

# Acute Thrombosis of the Abdominal Aorta Secondary to Low Cardiac Output Syndrome

## Düşük Kalp Debisi Sendromuna Sekonder Akut Abdominal Aort Trombozu

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### ABSTRACT

Acute aortic occlusion is a rare but catastrophic pathology with very high morbidity and mortality. It may result from thrombus formation, saddle embolism and other etiologies related to arteriosclerosis, low flow states or hypercoagulability. The clinical presentations include ischemic and neurologic symptoms of the lower extremities, abdominal symptoms and acute hypertension. We present a case of acute aortic occlusion resulting from *in situ* thrombosis secondary to a low cardiac output state due to MI. A 61-year-old man underwent sigmoid colon resection for volvulus formation 5 days before his acute presentation. He presented as acute inferior MI with low cardiac output syndrome. Successful stent implantation of the RCA was performed as an emergency via the right brachial artery since the femoral pulses were not palpable. Abdominal aortography showed total occlusion of the abdominal aorta distal to the renal arteries. Emergency bilateral femoral embolectomy was performed with local anesthesia, resulting in good distal pulses. Postoperatively, he deteriorated with acidosis, hypotension, oliguria and increased inotrop requirement. He died of cardiac failure and severe metabolic derangement on the second day after operation. Early diagnosis and treatment is very important for preventing metabolic compromise in these patients. The choice of surgical procedure depends on the general condition of the patient, the presence of chronic aortic occlusive disease, presence of renal and mesenteric ischemia and cardiac function of the patient. (JAREM 2012; 2: 124-6)

**Key Words:** Abdominal aorta, thrombosis, surgical treatment

### ÖZET

Akut aort okluzyonu nadir görülen ancak yüksek morbidite ve mortalite ile seyreden bir patolojidir. Aort içinde trombus formasyonu, masif emboli, aterosklerozla ilişkili diğer etiyojiler ile düşük akım ve hiperkoagulabilite bu patolojiye yol açan nedenleri oluşturmaktadır. Klinik olarak akut bacak iskemisi ve bacaklarda nörolojik semptomlar, batınla ilişkili semptomlar ve akut hipertansiyon ile bulgu verebilir. Yazımızda akut miyokard enfarktüsü sonrası düşük kalp debisi sendromuna sekonder, abdominal aortada *in situ* trombus oluşmasına bağlı total okluzyon vakasını ve tedavi seçeneklerini sunmayı amaçlamaktayız. Altmış bir yaşında erkek hastaya kliniğimize refere edilmeden 5 gün önce volvulus nedeniyle sigmoid kolon rezeksiyonu uygulanmıştır. Akut inferior miyokard enfarktüsü tanısı konulan hastaya acil olarak koroner anjiyografi yapılarak sağ koroner artere başarılı stent uygulaması yapıldı. Bu esnada femoral nabızların olmadığı farkedildiğinden uygulama sağ brakial arterden yapıldı ve aortografi ile abdominal aort görüntülendi. Aortanın total olarak infrarenal seviyede tıkanıdığı gözlemlendi. Sorulduğunda hasta bacaklarında ağrı ve uyuşma olduğunu söyledi. Acil olarak operasyona alınarak lokal anestezi ile her iki femoral artere embolektomi yapıldı ve bol miktarda trombus temizlendi. Operasyon sonunda distal nabızlar palpe edilmekteydi. Yoğun bakım takiplerinde hastada asidoz, hipotansiyon, oligüri ve artmış inotrop ihtiyacı ile birlikte klinik kötüleşme gözlemlendi. Hasta kardiyak yetmezlik ve metabolik problemler nedeniyle postoperatif 2. gün kaybedildi. Başarılı cerrahi tedavi sonrası dahi yüksek mortalite ile seyreden bu patolojide erken tanı ve tedavi önem arz etmektedir. Seçilecek cerrahi tedaviye hastanın genel durumuna, kronik aortik aterosklerotik hastalığın varlığına, renal ve mezenterik iskemi olup olmasına ve hastanın kardiyak fonksiyonlarının iyi olup olmasına göre karar verilmesi gereklidir. (JAREM 2012; 2: 124-6)

**Anahtar Sözcükler:** Abdominal aort, tromboz, cerrahi tedavi

### INTRODUCTION

Acute aortic occlusion is a rare but catastrophic pathology with very high morbidity and mortality (1). It may result from thrombus formation, saddle embolism, false-lumen expansion in aortic dissection, aortic trauma, and other etiologies related to arteriosclerosis, low flow states or hypercoagulability. Pre-existing atherosclerosis combined with a low flow state because of poor cardiac performance is a relatively frequent cause of acute aortic occlusion. The clinical presentations include acute limb isch-

aemia, neurologic symptoms of the lower extremities, abdominal symptoms and acute hypertension. Postoperative mortality is high even with optimal surgical treatment (2). Death can be associated with major organ ischemia such as stroke, myocardial infarction, hepatic infarction, and mesenteric ischemia, as well as with severe respiratory failure, fatal arrhythmia, uncontrollable hyperkalemia or renal failure secondary to myonecrosis. We present a case of acute aortic occlusion resulting from *in situ* thrombosis secondary to a low cardiac output state due to myocardial infarction (MI).



## CASE REPORT

A 61-year-old man, who had no significant past medical history apart from hypertension, underwent sigmoid colon resection for volvulus formation 5 days before his acute presentation. At that time, he had sudden chest pain and hypotension in the general surgical ward and was diagnosed as acute inferior MI. An emergency coronary angiography was done and successful stent implantation for ostial occlusion of the right coronary artery was performed. The coronary angiography was done via the right brachial artery since the femoral pulses were not palpable. Abdominal CT angiography showed total occlusion of the abdominal aorta just distal to the renal arteries (Figure 1). His chest pain being less, the patient described bilateral leg pain and numbness. He was transferred to the operating room immediately and bilateral femoral embolectomy was performed via left and right groin incisions with local anesthesia. A large amount of fresh thrombus material was evacuated from both sides and distal pulses were palpable at the end of the operation. During follow-up in the ICU, his clinical situation deteriorated with acidosis, hypotension, oliguria and increased inotrop requirement. He died of cardiac failure and severe metabolic derangement on the second day after operation.

## DISCUSSION

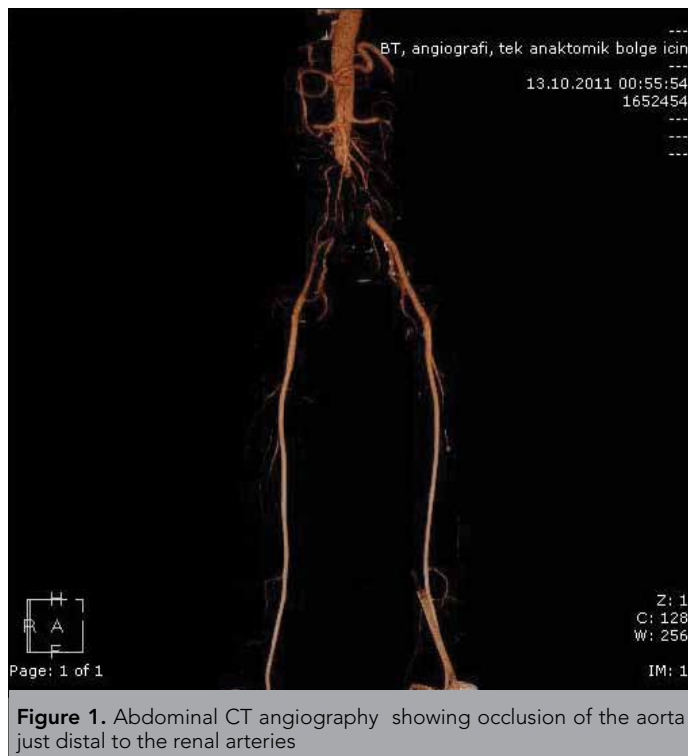
Acute aortic occlusion is a rare but catastrophic pathology which can be the result of in situ thrombosis or acute embolic occlusion. Patients with acute aortic occlusion typically present with severe bilateral lower limb pain and evidence of lower limb ischemia with paresthesia or paraplegia, absence of palpable pulses in the lower extremities, and mottling from the waist down (3). Severity of symptoms depends on the acuity of onset and time required for collateralization. Patients frequently have coexisting diffuse arterial disease including coronary artery and cerebrovascular

disease. The presence of neurologic signs have been implicated in the delay in diagnosis with patients incorrectly referred for neurologic consultations. As in our case, the presence of other vascular pathologies may be the cause of aortic occlusion and moreover, they may complicate and delay diagnosis. MR angiography, CT Angiography and conventional angiography are the primary options for diagnosis. We prefer CT Angiography in our patients, although the current case was first diagnosed in the catheter lab during coronary angiography.

Mortality and morbidity of acute aortic occlusion is high even after revascularization, with postoperative mortality rates between 14% and 60% in the studies analyzing 10 or more patients with acute aortic occlusion (1, 3, 4). Death may result from a wide range of pathologies including respiratory failure, mesenteric ischemia, fatal arrhythmia, myocardial infarction, stroke, hyperkalemia, or renal failure, and fatal organ failure even without obvious arterial occlusion in major organs. This suggests that the cause of death may be related to systemic dissemination of the toxic and inflammatory substances released from the damaged cells of inadequately reperfused tissues or organs. In our patient we observed progressive, rapid deterioration after surgical intervention, which suggested a similar mechanism. Babu et al. (4) showed that poor left ventricular function and a hypercoagulable state portend an ominous prognosis. Our patient had poor cardiac performance due to myocardial infarction and, with metabolic derangement, he deteriorated rapidly. This case emphasizes the importance of early diagnosis and intervention in these patients. Prompt diagnosis and treatment are important in order to prevent muscle cell ischaemia and massive volume cell death, which lead to the release of myoglobin, potassium, and lactic acid (5).

Preoperative management includes administration of heparin, hydration, and optimization of cardiac function. A vigorous pre-emptive approach including early treatment of acidosis and hyperkalemia during revascularisation could enhance the outcome of surgery in patients with acute aortic obstruction. Surgical treatment options are simple thromboembolectomy, extra-anatomic bypass and aortic reconstruction. Thromboembolectomy should be attempted by the femoral approach. Both femoral arteries should be exposed initially because femoral arteries are the site of distal anastomosis whether the inflow is chosen to be the aorta or axillary artery. This is the procedure of choice in those patients with acute aortic thrombosis or embolism and no evidence of preexisting occlusive disease. In our patient, aortic occlusion was secondary to low flow status without severe preexisting atherosclerotic disease of the aorta and we preferred simple embolectomy via both femoral arteries with successful restoration of patency. With this technique, we avoided an open surgical procedure and general anaesthesia without any hemodynamic compromise during the procedure.

If there is chronic aortic occlusive disease, evidence of renal or mesenteric ischemia and in patients with adequate left ventricular function, direct aortic reconstruction should be preferable. Extra-anatomic bypasses have lower patency rates and, hence may not be ideal for all patients. Thrombolytic therapy may be preferable in patients with acute aortic thrombosis caused by a hypercoagulable state because this subset of patients fared poorly with surgical intervention despite normal arteries and good LVF (4).



**Figure 1.** Abdominal CT angiography showing occlusion of the aorta just distal to the renal arteries

## CONCLUSION

Acute aortic occlusion is a rare but catastrophic pathology with high mortality and morbidity rates even after successful revascularization. Early diagnosis and treatment is very important in order to prevent metabolic compromise. The choice of surgical procedure depends on the general condition of the patient, the presence of chronic aortic occlusive disease, presence of renal and mesenteric ischemia and cardiac function of the patient.

**Conflict of interest:** No conflict of interest was declared by the authors.

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