Endovascular Stent Graft Repair of Localized Acute Aortic Intramural Hematoma: A Case Report and Literature Review

Lokalize Akut Aortic İntramural Hematomun Endovasküler Stent Greft ile Onarımı: Olgu Sunumu ve Literatür İncelemesi

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ABSTRACT
Aortic intramural hematoma (IMH) is a variant of acute aortic syndrome, which can be life-threatening. Ascending aorta IMHs, particularly accompanied by penetrating aortic ulcer (PAU), can cause dissection, rupture, and cardiac tamponade. Therefore, early surgical treatment is recommended for IMHs of the ascending aorta. Herein, we present the case of a 60-year-old male patient who was on warfarin sodium treatment and in whom an IMH localized to the arcus aorta was detected incidentally via computed tomography, with the suspicion of pulmonary embolism, and an endovascular stent graft was inserted into the arcus aorta. This case highlights the importance of following ulcerated aortic plaques and suggests that IMH can be successfully treated with endovascular stent grafting.

Keywords: Hematoma, endovascular procedures, ulcer

ÖZ
Aortik İntramural Hematom (İMH), hayatı tehdit edebilen önemli bir akut aortic sendrom tipidir. Özellikle penetran aortik ülserin eşlik ettiği çıkan aorta İMH’leri diseksiyon, rüptür ve kardiyak tamponada neden olabilir. Bu sebeple çıkan aortada saptanan İMH’da erken cerrahi tedavi önerilmektedir. Biz bu çalışmada oral warfarin kullanılan 60 yaşına erkek hastaya pulmoner emboli şüphesi ile bilgisayarlı tomodiagnostiğinde tespit edilen, intramural hematomun endovasküler stent greft ile başarılı bir şekilde tedavi edilebileceğini göstermektedir.

Anahtar Kelimeler: Hematom, endovasküler işlemler, ülser

Introduction
Spontaneous intramural hematoma (IMH) is an aortic wall hematoma in the absence of an intimal flap. As in dissections of the thoracic aorta, IMH can be classified as Type A if it involves the ascending aorta, aortic arch, or both, and as Type B if it involves the descending aorta. Prognosis in IMH is similar to that in aortic dissection and it can be with or without penetrating aortic ulcer (PAU). Early repair with surgery or endovascular stent grafting (ESG) is of utmost importance [1]. Herein, we present the case of a 60-year-old patient with spontaneous, acute, and localized aortic IMH treated with ESG, with the discussion of current literature. This report has attempted to highlight the importance of follow-up in PAU.

Case Report
A 60-year-old male patient, who was on oral warfarin sodium (Coumadin; Zentiva Medical) treatment with the diagnosis of deep venous thrombosis for about three years, was admitted to our hospital with cough, difficulty in breathing, and hoarseness. Thoracic computed tomography (CT) (Siemens, Germany) was performed upon the suspicion of pulmonary embolism and it revealed a mass, around 42×48 mm in diameter, localized at the arcus aorta with increased pressure on the pulmonary artery (Figure 1). The mass was considered as an atherosclerotic plaque formation observed in the same arcus aorta area (Figure 2), and these were thought to have formed due to the plaque rupture of an IMH. Transesophageal echocardiography (TEE) and CT showed no dissection flap. Physical examination revealed blood pressure of 150/90 mmHg and regular pulse of 90 beats/minute. Transthoracic echocardiography showed mildly reduced left ventricular function with an estimated ejection fraction of 50% and pericardial effu-
Figure 1. CT scans of intramural hematoma located in the arcus aorta

Figure 2. CT scans of penetrating atherosclerotic ulcer located in the arcus aorta

Figure 3. Final angiography showing orifices of the supra-aortic vessels and the endovascular graft located in the arcus aorta

Discussion

Spontaneous IMH has been frequently reported in patients with acute aortic syndrome (AAS). The lack of a demonstrable intimal tear or dissection flap is essential for the diagnosis of IMH. Circular or crescent-shaped regional aortic wall thickening with thickness >7 mm and/or intramural blood accumulation suggest the diagnosis of IMH [2]. The prevalence of IMH in AAS ranges from 6% to 30%. Rupture, true aneurysm, or pseudoaneurysm can develop; however, complete resolution can also be achieved [1]. In addition, IMH can be accompanied with or without PAU. However, many studies investigating the etiology of IMH have suggested that PAU is the cause of IMH [2]. PAU can be defined as the ulceration of an atherosclerotic lesion extending to the media by penetrating the internal elastic lamina. Stanson et al. [2] and Coady et al. [3] defined PAU as a malignant lesion. They suggested that patients designated as malignant cases exhibited acute symptoms, requiring the use of more aggressive treatment methods. Not only ulcers of the ascending aorta and aortic arch, but also ulcers of the proximal descending aorta have a poorer prognosis than the ulcers of the mid or distal descending aorta. Therefore, early surgical intervention is recommended for the IMH of the ascending aorta. Follow-up with medical therapy is primarily recommended for the IMH of the distal descending aorta. In particular, the presence of an enlarging pleural effusion and/or uncontrolled pain must be considered as an indication necessitating early surgery or endovascular treatment in patients with IMH and PAU [1].

Spontaneous IMH and dissections of the aortic aneurysms can be successfully treated by endovascular methods [4]. This novel method offers an alternative treatment to traditional surgical methods, with lower mortality and complication rates.

Surgical replacement of the aortic arch with open surgery in arcus aortic pathologies is a diffi-
Revascularization of the left subclavian artery was initially deemed mandatory. However, the current general opinion is that this procedure is unnecessary and collateral circulation as well as blood supply from the contralateral vertebral artery would provide sufficient circulation. In our case, the left carotid bypass was not performed as the left common carotid artery originated from the right truncus brachiocephalicus, and the subclavian bypass was not performed as there were no circulatory problems in the left arm. In addition, proximal ligation of the artery was not required as left subclavian artery-related endoleaks were not observed.

Another problem after IMH stenting is the decision to drain the hematoma. In the case study by White et al. [10], in which an acute IMH with PAU was treated using endovascular stenting, IMH resulted in full resolution within three months of follow-up after stenting. In our case, we did not intervene with the hematoma after stenting and found that the IMH diameter decreased, as confirmed by repeated CT after one month.

In conclusion, IMHs and PAUs are important variants of classical aortic dissection. Currently, there is evidence that the two may not be different diseases and both diseases share notable common themes in their pathophysiology. Therefore, follow-up and the early treatment of PAU is very important for the prevention of further potential complications. In conclusion, we believe that aortic IMH can be successfully treated with ESG if it is accompanied by PAU.

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References