral nodal infiltrates that tend to cavitate and are more predominant in the lower lobes.

The patient described had an uncommon course, both because of the unusual radiographic appearance of her disease, and also because of the associated complications. The presentation as a pulmonary nodule is uncommon in WG and is particularly misleading, mimicking a malignant process. Therefore, WG should be included in the differential diagnosis of any pulmonary nodule. The reappearance of the patient's disease with an abrupt onset of severe alveolar hemorrhage associated with hemoptysis and respiratory failure is also considered to be a rare complication of WG. In addition, the patient had clinical and laboratory features of painless thyroiditis. Whether the thyroiditis was related to WG or not is unclear; however, acute thyroiditis in association with WG has been described previously in one patient.

The importance of this report lies primarily in the presentation and the unpredictable course of WG. On her first admission, the patient had a solitary nodule strictly limited to the right upper lobe, without evidence of involvement elsewhere in the lung or outside the respiratory tract. After excision of the lesion, she was well for a while, but then relapsed fulminantly, leaving no time for preventive treatment, despite close follow-up. Previous literature describes few patients with WG which presented as a solitary pulmonary lesion. Usually, the lesions were removed surgically, as malignancy was suspected. Although systemic manifestations, such as fever, malaise, and weight loss, were often described, these symptoms disappeared after surgery, and most patients had a benign clinical course and cure, without medical treatment. Reviewing their experience, Blennerhassett et al concluded that localized pulmonary WG may not need medical treatment unless extrapulmonary manifestations are present; however, on the other hand, in a recent case, WG presented as a solitary mediastinal mass which was excised but was misdiagnosed, and the patient was discharged without medical treatment. Three months later, she developed rapidly progressive renal failure due to WG and remained on continuous hemodialysis despite adequate therapy.

Treatment with cyclophosphamide and prednisone leads to cure in the majority of patients with WG. In addition, treatment with a trimethoprim-sulfamethoxazole combination may be an alternative therapy, with fewer side effects, for some patients with WG, particularly those with localized forms of the disease. The systemic manifestations observed also in patients with localized disease may suggest that WG is never a true localized or limited disease that can be removed surgically. The present case and the other recently reported strongly suggest the need for full chemotherapy immediately upon diagnosis of WG, even if after excision of a solitary lesion no further signs of the disease are present, in order to avoid relapses which may be associated with severe complications and a fatal outcome. Now that the antineutrophil cytoplasmic antibodies test is more readily available, its use may help in guiding the intensity and duration of therapy for "localized" WG in the absence of localized or systemic manifestations.

**References**


**Combined Median Sternotomy and Video-assisted Thoracoscopic Resection of Pulmonary Metastases**


Median sternotomy has been a common approach for resection of bilateral pulmonary metastases. It provides good exposure and quick accessibility to most lesions in the lung. The retrocardiac left lower lobe may at times be a problematic area for resection of metastases. We have used a simultaneous median sternotomy and left video-assisted thoracoscopic approach to remove three such lesions in two patients, with satisfactory results. (Chest 1993; 104:556-58)

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Pulmonary metastases are commonly seen in the course of many malignancies. A small group of highly selected patients may derive benefit from excision of pulmonary metastases. Those considered for resection should meet the following criteria: (1) must have their primary tumor controlled; (2) have no other metastatic disease; and (3) all metastases in the lungs should be amenable to removal.

Median sternotomy has emerged as a popular and effective method for resection of pulmonary metastatic disease. This approach allows examination of both lungs for metastases and the removal of bilateral lesions in one setting. Posteriorly located lesions, especially in the left lower lobe, can be technically difficult to visualize and remove through the median sternotomy because of the intervening cardiac structures.

Sarcomas frequently metastasize to the lungs, and when this is the sole site of disease, resection may improve survival. We report three instances where video-assisted thoracoscopy was used in conjunction with a median sternotomy incision to allow removal of all pulmonary metastases in two patients with metastatic osteosarcoma.

**Materials and Methods**

Both patients presented with multiple pulmonary lesions and a previous amputation for osteosarcoma. One patient had undergone a thoracotomy 2 years previously for resection of 2 pulmonary metastases. Chemotherapy with doxorubicin hydrochloride (Adriamycin) had been utilized, and a recent MUGA scan in 1 patient revealed a 30 percent ejection fraction. Both patients were otherwise free of disease and healthy, with adequate pulmonary function. A total of nine metastatic lesions were resected in these two patients, one of which was not identified by preoperative computed tomographic (CT) scans.

**Technique**

The patient is anesthetized, intubated with a double-lumen endotracheal tube, and placed in a supine position with the left arm extended at a 90° angle (Fig. 1). The entire chest is prepared and draped as for a median sternotomy, and the preparation is extended as far lateral on the left side of the chest as possible. A median sternotomy is performed, and both lungs are carefully examined for metastatic lesions.

Lesions in the right lung and left upper lobe are removed by wedge resection. Left lower lobe lesions, especially when posterior and deep, may be difficult or impossible to expose and remove (Fig 2). Special retractors to elevate the left hemisternum are often used to aid in exposure for more difficult lesions. Both of our patients had lesions which could not be exposed and resected safely at median sternotomy.

Two 12-mm trocars (Auto Suture; Surgiport; U.S. Surgical Corporation) are placed in the sixth and seventh intercostal space in the anterior and posterior axillary line (Fig 1). During this maneuver, the heart and lung are protected by manual retraction through the median sternotomy. The video element is advanced through one port. The lesions to be removed are identified by palpation through the median sternotomy incision and visualization through the thoracoscope. Standard lung clamps and instruments may be passed through the median sternotomy to aid in exposure of the lesions.

For superficial lesions, the endoscopic stapling device (Auto Suture; Endo-GIA; U.S. Surgical Corporation) is placed in the thoracic cavity through the 12-mm trocar (Fig 3). The metastasis is grasped with the fingers and lifted away from the remaining lung. Utilizing the video thoracoscope, the stapler can then be advanced underneath the lesion and fired. A wedge excision of the lesion is accomplished. Two of the three lesions in our two patients were removed in this fashion.

A third lesion was deeper in the lower lobe and was resected.
using the Nd:YAG laser as previously described. Visualization was provided through the thoracoscope while the laser fiber was introduced through a separate port. The lesion was intermittently palpated through the median sternotomy for guidance, and a smoke evacuation suction was used.

At completion of the resections, one trocar site is used for a chest tube, and the second is closed with a subcuticular stitch and Band-Aid. The median sternotomy incision was closed in the standard fashion. Both patients were discharged within seven days after a smooth postoperative recovery.

**Discussion**

Resection of bilateral pulmonary metastases is an accepted treatment, both for attempted cure and palliation of multiple metastases. Formerly, the options for surgical approach included bilateral thoracotomy or median sternotomy. The advantage of the median sternotomy approach is the ability to undertake resections bilaterally through a single incision, which results in less pain and ventilatory compromise than the thoracotomy approach. The single greatest disadvantage of the median sternotomy approach is that metastases in the left lower lobe may require some displacement of the heart to gain exposure. Attempts to place the heart and allow visualization of the posterior portion of the left lower lobe may lead to hemodynamic compromise, especially in patients with underlying cardiac dysfunction. A simultaneous sternotomy and thoracoscopic approach obviates this difficulty and allows for complete resection of metastases.

Video-assisted thoracoscopy is a rapidly evolving therapeutic modality whose exact role has yet to be defined. It is a minimally invasive procedure which allows the operator to remove small peripheral lung lesions. The procedure is well tolerated and could theoretically be utilized bilaterally to achieve complete resection of multiple pulmonary metastases during a single period of anesthesia. Although digital examination of the lung through the trocar sites can be performed, it is not quite as complete or sensitive as the palpation done at median sternotomy. The potential disadvantages of using bilateral thoracoscopy for resection of metastatic lesions is the risk of missing additional lesions and the time required for multiple thoracoscopic resection.

Resection of single, small peripheral nodules may require over an hour, as recently reported by Landreneau and colleagues. Although the time required for thoracoscopic resection has decreased with experience and although this technique might be appropriate for one or two nodules on either side, multiple bilateral nodules could require an excessive duration of anesthesia, which might appear unnecessary. Many metastases smaller than 1 cm are not visualized on the CT scan of the chest and could remain unrecognized and unresected if approached only thoracoscopically. The combination of median sternotomy and left-sided thoracoscopy is a reasonable compromise which allows for identification and excision of all nodules in an acceptable anesthetic time without the added morbidity of a thoracotomy incision.

**References**


**Use of Nd:YAG Laser in Endobronchial Granular Cell Myoblastoma**

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Granular cell myoblastoma is an uncommon benign tumor that causes pulmonary complications due to obstruction of the airways. We report the first case of bronchial obstruction due to granular cell tumor treated with Nd:YAG laser. The Nd:YAG laser appears to be an effective new tool for relieving obstruction and, in some cases, preventing recurrence, and can be delivered with the use of a flexible bronchoscope. (Chest 1993; 104:958-60)

Granular cell myoblastoma is a rare tumor of Schwann cell origin that is almost always benign and occurs primarily in the skin and tongue. Although unusual, there are several reports of tracheobronchial lesions. Pulmonary complications from these tumors are due to bronchial obstruction and usually present as persistent or recurrent consolidation or atelectasis. Treatment has been predominantly by surgical or endobronchial resection. We report the first case of bronchial obstruction due to a granular cell tumor treated with a Nd:YAG laser.

**Case Report**

The patient was an 80-year-old white woman who had been in her usual state of health until 2 days prior to hospital admission when she developed a productive cough, fevers, chills, and right-sided pleuritic chest pain. She was seen by her private physician who found a right lower lobe infiltrate and pleural effusion on the chest radiograph, and admitted her to the hospital for treatment of pneumonia. Cultures were positive for Streptococcus pneumoniae and she was treated with intravenous penicillin for pneumococcal pneumonia. At the time of hospital discharge, she was asymptomatic.

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