

# DOWNLOAD PDF AORTIC ATHEROMATOUS DISEASE: ULCERS AND PENETRATING AORTIC ULCERS

## Chapter 1 : Penetrating Atherosclerotic Aortic Ulcer

*Disease Course. Penetrating atherosclerotic ulcer refers to an ulcerating atherosclerotic lesion that penetrates the elastic lamina and is associated with hematoma formation within the media of the aortic wall (, 1-, 3).*

Fri, 23 Mar Aortic Dissection Penetrating atherosclerotic ulcers are atherosclerotic lesions of the aorta that penetrate the internal elastic lamina and allow hematoma formation within the media of the aortic wall. The large majority of such ulcerations occur in the descending thoracic aorta, but less often they may occur in the arch or, rarely, in the ascending aorta. The ulcers may progress to form aortic pseudoaneurysms or, less often, lead to transmural aortic rupture. Those in whom penetrating atherosclerotic ulcers develop tend to be elderly and are on average about a decade older than those who present with typical aortic dissection. Most have a history of hypertension and smoking. They tend to have severe and extensive atherosclerosis; the majority have evidence of other atherosclerotic cardiovascular disease and as many as half also have a history of a preexisting abdominal or thoracic aortic aneurysm. Improved prognosis of thoracic aortic aneurysms: Diseases of the aorta. A Textbook of Cardiovascular Medicine. Familial thoracic aortic aneurysms and dissections. Aortic root dilatation in young men with normally functioning bicuspid aortic valves. Histologic abnormalities of the ascending aorta and pulmonary trunk in patients with bicuspid aortic valve disease: A prospective study to assess the frequency of familial clustering of congenital bicuspid aortic valve. Familial patterns of thoracic aortic aneurysms. Familial thoracic aortic dilatations and dissections: Identification of a chromosome 11q Yearly rupture or dissection rates for thoracic aortic aneurysms: Natural history of descending thoracic and thoracoabdominal aneurysms. The natural history of thoracic aortic aneurysms. Epidemiology and clinicopathology of aortic dissection: Gender-related differences in acute aortic dissection. Characterizing the young patient with aortic dissection: Cocaine -related aortic dissection in perspective. Chronobiological patterns of acute aortic dissection. Acute intramural hematoma of the aorta: Intramural hematoma of the aorta: Prognosis of aortic intramural hematoma with and without penetrating atherosclerotic ulcer: Penetrating ulcer of the thoracic aorta: How do we recognize it? How do we manage it?

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## Chapter 2 : Endovascular Today - Penetrating Aortic Ulcer and Intramural Hematoma (November )

*Penetrating aortic ulcers are an uncommon, but potentially life-threatening, condition arising from a disruption of the inner lining of the aorta. The process is also called penetrating atherosclerotic disease because of the association with the build-up of cholesterol and calcium into the blood vessels of the body (atherosclerosis).*

Published online Jul 6. Abstract Chest pain is a very common symptom and can be of cardiac or non-cardiac origin. It accounts for approximately 5. Penetrating atherosclerotic aortic ulcer PAU , an uncommon condition, is also a potential cause of chest pain. We here report the case of a year-old woman who presented with atypical chest and back pain. The pain persisted for 4 weeks necessitating two emergency room visits. Initial tests were non-significant including cardiac troponins, an electrocardiogram EKG , and a chest X-ray on her first visit. Upon her second visit, she underwent a computed tomography angiogram of chest with contrast which revealed a PAU with an intramural hematoma in descending aorta. The PAU was finally diagnosed with an exclusion of other chest pain causes. She was treated non-surgically with a blood pressure control strategy and pain management. After a 2-month period of smoking cessation and following the achievement of a controlled blood pressure, she felt well without chest pain. It presents mostly with chest pain or chronic back pain. We report this case as a reminder that PAU may present with a very common symptom chest pain and clinicians should be aware of uncommon chest pain etiologies. Case presentation A year-old black woman presented with chest pain for 6 days. Three weeks prior to this presentation, she was evaluated in the emergency room for similar complaint and was discharged after having normal blood and imaging tests including cardiac enzymes, electrocardiogram EKG , and chest X-ray. She denied any shortness of breath, cough, or hemoptysis. She had no previous history of rash, prior shingles, or lower back pain. She had a past medical history of hypertension and was taking amlodipine and metoprolol at home. Her family history included hypertension in both parents. She was a chronic smoker, smoking an average of five cigarettes a day for more than 20 years, but denied any alcohol or illicit drug use. On examination, she had normal pulses, a normal heart rate, and rhythm without any murmurs or gallops. There was no chest wall tenderness, abdominal discomfort or costovertebral angle tenderness, and pedal edema. A chest X-ray was unremarkable. Routine blood tests were done, which showed normal values of complete blood count, basic metabolic panel, liver function tests, TSH, coagulation profile, lipid profile, and serum cardiac troponin I cTnI.

*Penetrating atheromatous aortic ulcer (PAU) is an ulceration of atheromatous plaque extending through the intima and the media. Once considered rare, there is rising awareness of this lesion. Risk factors are male gender, old age, hypertension, smoking, and coronary disease.*

Aortic intramural hematoma IMH is an acute aortic disease, defined by the presence of hemorrhage within the aortic wall, and no evidence of intimal tear. The penetrating aortic ulcer PAU is a chronic aortic condition, defined by an ulcer-like disruption of the intima maturing within the aortic lumen. IMH usually presents with a smooth intima and some degree of atherosclerosis, whereas PAU is associated with systemic atherosclerosis and, often, a thickened intima with craters Figure 1. Stanson et al accurately described PAU as an ulceration of an atheromatous plaque that disrupts the internal elastic lamina and allows hematoma formation within the media of the aortic wall. IMH is distinguished from AD by the absence of an intimal flap. Both entities show similar mechanisms of inflammation and expression of matrix metalloproteinases and medial proliferative changes with transformation of smooth muscle cells from contractile to mutant phenotypes. Moreover, both commonly show apoptosis and medial degeneration. Another hypothesis is that IMH originates from small entry tears in the intima followed by thrombosis of these tears, making these tears difficult to detect on imaging studies. Arterial hypertension, hyperlipoproteinemia, and aortic sclerosis have shown to be predisposing features of PAU. Because all of these factors are often more present in older patients, PAU is more frequently seen in the elderly. Complicated PAU is defined by the development of aneurysms, pseudoaneurysms, dissections, or aortic ruptures. Close evaluation of PAU, by measuring both diameter and depth of the ulcer, is mandatory to prevent aortic complications. The clinical presentation of PAU is very diverse. Basically, PAUs are asymptomatic aortic lesions, identified during imaging indicated for other reasons. In this cohort, patients with PAU associated with IMH had more emergent interventions with no difference in all-cause survival at 24 months. AD presenting with a thrombosed false lumen could resemble IMH on imaging because entry tears are no longer visible. In order to differentiate between these conditions, cross-sectional imaging is considered the gold standard. The presence of pleural effusion can make the distinction between intact and disrupted adventitia challenging. However, the close relationship between the IMH and the adventitia may trigger the development of periaortic hematoma and rupture. On the contrary, acute AD with a thrombosed false lumen shows curvilinear intramural clots often missing a well-defined outer wall because of mediastinal hematoma and pleural effusions. Some investigators have shown that PAU is mainly located in the descending aorta. Differently, IMH thrombus has a smooth surface, represented by the aortic lamella, and may extend longitudinally. Occasionally, IMH may cause obstruction of an aortic side branch, resulting in end-organ ischemia and necessitating interventional therapy. Calcium-channel blockers are considered the alternative medication of choice. To normalize the blood pressure caused by stimulation of adrenergic receptors, adequate analgesic therapy should be initiated, preferably with morphine sulphate. However, the differentiation between periaortic hematoma and pleural effusion is essential because pleural effusion is not a sign of impending aortic rupture but rather a reactive fluid collection in the thoracic region. IMH located in the aortic arch or descending aorta is less likely to be associated with adverse outcomes, and conservative medical therapy might be performed. However, symptomatic PAU has a devastating natural course with progression and rupture; therefore, urgent repair is recommended. If the ascending aorta is involved, surgery is indicated. Treatment with longer endografts provides a safety margin against undertreating the intimal defect. Thus, the endograft should be anchored in the noninvolved wall above and below the intimal defect. However, due to the extensive atherosclerotic lesions involving the arch, TEVAR resulted in a higher rate of perioperative stroke 8. Although IMH originates in an acute mode, PAU is a chronic disease that can develop rapidly, both with unpredictable natural courses. PAU has various ways of presentation and an unknown incidence that could be underestimated because it often presents with a high

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occurrence of asymptomatic lesions. He has stated that he has no financial interests related to this article. Penetrating atherosclerotic ulcers of the thoracic aorta: New frontiers in diagnosis and management: From etiology to diagnostic strategies. Acute aortic intramural hematoma: The differences and similarities between intramural hematoma of the descending aorta and acute type B dissection. TEVAR for non-aneurysmal thoracic aortic pathology. Intramural hematoma and penetrating atherosclerotic ulcer of the aorta. Intramural hematoma in acute aortic syndrome; more than one variant of dissection? Acute intramural hematoma of the aorta: Penetrating atherosclerotic ulcer of the descending thoracic aorta and arch. *J Thorac Cardiovasc Surg*. Prognosis of aortic intramural hematoma with and without penetrating atherosclerotic ulcer: Acute aortic dissection and its variants. Intramural hemorrhage of the thoracic aorta: Prognosis of intramural hemorrhage compared with classic aortic dissection. Outcomes of medically treated patients with aortic intramural hematoma. Intramural hematoma of the aorta: Prognostic value of clinical and morphologic findings in short-term evolution of aortic intramural haematoma: The challenge of associated intramural hematoma with endovascular repair for penetrating ulcers of the descending thoracic aorta. Intramural hematoma and penetrating ulcers: *Eur J Vasc Endovasc Surg*. Presentation, complications, and natural history of penetrating atherosclerotic ulcer disease. Expert consensus document on the treatment of descending thoracic aortic disease using endovascular stent-grafts. Ince H, Nienaber CA. Diagnosis and management of patients with aortic dissection. Long-term follow-up of aortic intramural hematoma: Nonsurgical reconstruction of thoracic aortic dissection by stent-graft placement. *N Engl J Med*. Endovascular treatment of thoracic aortic diseases: Early and midterm results after endovascular stent graft repair of penetrating aortic ulcers. Endovascular treatment of acute aortic syndrome. Aortic branch artery pseudoaneurysms accompanying aortic dissection. *J Vasc Interv Radiol*. Late outcomes with repair of penetrating thoracic aortic ulcers: Clinical features and long-term outcome of type A and type B intramural hematoma of the aorta.

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## Chapter 4 : Penetrating Ulcer | Columbia University Department of Surgery

*Penetrating atheromatous ulcer (PAU) is a rare vascular condition that was designated by Stanson and associates as a synonymous vascular disease of the dissecting aneurysm of the aorta, but the pathophysiology, diagnosis, and management of PAU are often difficult.*

Penetrating Aortic Ulcers Introduction Ulcers. Everyone has heard of them. You know, the kind of digestive problem which results from too much stomach acid and is relieved with antacids. The kind that causes stomach pain. In the case of a gastric stomach ulcer, there is an erosion of the protective lining of the stomach which causes pain due to the deeper tissue of the wall of the stomach being exposed to stomach acid and is associated with eating spicy foods. Definition of penetrating aortic ulcers The Aorta, like the stomach, is also prone to developing ulcers. As you recall, the aorta is a blood vessel largest in the body! The aortic wall is composed of three layers: The intimal layer of the aorta refers to a thin, continuous sheet of cells, called the endothelium, which line the innermost part of the aorta. These cells are in direct contact with blood. Think of your lawn. The sod sitting on top of the dirt is similar to the endothelial layer of the aorta. Penetrating aortic ulcers are a medical condition consisting of a focal erosion of the endothelium of the aorta. This means that a small section of the sheet of cells lining the cells of the aorta disappear. PAUs are part of a spectrum of diseases of the aorta called acute aortic syndrome topic of future post. Back to your yard, think of a small patch of dead grass in your lawn where the dirt below is exposed and all grass is gone. Pathophysiology of penetrating aortic ulcers In its normal, healthy state, the inner lining of the aorta consists of a glistening sheen of healthy cells. However, the glistening sheen can become dull and irregular as a result of atherosclerotic disease. Atherosclerosis is a degenerative process, usually associated with aging, where the body deposits both cholesterol and calcium into the lining of a blood vessel in this case, the aorta. These atherosclerotic deposits can be either large or small. Plaques can occur anywhere in the vasculature of the body, and when they occur in the aorta, can cause a problem. The aorta is meant to be a flexible and elastic structure which expands and contracts with the pulse. The pulse represents the dynamic change in the blood vessel associated with blood ejecting from the heart. The heart beat causes a rush of blood out of the heart which forces the aorta to physically expand and contract. With the stiffening of the aortic wall associated with atherosclerosis as we age, the stresses and strains of the aortic wall change in relation to blood flow. When there is a plaque of cholesterol and calcium, combined with a stiffened aorta, these plaques can suddenly rupture. When a plaque ruptures, blood seeps below the endothelial cell surface and creates a disruption in the inner lining the the aortic wall. This disruption in the aortic wall resulting from a ruptured plaque is a penetrating aortic ulcer. In addition to the ulcer, an intramural hematoma occurs bleeding into the wall of the aorta. How often do penetrating aortic ulcers occur? What are the symptoms of a penetrating aortic ulcer? The most common symptom is back pain. Most patients describe this as a new pain in the mid-back between the shoulder blades. The pain can be either sharp and stabbing or dull and radiating. The sharp, stabbing pain is usually localized to one spot in the back. The dull, radiating pain is usually spread across the entire upper back. Other symptoms, include chest pain which is similar in characteristics to pain associated with a heart attack. If the penetrating aortic ulcer is located in the abdominal aorta, the pain would be in the low back. How do you know if you have a penetrating aortic ulcer? These penetrating aortic ulcers develop suddenly literally in a heart beat. If the pain is so intense that you have to go to the emergency room, doctors will perform a battery of tests. If a CAT scan is performed at the time of the emergency room visit and it should be , then the penetrating aortic ulcer can usually be diagnosed by seeing the erosion and hematoma of the aortic wall. What is the health risk of having a penetrating aortic ulcer? As mentioned above, penetrating aortic ulcers are part of a spectrum of an acute aortic syndrome. The risk of a penetrating aortic ulcer is that the aorta could rupture. The ulceration in the aortic wall is literally a defect which decreases the integrity of the aortic wall. If aortic rupture occurs, massive internal bleeding could lead to death. Penetrating aortic ulcers can also lead to aortic dissection. We

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discussed aortic dissection in a previous post [HERE](#). Aortic dissection is a whole other aortic emergency which also carries a risk of death. What are the risk factors for developing penetrating aortic disease? Like most aortic diseases, including aortic aneurysms and aortic dissections, high blood pressure hypertension, elevated blood cholesterol hypercholesterolemia and a history of atherosclerosis increase your risk for developing penetrating aortic ulcers. For more information concerning the risk factors for developing aortic disease, download your copy of my book [here](#). What do you do if you suspect you have a penetrating aortic ulcer? Most of the time, penetrating aortic ulcers are detected through a battery of tests, including a CAT scan, which are performed for new, severe chest or back pain in the emergency room. If you have any of the risk factors for developing aortic disease mentioned above, then you should be considered to be evaluated by an aortic specialist. What are the treatments for penetrating aortic ulcers? Many penetrating aortic ulcers can be managed with medicines. These medicines are intended to significantly control the blood pressure and cholesterol in the blood. If the ulcers expand, they could become an aortic pseudoaneurysm which would potentially need surgery or treatment with an aortic stent. Likewise, if the penetrating aortic ulcer progresses to an aortic dissection, then the aortic dissection, depending on severity and extent, may need to be treated with aortic surgery or endovascular repair with an aortic stent-graft. Summary Penetrating aortic ulcers are an uncommon, but potentially life-threatening, condition arising from a disruption of the inner lining of the aorta. The process is also called penetrating atherosclerotic disease because of the association with the build-up of cholesterol and calcium into the blood vessels of the body atherosclerosis. Question Before this, did you ever consider that the aorta could be predisposed to developing ulcers just like the stomach? Share your comments and join the discussion.

### Chapter 5 : An uncommon cause of chest pain – penetrating atherosclerotic aortic ulcer

*Diagnostic Criteria for Penetrating Atheromatous Ulcer of the Thoracic Aorta Shigeki Kimura, MD, Makoto Noda, MD, vascular disease of the thoracic aorta that they.*

### Chapter 6 : Penetrating atherosclerotic ulcer of the descending thoracic aorta and arch – Mayo Clinic

*Chest pain is a very common symptom and can be of cardiac or non-cardiac origin. It accounts for approximately million annual emergency room visits in the United States, according to CDC data. Penetrating atherosclerotic aortic ulcer (PAU), an uncommon condition, is also a potential cause.*

### Chapter 7 : Penetrating Atherosclerotic Ulcer - Aortic Dissection

*The typical patient with penetrating atheromatous aortic ulcer is elderly and has hypertension, atherosclerosis, and back or chest pain, but pulse deficit, stroke, aortic insufficiency, and compromise of a visceral vessel are not present.*

### Chapter 8 : An Ulcer of a Different Sort: Penetrating Aortic Ulcers

*The penetrating atherosclerotic ulcer can resolve completely or stay stable, but they can also lead to aortic dissection, aortic saccular aneurysms and even spontaneous aortic rupture. There are conflicting reports about the most common course of penetrating atherosclerotic ulcers 1.*