Acute Traumatic Dissecting Aneurysm of the Abdominal Aorta

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ACUTE transection and traumatic aneurysm of the descending thoracic aorta due to rapid deceleration is a well recognized entity. Fracture of the intima, subintimal hematoma and thrombosis is sometimes seen in peripheral arteries following nonpenetrating injury. The abdominal aorta may also be injured by blunt trauma as related in the following case report, which describes fracture of the intima, acute dissecting aneurysm and occlusion of the abdominal aorta in an elderly man and represents the second reported instance of traumatic dissecting aneurysm of the abdominal aorta.

Case Report

E. L., a 65-year-old man, was admitted to the Charity Hospital Emergency Room on 3/9/69, 12 hours following an automobile accident in which he was a driver; he had not been wearing a seat belt at the time of injury. The patient had been admitted to a local hospital for initial observation and was later transferred because of inability to move his legs.

Blood pressure, pulse, respiration and temperature were normal, but the patient appeared weak, agitated and apprehensive. His legs were ischemic, mottled, cold and without femoral pulses. Right and left bundle branch block with mild S-T segment elevation were noted on electrocardiogram. A small amount of dark blood was aspirated from the stomach immediately following insertion of a nasogastric tube. Hematocrit was 35 per cent; urinalysis was normal. Aortogram demonstrated occlusion of the aorta just below the inferior mesenteric artery (Fig. 1).

At operation a moderate amount of retroperitoneal hematoma surrounded the aorta and extended behind the duodenum. Subadventitial hematoma was present over the anterior surface of the aorta, which was pulseless below the level of the inferior mesenteric artery. Severe atheromatous disease was apparent in the aorta and iliac arteries.

The aorta was cross-clamped just inferior to the renal arteries, and a longitudinal aortotomy disclosed a severely disrupted intima with subintimal hematoma and a flap of intima occluding the aorta. A transverse fracture of the posterior intima extended nearly circumferentially and accounted for the acute dissection (Fig. 2). Thrombosis extended throughout the terminal aorta and into the iliac arteries.

The aorta was transected above the dissection, and a dacron aortofemoral bypass was performed. During completion of the left femoral anastomosis, approximately 2 minutes following restoration of blood flow to the right femoral artery, the patient experienced sudden bradycardia, pulse rate 40 per minute. Bradycardia and hypotension were not reversed by rapid administration of blood, atropine and vasopressors, and the heart arrested. When the heart did not respond to external cardiac assistance, left anterior thoracotomy, administration of intracardiac adrenalin, isuprel, calcium chloride, and massage resulted in effective cardiac function for several minutes. The heart was found to have extensive calcification of the coronary ar-

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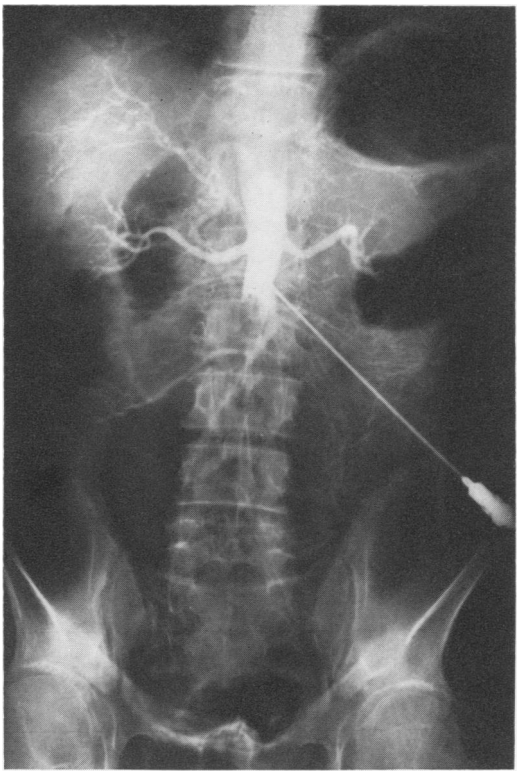

FIG. 1. Aortogram demonstrating occlusion at level of inferior mesenteric artery.

teries. A second arrest occurred several minutes later and was followed by dilatation and irreversible changes. The duodenum was finally inspected and found to be partially transected in the third portion. Necropsy confirmed the clinical findings.

Comment

Acute traumatic dissecting aneurysm of the abdominal aorta has been reported on one previous occasion. Ngu and Konstam reported a 37-year-old woman, who sustained a severe abdominal impact with a surfboard.[5] The intima of the posterior wall of the aorta, which was moderately atheromatous, was fractured transversely at the level of the inferior mesenteric artery. The dissected intima was forced against the anterior wall completely occluding the lumen and causing thrombosis of the aorta. No other injuries were present; the patient recovered.

Traumatic abdominal aortic aneurysm has been reported on two occasions, and each resulted from longitudinal disruption.[2, 7] Compression was suggested as the mechanism in each injury.

Parmley,[6] in a report of 296 cases of aortic injury caused by nonpenetraating trauma, stated that arteriosclerosis was considered to have added significantly to the traumatic lesion in only one instance, but the majority were in young men. Most injuries were transverse disruptions, but ragged, spiral or longitudinal ruptures were occasionally observed.

The mechanism of injury in the previously reported case of acute traumatic dissecting aneurysm of the abdominal aorta and in the present patient was compression. Both patients sustained transverse fractures of the intima at the level of the inferior mesenteric artery with intimal disruption, occlusion and thrombosis. This unusual injury would most likely occur following compression injuries among patients with severe arteriosclerosis in the abdominal aorta.

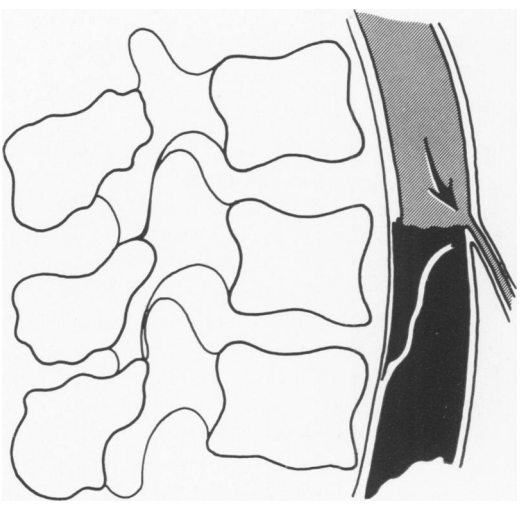

FIG. 2. Diagram demonstrating injury (fracture of posterior intima with acute dissection, intimal flap occluding aorta, and thrombosis).

Death in this patient appears related to restoration of blood flow to the right femoral artery, until which time he remained stable and tolerated operation well. Marked bradycardia, hypotension and cardiac arrest promptly followed. Reactive hyperemia,[1] metabolic acidosis,[4] release of a depressor substance from the ischemic limbs [8] and pulmonary embolism [8] have been either observed or suggested to occur following restoration of blood flow after acute aortoiliac occlusion. These or other factors, and severe coronary disease are considered contributory to death.

Summary

Acute traumatic dissecting aneurysm of the abdominal aorta has been described for the second time. An elderly man sustained blunt injury to the abdomen resulting in a transverse fracture of the intima of the aorta at the level of the inferior mesenteric artery. Acute dissection caused occlusion and thrombosis of the terminal aorta. The patient also sustained a partial transection of the third portion of the duodenum. Common features of this and the single previously reported case were: (1) compression injury of the abdomen in patients with atheroscolerotic aortas; (2) intimal fracture at the level of the inferior mesenteric artery; and (3) dissecting hematoma and occlusion of the terminal aorta.

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