Thoracic component is removed. In addition, any undue traction on the thoracic component can lead to spinal cord damage. It is, therefore, recommended that a combined single-staged thoracic and vertebral procedure be performed.

**Conclusions**

Although the differential diagnosis of this lesion was initially quite large and included developmental abnormalities, infectious and neoplastic etiologies, and diaphragmatic herniae, the roentgenographic and clinical signs permitted a considerable narrowing of the possibilities. Plain-film roentgenographic techniques may manifest certain characteristics favoring nerve-sheath tumors over ganglion-series tumors. The CT scanning or MRI is invaluable in assessing vertebral and intraspinal involvement in posterior mediastinal lesions and should be a part of the evaluation in any such lesion. This allows assessment of the vertebral component and serves to guide the decision for possible surgery by thoracic, orthopedic, or neurosurgeons. In so doing, many of the complications of the multistaged procedure can be avoided.

Early detection is important in preventing neurologic complications of intraspinal disease; long-term survival is the rule, with morbidity related to direct compressive or irritative effects of the mass. Despite extensive preoperative evaluation, diagnosis often eludes determination until tissue is obtained at thoracotomy.

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**Cardiac Arrest during Dipyridamole Imaging**

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A case of cardiac arrest and subsequent acute myocardial infarction occurring during thallium-201 imaging with oral dipyridamole augmentation is presented. Previous reports emphasizing the safety of this procedure are briefly reviewed and a recommendation for close hemodynamic and arrhythmia monitoring during the study is made. Large doses of oral dipyridamole may be contraindicated in patients with unstable angina.

Thallium-201 myocardial perfusion imaging is widely used to evaluate patients with suspected coronary heart disease. Immediately after injection of thallium-201, regional myocardial uptake of the isotope reflects regional coronary blood flow. The presence and size of a reversible underperfused zone and of an infarcted zone have important diagnostic implications. In an effort to increase the sensitivity of this method for the detection of functionally significant coronary artery disease, thallium studies are usually performed after near-maximal exercise, so that flow differences are increased between zones of ischemia and areas of normal perfusion. However, many patients have physical limitations which preclude adequate exercise in conjunction with thallium imaging. In these patients, pharmacologic coronary vasodilation using dipyridamole has been shown to offer a satisfactory alternative to exercise for the detection of ischemia and infarction. Although initial studies were done using intravenous dipyridamole, the intravenous preparation is still an investigational drug and is not available for use in most community hospitals. More recently, oral dipyridamole has been shown to be a satisfactory alternative, yielding almost equal diagnostic reliability when used in conjunction with thallium-201 imaging.

Studies using both intravenous and oral forms of dipyridamole have shown a high degree of safety. Although ventricular premature beats may occur with some frequency, in well over 600 cases combined from the recent literature only one case of ventricular fibrillation and no case of acute myocardial infarction have been reported in conjunction with this study. The frequency of angina pectoris has ranged from 16 to 41 percent, and in all cases, angina has been relieved promptly after intravenous administration of aminophylline. Recently, we evaluated a patient who sustained a cardiac arrest and acute myocardial infarction in the course of an oral dipyridamole-thallium study. To our knowledge, no previous occurrence of acute myocardial infarction has been reported in this context.

**Case Report**

The patient is a 71-year-old woman who presented with a three-week history of atypical chest and abdominal pain. The pain was described as "boring" in quality, was located in the lower lateral left chest and left upper quadrant of the abdomen, occurred two or three times...
times a week, and lasted about five minutes on each occasion. At no
time did the pain persist more than five minutes. Episodes of pain
usually occurred at rest, and on one occasion during the night, and
were sometimes associated with nausea. The patient had a 30-year
history of well-controlled mild hypertension, and at the time of the
examination she was taking nadolol (120 mg/day) and bendroflumethiazide
(5 mg/day) as her only medications. Physical examination showed no significant abnormalities. Results of x-ray
examination of the esophagus and stomach were normal. Resting
electrocardiogram showed 1 to 2 mm of symmetrical T wave
inversion in the precordial leads. Previous electrocardiogram eight
years before had been normal. In order to better evaluate her
symptoms, a standard treadmill test was attempted, but, after
completing stage 1 of a modified Bruce protocol with no electrocar-
diographic evidence of ST-segment depression, she could not
exercise further because of “arthritis” in her ankles. A resting
thallium-201 scan with oral dipyridamole augmentation was then
ordered.

The patient came to the radioisotope department in the fasting
state, and, in accordance with our standard protocol, was given 300
mg of dipyridamole by mouth. Because of the very high degree of
safety previously reported, continuous monitoring for arrhyth-
mas was not done. After 45 minutes, she walked briskly in the depart-
ment for five minutes, and then 2.9 millicuries of thallium-201 were
given intravenously. She began walking again, but after an additional
three minutes, she began to complain of chest pain. She was
immediately placed on the scanning table, and within moments had
a cardiac arrest. The initial rhythm strip obtained showed asystole.
As standard cardiopulmonary resuscitation was begun, she was given
intravenous aminophylline, 250 mg initially and then an additional
250 mg over the next 30 minutes. Normal sinus rhythm was restored
after 30 minutes, and the remainder of her hospital course was
uneventful. Sequential electrocardiographic and enzyme analysis
indicated definite acute transmural anterior infarction. Resting
myocardial imaging was performed two hours after the cardiac arrest
and showed a perfusion defect in the apical-inferior segments of the
left ventricular wall. Two weeks later, coronary angiography demon-
strated complete occlusion of the mid-portion of the left anterior
descending coronary artery, with only minor disease elsewhere in
the other coronary arteries.

DISCUSSION

Even in the absence of electrocardiographic abnormalities,
potential evidence of ischemia is often obtainable by
dipyridamole-thallium scanning, and these studies can usually
be done with a high degree of safety.7 However, whenever this
technique is used to demonstrate radiologic evidence of ischemia,
there is a risk that symptomatic ischemia may also be provoked.
Two mechanisms have been proposed to account for this effect of
dipyridamole. Dilatation in normal coronary vascular beds may result in increased flow
through the normal beds at the expense of decreased flow through
another coronary bed which is already maximally
dilated by ischemia. This shunting of blood away from
ischemic areas has been termed a “coronary steal.” In
contrast, administration of dipyridamole may also cause
significant peripheral vasodilatation, and the resulting hypo-
tension would reduce diastolic flow through the coronary
generally. Keltz and co-workers recently reported four
patients who developed angina and electrocardiographic
evidence of ischemia after receiving relatively small doses
(75-400 mg) of oral dipyridamole before undergoing coronary
bypass surgery. In each of these four cases, the ischemia
subsided slowly after the patients were given sublingual
nitroglycerin. Sublingual nitroglycerin has a peripheral
vasodilatory effect, and although blood pressure data are not
available from the report of Keltz et al, the clinical improve-
ment seen after this drug was administered to this group of
patients might be at least indirect evidence that the “coro-
nary steal” mechanism was the predominant effect of the
dipyridamole.

The fact that all four of the patients Keltz et al had
“unstable angina” further underscores the hazards of giving
large doses of oral dipyridamole to patients in this clinical
group. Certainly, but in retrospect, the patient we have
discussed in this report had “unstable angina.”

In conclusion, despite being a widely available and reliable
alternative to exercise stress testing in the evaluation of
patients with possible coronary artery disease, oral
dipyridamole-thallium imaging may occasionally unmask
ischemia of so severe a degree that catastrophic ventricular
arrhythmias and acute myocardial infarction may result.
Based on increasing experience, and illustrated by the case
presented, we recommend that appropriate caution be used
when these studies are performed. As in standard exercise
stress testing, this should include close monitoring of vital
signs and electrocardiographic observation for arrhythmias.
In addition, this test should be considered as relatively
contraindicated in patients with a clinical pattern of unstable
angina.

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