The histologic features of UIP have been recognized in association with collagen vascular diseases, such as rheumatoid arthritis and polymyositis or dermatomyositis. However, the histopathologic changes in the lung in primary SJS are poorly documented. To our knowledge, apart from a description of two cases of BOOP, the association between UIP and primary SJS has not been previously

The use of new diagnostic techniques, such as BAL, assists in detecting subclinical forms of lung diseases, such as lymphocytic alveolitis, a condition predisposing to LIP, or lymphoproliferative disorders in SJS. In the present study, the pulmonary pattern on the chest roentgenogram and CT scan may have been interpreted as "a reticulomacular shadow with honeycomb appearance," typically seen in cases with UIP, or occasionally observed in patients of LIP. On the other hand, bilateral basal micronodular densities are also seen in patients with BOOP. However, examination of BAL fluid in our patient revealed lymphocytosis with a reduced ratio of CD4/CD8, accompanied by a slight increase in neutrophils and eosinophils, suggesting the presence of BOOP or LIP. To establish the exact diagnosis, open-lung biopsy had to be performed in this patient. Histopathologic examination of the lung tissue confirmed the presence of UIP in association with primary SJS, although these two rare disorders may have been only coincidentally associated. If transbronchial lung biopsy were performed in this case, a diagnosis of LIP may have been made since the histologic features of UIP include the presence of dense, pleomorphic interstitial cellular infiltrates, such as lymphocytes and monocytes. This implies the possible presence of undetected UIP in SJS patients reported previously to have interstitial pneumonia or fibrosis or LIP.

Corticosteroids and immunosuppressive agents, such as chlorambucil and cyclophosphamide, have been used, with some benefit in SJS patients with pulmonary complications. However, no controlled studies are available to demonstrate the efficacy of any of these therapeutic modalities. In addition, it has been reported that UIP is associated with 66% mortality and a mean survival of 5.6 years, and that corticosteroid therapy results in improvement of only 11.5% of UIP patients, while the condition of 69.2% of patients worsened. This is in contrast to the improvement observed in most patients with idiopathic BOOP in response to corticosteroid therapy. However, patients with BOOP in the setting of a collagen vascular disease appeared to have a worse prognosis, as 50% died. One case of BOOP associated with primary SJS was successfully treated with corticosteroid therapy, but the other died of superimposed diffuse alveolar damage. Based on these observations, we elected to treat our patient conservatively. A close follow-up indicated that she was in a stable condition for up to 3 years.

In conclusion, we described the first case of primary SJS with UIP. The ultimate impact of interstitial pneumonia, such as UIP, on patients with SJS remains to be clarified. However, the attending physicians should be aware of these rare complications.

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REFERENCES


Intermittent Cocaine Use Associated With Recurrent Dissection of the Thoracic and Abdominal Aorta*

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Acute aortic dissection has been reported with the use of cocaine. We report a case of intermittent cocaine use spanning nearly 5 years and leading to recurrent dissection and extension of the false lumen. The

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patient repeatedly declined surgical correction. Management involved aggressive pharmacologic blood pressure control, close monitoring, and encouragement to enter drug rehabilitation. 

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Chest pain is a frequent complaint among cocaine users. Previously reported cases of cocaine-induced chest pain include myocardial ischemia or infarction, myocarditis, pneumomediastinitis, and pulmonary disorders with little recognition of aortic dissection. With the increasing popularity and availability of cocaine, the association between aortic dissection and cocaine abuse has been reported, however, a high index of suspicion remains necessary to avoid delayed or incorrect diagnosis. In order to emphasize the importance of recognizing dissecting aortic aneurysm as a cause of chest pain in this setting, we are reporting, to our knowledge, the first case of recurrent aortic dissection associated with intermittent chronic cocaine use.

Case Report

A 41-year-old African-American man with a history of hypertension and chronic renal insufficiency attributed to uncontrolled hypertension and IV heroin use complained of severe substernal chest pain radiating to the right flank. Blood pressure was 240/160 mm Hg. Pulse pressure was diminished in the lower extremities. Papilledema was present bilaterally. Serum creatinine level rose...
from a baseline value of 2.3 to 7.8 mg/dL. Serum drug screening detected cocaine metabolites. An ECG showed left ventricular hypertrophy and early repolarization. A chest x-ray film revealed atherosclerotic changes and widening of the descending aorta (Fig 1, top left). A transthoracic echocardiogram confirmed the presence of an intimal flap in the descending aorta. Treatment was initiated with sodium nitroprusside to which was added IV labetalol hydrochloride.

Because of an allergy to radiographic contrast medium and renal dysfunction, an MRI with multiple T₁ and T₂ weighted axial images was performed which showed a type 3 dissection of the thoracic aortic originating distal to the left subclavian artery with extension of the intimal flap to the level immediately proximal to the bifurcation of the iliac arteries (Fig 2). Renal size was at the lower limits of normal and the renal arteries displayed atherosclerotic changes. Renal scan showed diminished but equal renal perfusion.

The patient refused surgical intervention. Blood pressure was stabilized at 130 to 140/70 to 80 mm Hg with verapamil, clonidine hydrochloride, atenolol, and minoxidil. Renal function gradually returned to baseline values.

The patient remained stable for 6 months during which sporadic toxicologic screening was negative for the presence of cocaine. Over the ensuing 4 years, he was admitted 4 times for recurrent episodes of malignant hypertension. Each time, cocaine and its metabolites were detected. Each episode required aggressive blood pressure management with nitroprusside and IV labetalol. Acutely, blood pressure control was more easily achieved as cocaine and its metabolites were fully excreted. During this 4-year period, the serum creatinine level rose to 4.0 mg/dL.

A chest x-ray film revealed gradual enlargement of the aorta (Fig 1). At the time of the third episode, MRI demonstrated dissection of the ascending aorta with involvement of the aortic valve leaflet and enlargement of the descending aorta, measuring 7 cm at the level of the kidneys (Fig 2, bottom). A transesophageal echocardiogram confirmed extension of the dissection into the aortic valve leaflet.

Shortly thereafter, he was admitted to the hospital elsewhere for shortness of breath. An aortogram demonstrated a thoracic aortic aneurysm dissecting in spiral fashion into the abdomen to the level of the right renal artery which was supplied by a false lumen. Renal perfusion was deemed to be adequate as evidence by contrast within the right renal pelvis. The aortogram was complicated by acute renal failure with the serum creatinine level peaking at 9.2 mg/dL, the patient's level returned to baseline at 4.0 mg/dL.

The patient continued to opt for medical treatment and declared an advanced medical directive for no resuscitation. Chronic management of his blood pressure obligate the use of additional high-dose antihypertensive medications including clonidine, atenolol, nifedipine, enalapril maleate, and minoxidil.

Fifty-one months following his initial dissection, he was admitted for chest pain, epigastric pain, and hematemesis. His course was marked by progressive hypotension and bradycardia. The patient eventually suffered erosion of the aorta into the esophagus and died of exsanguination.

**Discussion**

**Pathophysiology**

This patient's multiple admissions for uncontrolled hypertension exacerbated by use of cocaine and leading to the development and progression of dissecting aortic aneurysm underscore the basic principles guiding its pathophysiology. Aortic dissection begins with a tear in the intimal layer of the aortic wall followed by formation and propagation of a subintimal hematoma. If left untreated, the dissection ruptures. While the hematoma propagates, the flow of any major artery arising from the aorta may be reduced. The hematoma may also extend into the base of the aortic valve leading to aortic regurgitation. This process is dramatically illustrated in our patient's MRI studies that show involvement of the aortic valve and layers of intramural clot dating the multiple dissection episodes much like the rings of a tree.

The intimal tear originates from preexisting degeneration of the media causing decreased cohesiveness between the layers of the aortic wall. A combination of repeated lateral motion of the aorta related to the contracting heart and the hemodynamic shear forces of the bloodstream enhanced by hypertension act simultaneously on the wall of the aorta leading to the formation of an intimal tear and dissection of the hematoma through the media. The advancement of the hematoma is influenced by the magnitude of the systolic pressure and the steepness of the pulse wave propagation, (dP/dt)max, generated by each cardiac cycle.

Cocaine exerts powerful vasoconstrictive actions and causes intense stimulation of the sympathetic nervous system. Cocaine acts directly on the vasomotor centers to produce high blood pressure and tachycardia. In addition, cocaine blocks the reuptake of norepinephrine at the presynaptic level. As a result, norepinephrine accumulates at the postsynaptic receptor site causing intense sympathetic stimulation. By simultaneously elevating arterial pressure, accentuating cardiac chronotropy and inotropy, and inducing intense vasoconstriction, cocaine creates a milieu conducive to the development and propagation of aortic dissection. The scarcity of reports of cocaine-associated aortic dissection is therefore somewhat remarkable.

**Clinical Presentation and Classification**

The clinical hallmark of aortic dissection is severe chest pain affecting more than 90% of patients. Usually the pain is sudden in onset, excruciating, and constant. Often it is described as a "tearing" or "ripping" sensation between the scapulae.

Aortic dissection is classified depending on the location of the intimal tear. At the time of the first episode, our patient's aneurysm was categorized as a type 3 dissection, since it spared the ascending aorta and the arch. Subsequently, the dissection progressed to a type 1, also known as type B. This differentiation is clinically important because any dissection that involves the ascending aorta can be lethal; hence surgery is the treatment of choice. Too few reports of dissection due to cocaine exist to permit identification of distinguishing clinical features or predilection for anatomic location.

We speculate that chest pain in a known cocaine user may either be misattributed or solely attributed to other causes, such as cardiac ischemia. Indeed, in 1 to 2% of patients with aortic dissection also have sustained myocardial infarction, which was not the case in this patient. In addition, Cohle and Li reported a fatal case of aortic dissection leading to dissection of the coronary arteries. Failure to diagnose a dissection may lead to inadvertent and life-threatening use of thrombolytic therapy.

Most patients exhibit hypertension during dissection. The presence of cocaine and its metabolites further exacerbates the elevated blood pressure. As the cocaine levels decrease,
Figure 2. MRI at the level of the aortic outflow tract. Top: first admission. Demonstrates the true aortic lumen and a hematoma within the false lumen of the descending aorta. Bottom: from admission 31 months later. Demonstrates the true lumen, the most recent hematoma, and two organized hematomas from previous dissections in the descending aorta. Also shows extension of the dissection into the aortic outflow tract and the aortic valve leaflet.

the hypertension may be more easily controlled and vigilance should be exerted to avoid hypotension. This was clearly demonstrated in this case, since blood pressure management became easier as the cocaine metabolites dissipated from the circulation. Hypotension may also indicate more ominous complications such as rupture, pericardial tamponade, myocardial infarction, or acute aortic regurgitation with cardiac failure as in the immediate premorbid presentation of our patient.1

Despite recurrent dissections that involved more than 75% of the circumference of the aortic wall, our patient surprisingly displayed no neurologic deficits. As many as 15 to 20% of patients experience loss of consciousness or focal deficits due to impaired blood flow via the brachiocephalic vessels or involvement of the spinal arteries.12 In the current situation, the dissection’s spiraling path apparently allowed it to miss these major arterial orifices.

Diagnostic Measures

Early detection is crucial to reducing mortality. Routine laboratory testing is not helpful. Confirmation of dissection can be accomplished by imaging techniques including chest x-ray film, thoracic and transesophageal echocardiogram, CT scan, MRI, or angiography or all of these. The choice of study depends on the stability of the patient as well as the availability and clinical utility of each test to provide detailed information while posing minimal risk to the patient.13 Although the chest x-ray film may demonstrate widened mediastinal structures, it seldom provides definitive diagnosis. Transesophageal echocardiography possesses a sensitivity of 99% and a specificity of 98% (confirmed by CT scan or angiography) and can be done at the bedside. Unfortunately, false-positives can occur and the modality is operator-dependent and not universally available.14,15
In contrast, CT scanning is widely available. Its value as an imaging technique is similar to that of angiography. The relative sensitivity and specificity of CT scanning are 83 and 100%, respectively, compared with 88 and 94% for angiography. CT scanning is less invasive than angiography, but both require the use of contrast agents which posed considerable risk to our patient.

MRI is rapidly gaining usefulness though not widely available. With the addition of turbo-FLASH dynamic magnetic resonance angiography the tear site and the degree of flow within the false lumen can be ascertained even when spin echo and cine MRI techniques fail. For any given patient, the choice of diagnostic modality should optimize the speed and accuracy of diagnosis while placing the patient at minimal risk.

Management

The treatment of aortic dissection comprises intensive drug therapy and surgical correction of the vascular defect. Drug therapy is aimed at reducing the hypertension and shearing forces which contribute to the propagation of the dissection. A combination of sodium nitroprusside and a β-blocker is recommended for initial stabilization of the pressure. IV labetalol is a useful adjunct for treating acute hypertensive crisis. When β-blockade is contraindicated, ganglonic blockers such as trimethaphan camysylate or a calcium channel blocker with minimal tachycardic or positive inotropic effects may be used. Angiotensin-converting enzyme inhibitors can be of particular value but should be used with caution and close monitoring of renal function in the setting of renal artery involvement.

Our patient survived 20 months after his dissection extended into the ascending aorta and aortic valve leaflet without surgical intervention, but this was a very atypical clinical course. Operative intervention is indicated for all acute type A dissections, chronic type A dissections if there is significant aortic regurgitation, or localized aneurysm. Without surgical intervention, type A dissections display a 30-day mortality in excess of 90%. Prognosis is poor regardless of type of treatment for patients with myocardial infarction or stroke. Overall 10-year actuarial survival is 40%. Late complications include dissection, progressive aortic regurgitation, and true aneurysm formation. The risk of dissection is high: 13% at 5 years and 23% at 10 years. There are no data as to the impact of cocaine use on dissection and to our knowledge this is the first case of such a report.

After appropriate acute medical and surgical management, survivors of aortic dissection should continue to receive antihypertensive treatment to reduce the shear stress on the aortic wall and be followed assiduously. Serial chest x-ray films and follow-up CT scans or MRI are invaluable tools to monitor size and shape of the aneurysm. In any event, cocaine should be avoided.

Conclusions

In conclusion, this particular case is of note because there has been no prior report of recurrent aortic dissection in association with habitual, intermittent cocaine use. It emphasizes the use of aggressive medical management when surgical intervention is not possible. Moreover, it demonstrates the importance of abstinence from cocaine in attempting to control blood pressure and thus halt the progression or recurrence of dissection. This case also demonstrates the utility of MRI in the diagnosis and monitoring of dissection when other methods may pose greater risk to the patient with underlying renal failure.

References