pends upon the clinical setting. In our patient, the following factors favor the inhalation of a toxic substance as the cause for alveolar hemorrhage: her age and race, the temporal relationship of alveolar hemorrhage with frequent cocaine inhalation, and the presence of a significant peripheral eosinophilia.

Cocaine inhalation may result in alveolar hemorrhage through either of two mechanisms: vasoconstriction of the pulmonary circulation resulting in anoxic cell damage or by a direct toxic effect. Cocaine blocks the presynaptic reuptake of the neurotransmitters dopamine and norepinephrine, leading to severe vasoconstriction.

Vasoconstriction of the pulmonary vascular bed following cocaine inhalation may result in epithelial or endothelial cell damage and precipitate alveolar hemorrhage. Alternatively, the alveolar epithelium may be directly injured by the inhalation of toxic substances with subsequent involvement of the alveolar basement membrane. Inhaled drugs associated with alveolar hemorrhage include volatile hydrocarbons, trimellitic anhydride, d-penicillamine and lymphangiogram dye.

Although contaminants are commonly present in street-purchased cocaine, the most common adulterants (talc, mannitol, lactose, tetracaine, lidocaine, procaine) have not been associated with pulmonary hemorrhage.

Previous reports of respiratory complications from cocaine abuse consisted of individuals who had administered the drug by the nasal or intravenous routes. Although reports describing the pulmonary complications of freebase inhalation are limited, 25 percent of these individuals have respiratory complaints. The most frequent problems experienced are dyspnea (63 percent), cough (58 percent), cough with bloody or black sputum (34 percent) and ill-defined chest pain (25 percent).

Two recent reports described reductions in carbon monoxide diffusing capacity in chronic cocaine smokers. Weiss et al. reported two individuals with persistent reductions in their diffusing capacities even after abstaining from cocaine for two weeks. In a larger series by Itkonen and coworkers, 58 percent (10/19) of consecutively studied freebase cocaine users had diffusing capacities which were less than 70 percent of predicted. Both groups of authors proposed that the reduced diffusing capacities might be secondary to cocaine-mediated vasoconstriction of the pulmonary vascular bed.

Although the temporal relationship of freebasing cocaine and developing alveolar hemorrhage with eosinophilia remains circumstantial, we know of no other explanation for this individual's pulmonary hemorrhage. The rarity of alveolar hemorrhage previously reported with cocaine abuse suggests that it may be unique to the inhaled route, that host factors are important, or that pulmonary hemorrhage is rarely considered as an explanation for hemoptysis in these individuals. During the current epidemic of cocaine inhalation, further investigation is needed to define the true incidence and mechanism of cocaine-induced alveolar hemorrhage.

ACKNOWLEDGMENTS: The authors wish to thank Dr. Robert Van Wesep for preparing the photomicrographs, and Ms. Anne Cyr for secretarial assistance.

REFERENCES


9 Zerkir EL, Novey JH. Cocaine free base use. J Psych Drugs 1982; 14:311-19


12 Zerkir EL, Novey JH. Cocaine free base abuse: A new smoking disorder. J Psych Drugs 1982; 14:321-23

An Unusual Complication of Left Ventricular Pseudoaneurysm: Hemoptysis

Aanindra Jain, M.D.; Neil E. Strickman, M.D.; Robert J. Hall, M.D.; and David A. Ott, M.D.

Left ventricular aneurysm is a common sequela of anterior myocardial infarction. At the time of coronary artery bypass grafting, resection of this aneurysm is frequently undertaken to alleviate symptoms of heart failure and/or refractory ventricular tachycardia. Complications related to aneurysmectomy are uncommon. We describe an unusual patient who presented with hemoptysis related to the formation of a pseudoaneurysm which communicated with the lung parenchyma. The etiology of the pseudoaneurysm formation was an indolent, slow-growing infection.

Aneurysm of the left ventricle is a commonly recognized complication of transmural myocardial infarction. A less frequent complication is the formation of a pseudoaneurysm. Pseudoaneurysms have also been reported as rare complications of cardiac surgery. We describe the findings on two-dimensional echocardiogram, gated radionuclide ventriculography and surgery in a patient with a pseudoaneurysm after aneurysmectomy who presented with hemoptysis. Infection was the etiology for the formation of the pseudoaneurysm.

*Cardiac Catheterization Laboratory, University of North Carolina, Chapel Hill.
†Clinical Assistant Professor of Medicine, Baylor College of Medicine, Texas Heart Institute, Houston.
‡Medical Director, Texas Heart Institute, Houston.
||Associate Surgeon and Clinical Assistant Professor, Texas Heart Institute.

Reprint requests: Dr. Jain, Room 9, 2nd Floor, Old Clinic Building, North Carolina Memorial Hospital, Chapel Hill 27514

CHEST / 93 / 2 / FEBRUARY, 1986 429
of the pseudoaneurysm and resultant left ventriculo-pulmonary fistula leading to hemoptysis.

**Case Report**

A 65-year-old woman with a history of anterior myocardial infarction with the development of a true left ventricular aneurysm had undergone surgical plication of the aneurysm and saphenous vein bypass grafting to the right coronary artery in October, 1982. She was asymptomatic for one year after surgery. She then developed chest and scapular pain with hemoptysis. Her physical examination and chest x-ray film were unremarkable. She was treated for two weeks with antibiotics for presumed bronchitis, with no change in symptoms. She then underwent bronchography, which also was unremarkable. A repeat chest x-ray examination three months later showed massive enlargement of the heart. Cardiac catheterization was performed which demonstrated a narrow communication from the left ventricular apex to an extracardiac sac. This was consistent with a pseudoaneurysm. She was referred to The Texas Heart Institute for surgical removal of this pseudoaneurysm.

Physical examination was remarkable for a diffuse cardiac impulse. A grade 3/6 holosystolic blowing murmur was audible over the entire precordium with a soft early diastolic murmur at the apex. The ECG showed normal sinus rhythm with evidence of remote anterior myocardial infarction. The chest x-ray film revealed an enlarged cardiac silhouette with blunting of the left costophrenic angle.

Two-dimensional echocardiogram was performed using an ATL sector scanner interfaced with a Panasonic video recorder. Adequate echocardiographic images were obtained in multiple views. Apical two- and four-chamber views best demonstrated two large echo-free spaces which communicated with the left ventricle through a narrow channel at the apex (Fig 1).

Gated radionuclide blood pool images were obtained using in vivo labeling of red blood cells with technetium 99m. Images were obtained in anterior and 40° left anterior oblique and left lateral views. The calculated ejection fraction was 24 percent. A large noncontractile chamber, two times the size of the left ventricle, was best seen in the 40° left anterior oblique position (Fig 2). A narrow neck was visualized at the apex through which the left ventricle communicated with the pseudoaneurysm.

The combination of two-dimensional and radionuclide blood pool imaging provided the location of the pseudoaneurysm. These images were used to direct the surgical approach. After careful dissection and identification of the pseudoaneurysm, the patient was placed on bypass using the standard technique. An 8 cm mass was found at the apex which was adherent to the left lower lobe and the diaphragm. There was an opening between the Teflon felt strips and the pseudoaneurysm and the lung. Though the tissue was friable, no gross pus was expelled from this cavity. Pathologic evaluation disclosed multiple microabscesses, the cultures of which grew Peptostreptococcus. She was treated with intravenous vancomycin for two weeks and then oral penicillin. Her postoperative course has been uneventful.

**Discussion**

Ventricular pseudoaneurysms are found most often following acute myocardial infarction. Our patient demonstrates late formation of a pseudoaneurysm following repair of a left ventricular aneurysm. Infection due to indolent organism was implicated as the etiology. Review of the literature revealed four previous case reports of pseudoaneurysms following aneurysmectomy. Love et al also reported a patient with pseudoaneurysm after cardiac surgery. This pseudoaneurysm was at the Teflon-felt pledges used for left ventricular venting. In all of these cases infection involving the Teflon felt pledget was found.

Hemoptysis is a rare finding in patients with pseudoaneurysm and it indicates the formation of a ventriculopulmonary fistula. To date, there has been only one previous report of this unusual presentation. Infection at the site of previous surgical repair was also implicated in the formation of pseudoaneurysm and ventriculopulmonary fistula. Since surgical repair can be very successful, a ventriculopulmonary fistula should be considered in any patient with previous history of aneurysmectomy who presents with hemoptysis. Two-dimensional echocardiography and radionuclide blood pool imaging can readily identify pseudoaneurysms of the left ventricle.

**Acknowledgment:** We gratefully acknowledge the technical and secretarial assistance of Sharon Powell.
REFERENCES

5 Bevelaqua FA, Culliford AT. Chronic hemoptysis secondary to infected pseudoaneurysm. NY State J Med 1983; 83:87-9

Transbronchial Mediastinal Cystography*

Pál Barzó, M.D.

This article demonstrates a new method applied to two patients suffering from a subcarinal, mediastinal cyst, which, however, remained undetected by routine roentgenographic tests. In the first case, transbronchial needle aspiration was applied to remove the content of the cyst and injecting an x-ray contrast material (Endocistobil) for contrast roentgenography, whereas in the second patient the same x-ray contrast substance was injected by using an ultrathin catheter introduced through an opening which connected the cyst with the bronchial system. This method represents progress in the preoperative diagnosis of subcarinal mediastinal cysts.

The recognition of mediastinal cysts may be difficult, if on a routine chest x-ray film it is projected in the central shadow. The cysts can be judged sufficiently well on the basis of noncontrast computed tomography (CT); nevertheless, the size, the structure, the position, and the relationships of them to the surrounding organs may be better revealed when using contrast roentgenography. Zimmer et al., performed such studies by a percutaneous puncture, and we have introduced the transbronchial approach for mediastinal cystography. Transbronchial cystography is justified if the suspected cyst and wall of the bronchus are adjacent to each other. If the internal space of the cyst is not opened toward the bronchial lumen, it can be filled with x-ray contrast substance through a needle puncture, and if it is, the same task can be performed by using a catheter through the communicating opening.

CASE REPORT

Patient I was a 27-year-old man hospitalized for gradually developing dyspnea, fever, and some retrosternal pain. The results of physical examination were normal. The routine AP chest roentgenogram displayed a slight widening to both sides at the height of the bifurcation (Fig 1). Bronchoscopy revealed a considerably flattened carina. The posterior wall of the trachea and both main bronchi, as well as the medial wall of the intermediary bronchus, were considerably protruded. The size of the bronchial lumen was reduced to about one third. On the site of this protrusion, transbronchial needle aspiration was performed and about 80 ml of a turbid, debris-containing fluid was obtained. Microscopic and bacterial cultures showed that this fluid was sterile; however, it was rich in fibrin, and contained a few neutrophils and lymphocytes. The needle aspiration reduced the compression symptoms only temporarily; therefore, it was repeated again after one week. This time, however, after having performed the aspiration, 16 ml of an intravenously used x-ray contrast substance (Endocistobil) was injected into the cyst (Fig 2).

*From the Department of Pulmonology and Bronchoscopy, Department of Pathology, County Hospital, Miskolc, Hungary.