chronic empyema cavity were resected. Twenty-five Lucite balls 2.5-cm in diameter were extracted (Fig 1). The resulting space contained multiple densely fibrotic and partially ossified septae. This tissue was resected, and a limited apical decortication was performed. At the completion of these maneuvers, the lung expanded to fill most of the apical space. The lung was pink and normal in appearance except in a single area where a Lucite ball had eroded into the apex of the right upper lobe. This area was repaired with silk sutures. The residual apical space was filled by transposition of the pectoralis major flap through the defect in the chest wall. The wound was closed primarily. Chest tubes were left in the apical space and removed on the seventh postoperative day. Cultures grew *S. aureus*. A regimen of intravenously administered vancomycin and cefoxitin was given for 9 days.

The patient made an uneventful recovery and was discharged on the 12th postoperative day. She is now doing well 1½ years later, with no evidence of recurrent infection.

Pathologic examination revealed a small focus of follicular, large-cell lymphoma in the resected visceral pleura.

**DISCUSSION**

Extrapleurostal and extrapleural pneumolysis were forms of collapse therapy for apical pulmonary tuberculosis cavity in which a plane of dissection deep to the ribs was created over the upper chest, allowing the cavity upper lobe to collapse and (theoretically) heal.1 The intrathoracic space thus created was then maintained by filling it with various substances, including air, oil, or mineral oil,2 gauze, paraffin wax, rubber sheeting or bags, and finally, in 1945, with Lucite balls by Wilson.3 The term “plomb” derives from the French for lead and refers to any inert body used to collapse the lung for treatment of pulmonary tuberculosis. The procedure was abandoned by most chest surgeons because of a high incidence of early complications.4

There is little information on the late complications of plombage thoracoplasty. Shepherd5 reported a personal series of four cases and surveyed British surgeons for their experience. He noted that 452 plombage operations were performed in Britain in the years 1953 to 1954. Sixteen percent experienced early problems, and most plombs were removed within 5 years of surgery because of complications. She was able to track 119 patients on a long-term basis. Of these, 17 experienced complications including hemorrhage, infection, and fistulization to the bronchus, aorta, esophagus, and skin as long as 30 years postoperatively. Horowitz et al6 reported four cases of delayed complications 30 to 40 years after plombage thoracoplasty (3 Lucite and 1 paraffin). The plombs were resected, and the residual space was controlled by thoracoplasty, open drainage, or by filling the space with antibiotic solution.

Our case represents a rare instance of delayed plomb erosion of the chest wall with fistulization and infection of an extrapleurostal space 45 years after the original operation. Removal of the plomb and decortication of the lung were surprisingly easy, and the small residual space was obliterated successfully by intrathoracic transposition of a pectoralis major muscle flap.

Historically, the use of the pectoralis major muscle flap as an adjunct to extrapleural thoracoplasty had first been described by Archibald7 in 1920.

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### Pulmonary Artery Aneurysm Presenting as a Lung Mass*

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We describe a case of pulmonary artery aneurysm in which clinical clues and conventional imaging suggested a lung tumor, and the actual nature of the lesion was discovered at the time of thoracotomy. This case shows the importance of an awareness of this condition in the formulation of a differential diagnosis for a lung mass.

**PAA=pulmonary artery aneurysm**

**Key words:** diagnosis; lung mass; pulmonary artery aneurysm

Pulmonary artery aneurysm (PAA) is a rare condition, either congenital or acquired in origin. Tuberculosis and syphilis, once major causes of acquired PAA, are now better controlled since the introduction of antibiotics. However, other sources of infection may on rare occasion cause mycotic PAA.1 Here, we report a case of mycotic PAA, that was very likely related to pneumonia and which, by conventional imaging, was presumed to be a solid lung mass.

**Case Report**

A 58-year-old white woman presented with a sudden onset of fever, chills, night sweats, and a productive cough. A chest x-ray film

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showed a right lower lobe infiltrate as well as an ill-defined mass in the right infrabasilar area. When the symptoms failed to resolve on (Bactrim), with sulfamethoxazole-trimethoprim (Bactrim) therapy, her physician admitted her to the hospital for intravenous administration of antibiotics and further evaluation.

The patient had a history of controlled hypertension as well as a 140 pack-year history of cigarette smoking prior to quitting four years previously. Her father had died of lung cancer. On physical examination at this time, there were crackles and decreased breath sounds at the right lung base. Her laboratory values were notable only for microhematuria. Because of the suggestion of a right lung mass, a CT scan of the chest and abdomen with contrast medium was obtained (Fig 1). It confirmed the presence of a 3x2x3-cm well-defined round right infrabasilar mass and also unexpectedly demonstrated a mass in the right kidney. Bronchoscopy showed normal tracheobronchial anatomy with no evidence of an endobronchial lesion or airway compression. A renal ultrasound examination confirmed the presence of a 3.1x3.1x 2.7-cm solid mass in the right kidney which was most compatible with a primary neoplasm. The patient was discharged after improvement on a regimen of intravenously administered erthromycin and sulfamethoxazole-trimethoprim. No organisms were isolated from cultures. A 5-tuberculin unit purified protein derivative test and an acid-fast bacillus smear of the sputum were negative, as were a serum Legiosnella titer and a urine Legionella antigen test.

Fine needle aspiration of the right kidney mass revealed renal cell carcinoma. A chest CT scan performed 6 weeks after discharge showed the right lung mass to be unchanged. To help exclude a metastatic focus or a synchronous primary carcinoma of the lung, a CT-guided needle biopsy was performed. This was nondiagnostic, and it was decided to proceed with an open-lung biopsy. Thoracotomy revealed a 2-cm dark blue mass on the right inferior pulmonary artery at the junction of the middle lobe artery and the superior segmental artery to the lower lobe. There was no tissue plane between the mass and the artery, and fine needle aspiration of the mass revealed blood. The mass was concluded to be an aneurysm of the pulmonary artery. Because of the location of the mass, resection of the lesion would have necessitated a bilobectomy. Considering the magnitude of the resection necessary to remove the lesion, the patient was closed without further manipulation pending further evaluation.

A few weeks later, the patient had an uncomplicated right radical nephrectomy. The patient was subsequently referred to an angiographer who performed a pulmonary arteriogram. It was believed that the lung mass evident on CT represented an aneurysm secondary to infection. The presence of shunting through an arteriovenous fistula was excluded with a PaO2 of 572 mm Hg with the patient breathing 100% oxygen. Angiographically, it was believed that the aneurysm had spontaneously thrombosed, and no additional intervention was necessary. In clinical follow-up, the patient has done well and remains free from recurrence of her renal cell carcinoma after about 1 year.

**DISCUSSION**

Since the rarity of PAA makes it an unlikely cause of a suspected lung mass, historical and clinical clues may be essential to the recognition of PAA. An accurate incidence of PAA is difficult to determine, but it appears quite rare. Two major reviews in 1939 and 1947 together reported only 147 autopsy-proven cases of proximal PAA up to that time.2,3

The current incidence may be even lower than early estimates because advances in medicine have affected some of the major etiologies, in particular infection. Barter et al.4 divide PAAs into two groups: those with and those without arteriovenous communication. In the latter group, infection is an important cause. Tuberculosis was perhaps the most common cause of PAA in the preantibiotic era. The aneurysms, known as Rasmussen's aneurysms, result from extension of infection from surrounding lung tissue, therefore usually involving intrapulmonary vessels. Syphilitic infection of the vasa vasorum of pulmonary arteries can also cause injury leading to aneurysm formation, usually in more proximal sites. Syphilis accounted for 33% of the proximal PAAs reviewed in 1939 and 1947.2,3 but it has likewise diminished as an etiology. 1 Pneumonia, the presumed cause in the case reported here, may cause mycotic PAAs by endovascular seeding or by direct extension. Myotic PAAs have also resulted from endovascular seeding from endocarditis, osteomyelitis, and skin abscess.1

Other causes of PAAs without arteriovenous communication include congenital cardiac abnormalities, especially patent ductus arteriosus; vascular abnormalities, including congenital atresias or hypoplasias, Marfan's syndrome, and various vasculitides; pulmonary hypertension; trauma, such as from pulmonary artery catheterization; and Hughes-Stovin's and Behcet's syndromes. Myotic PAAs appear to be associated with the presence of congenital cardiac abnormalities, pulmonary hypertension, and intravenous drug abuse. Finally, some PAAs have no known etiology.1

Pulmonary artery aneurysms with arteriovenous communication usually are congenital, with about 60% being related to genetic defects and 40% occurring in association with hereditary hemorrhagic telangiectasia (Osler-Weber-Rendu disease). A small number also may be due to infection.1

Symptoms associated with PAA include exertional dyspnea, hemoptysis, cough, and chest pain or tightness. Signs of right ventricular failure (edema, ascites) may be evident, and a harsh systolic murmur, diastolic murmur, thrill, pulsation, or dullness in the left second to third interspaces also may occur.2,3 If arteriovenous communication exists, right-to-left shunting may cause cyanosis, clubbing, and paradoxical emboli to the brain.1

The chest x-ray film may show single or multiple small or large lesions,4 often resembling inflammation or a neo-

**FIGURE 1.** Contrast-medium-enhanced CT appearance of the suspected lung mass. The lesion (arrow) appears solid, without visible connection to pulmonary vasculature.
plasm. Rapid change in radiographic appearance might be a clue to a mycotic aneurysm. The cardiac shadow may appear triangular (the shadow of Labry and Bordet) due to rotation of the heart by the dilated pulmonary artery. On fluoroscopy, one might see a pulsation known as Pezzi’s sign or the “hilar dance.” Echocardiography may sometimes detect a PAA. While angiography has been the gold standard of diagnosis, CT and magnetic resonance imaging have recently become important alternatives. With CT, it may be necessary to time the injection of contrast medium to fill the pulmonary vessels at the moment they are imaged. A pulmonary artery aneurysm may exhibit slow emptying of contrast medium because of the loss of elastic tissue.

Corrective procedures for PAA’s have included resection, lobectomy, aneurysmorrhaphy, or banding. Embolotherapy with particulate matter or balloons is an option if the lesion is peripheral.

The prognosis of PAA is not clear. Some estimate that up to one third of patients with PAA die of rupture. Others point out that the natural history is hard to determine, since one may not know the age of an aneurysm at the time of detection. Some PAA’s have gone 3 to 17 years without rupture. Myotic PAA’s secondary to pneumonia have presented with rupture during the acute infection and as an incidental finding approximately 5 decades after the presumed infectious insult. Hemoptyis usually indicates an unstable aneurysm.

The case reported here shows how the diagnosis of PAA easily may be overlooked. In this case, pneumonia was the only clue associated with PAA, and conventional imaging supported the diagnosis of a solid mass. While PAA’s were on occasion been mistaken for a solid mass, the case reported here is unusual in that even CT failed to reveal the vascular origin of the mass. The most important factor in diagnosis may be a high degree of suspicion. In the postantibiotic era, when major causes of PAA such as tuberculosis and syphilis are less common, it is still important to remember PAA in the differential diagnosis of a lung mass.

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Nephrobronchial Fistula and Lung Abscess Resulting From Nephrolithiasis and Pyelonephritis*

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There are multiple etiologies reported as causes of lung abscess; however, this differential rarely includes intra-abdominal abnormalities other than extension of a hepatic process. We describe a patient who was found to have a lung abscess and empyema resulting from the development of a nephrobronchial fistula secondary to nephrolithiasis and pyelonephritis. The patient had no urinary symptoms or known abdominopelvic infection and the etiology of lung abscess was only incidentally discovered after chest CT revealed extension of pleural fluid below the diaphragm.

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Key words: lung abscess; nephrobronchial fistula; pyelonephritis

Lung abscess and empyema are unusual complications of nephrolithiasis and pyelonephritis. Reviews of lung abscess, including a comprehensive analysis by Perlman and colleagues, frequently do not even mention urologic or renal disease as predisposing factors. We report a case of a patient who presented with fever and a productive cough and was found to have a lung abscess and empyema secondary to a nephrobronchial fistula from asymptomatic nephrolithiasis with pyelonephritis.

CASE REPORT

The patient was a 45-year-old healthy woman who noted the onset of a dry cough and temperatures to 39.4°C 2 months prior to hospital admission. These symptoms resolved spontaneously but recurred 1 month prior to hospital admission; the patient had a cough productive of thick brown sputum and night sweats. An outpatient chest radiograph (CXR) showed right lower lobe consolidation and the patient was treated with 14 days of ciprofloxacin. Sputum production resolved, but the fevers persisted and she was...

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Selected Reports

CXR=chest radiograph

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