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Intimal Flap Intussusception into the Innominate Artery of a Bovine-type Aortic Arch in a Acute Type-A Aortic Dissection: A Case Report

Haitham M. Albar [1] and Elnazeer O. Ahmed[2,*]
[1]Department of Surgery, College of Medicine, Majmaah University, Almajmaah, 11952, Saudi Arabia.
[2]Cardiac Surgery consultant & head of cardiac surgery department, Cardiac Surgery Department, King Abdullah Medical City, Makkah, Saudi Arabia.

Corresponding author: Elnazeer O. Ahmed (e-mail: drnazeer@hotmail.com).

Abstract **Background:** Acute aortic dissection is a life-threatening condition that requires prompt diagnosis and immediate surgical intervention. The diagnosis depends primarily on demonstrating an intimal flap in the ascending aorta by preoperative imaging. We present a case of acute type- A aortic dissection with an absent dissection flap in the ascending aorta. **Case presentation:** A 37-year-old presented with alternating consciousness and cardiogenic shock. His clinical history and findings of echocardiography were suggestive of an acute aortic syndrome; however, the computed tomography did not demonstrate a dissection flap in the ascending aorta. Immediate surgical repair was undertaken. The dissection flap was found to be intussuscepting into the innominate artery. **Conclusion:** This case report adds to the existing evidence that the absence of an intimal flap in the ascending aorta does not rule out a severe type-A aortic dissection.

Key Words Aortic aneurysm, Aortic dissection, Antimal flap intussusception

1. Introduction

Acute type-A aortic dissection is associated with high mortality rates if not diagnosed timely and repaired immediately with surgical intervention [1]. The preoperative diagnosis depends primarily on demonstrating the presence of a dissection flap in the ascending aorta. Rarely is the dissection flap absent, and it can become a diagnostic challenge when presenting in an acute situation. We report the case of a type-A aortic dissection where the dissection flap could not be located in the adjacent region of the ascending aorta; instead, it was recovered intussuscepting into the brachiocephalic trunk of a bovine-variant of the aortic arch.

2. Case Report

A 37-year-old male was referred to our tertiary cardiac center with acute retrosternal chest pain and fluctuating consciousness. He was diaphoretic with cold and clammy distal extremities. His blood pressure was 89/71 mmHg, and electrocardiography showed sinus tachycardia with no evidence of myocardial ischemia. His cardiac troponin level was 0.01 mmol/l. Transthoracic echocardiography revealed an aortic root diameter of 56 mm and mild aortic regurgitation, with a 1.2 cm wide pericardial effusion. No dissection flap was visible in the ascending aorta. Computed tomography of the chest revealed a bovine-type aortic arch a single brachiocephalic trunk measuring 23 mm and giving rise to the innominate and the left common carotid arteries (Figure 1), and a dissection flap was observed in the aortic arch and the brachiocephalic artery (Figure 1). The ascending aorta measured 59 mm in diameter (Figure 1) and did not show a dissection flap.

It was decided to operate urgently on the patient based on the clinical presentation, hemodynamic instability, and aneurysmal dilatation of the ascending aorta. In contrast, the involvement of the ascending aorta in the dissection process remained uncertain. An 8 mm Dacron tube graft was anastomosed to the right subclavian artery after administration of 5000 heparin, followed by a midline sternotomy. Cardiopulmonary bypass was established with venous drainage via a suitable atrial cannula. While cooling to $21°C$, a valve-sparing root replacement was performed according to the inclusion technique by Tirone David [1] using a hemishield tube graft (Meadox Medicals, Oakland, USA). There was no aortic intima in the region above the sino-tubular junction

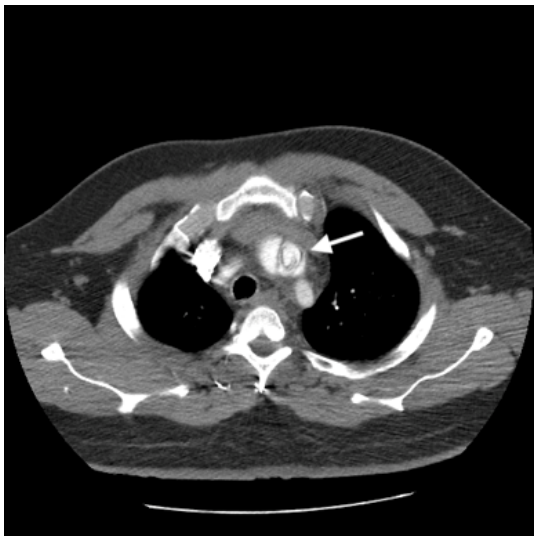

Figure 1: Contrast-Enhanced CT Showing the Intimal Flap Intussuscepting into the Brachiocephalic Trunk (White Arrow)

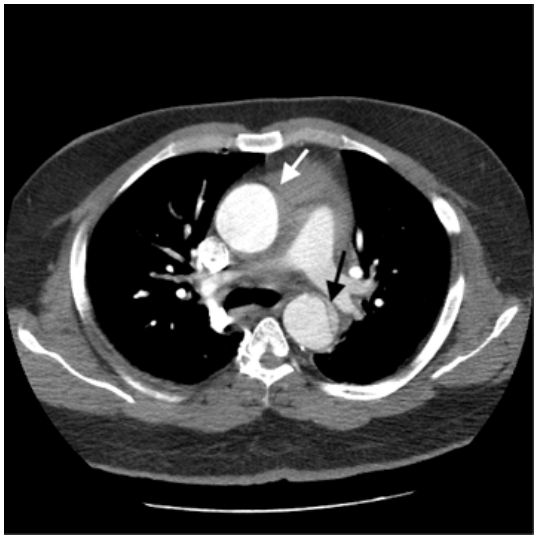

Figure 2: Contrast-Enhanced CT Showing the Absent Intimal Flap in the Ascending Aorta (White Arrow), and Visible Flap in the Descending Thoracic Aorta (Black Arrow)

and proximal to the cross-clamp site; hence, it was decided to explore the aortic arch under deep circulatory arrest. On removing the cross-clamp, the intimal flap spontaneously prolapsed into the view through the aortotomy. This was further corroborated in a retrospective review of the computed tomography (Figure 2). The redundant flap was fashioned to length, and a hemi-aortic arch replacement was performed.

The patient was admitted to the cardiac intensive care unit for 48 hours and was discharged from the hospital on the eighth postoperative day after a non-eventful hospital course.

3. Discussion

Acute Stanford type-A aortic dissection is a life-threatening condition, which, if left untreated, is associated with mortality rates as high as 50% in the first 24 hours [1]. Diagnosing the condition centers around detecting the presence of a dissection intimal flap in the ascending aorta, including the aortic root. However, the absence of an intimal flap obscures the decision-making process, resulting in delayed management, thereby negatively affecting the overall outcome as the surgical repair is the gold standard for the management [2]. Intimal flap intussusception is a rare condition with circumferential aortic dissections the flap can prolapse proximally into the left ventricle [3] or distally into the aortic arch [4]. In our case, the intussusception occurred in the brachiocephalic trunk; to our knowledge, this condition has not been published in the literature.

A bovine-type aortic arch refers to a shared origin of the left common carotid and the innominate arteries or the origin of the left common carotid artery from the innominate artery [5]. It has commonly been linked to thoracic aortic aneurysms [6].

In summary, this case report adds to the existing evidence that the absence of an intimal flap in the ascending aorta does not rule out a severe type- A aortic dissection. The patient's clinical history, findings on physical examination, and meticulous radiological screening should dictate the course of action without undue delay. Knowledge about this entity must be kept in mind of all cardiac surgeons especially when reviewing the investigations of suspected isolated intimal flap intussusception and to be managed as acute type A aortic dissection.

Conflict of Interest

The authors declare no conflict of interests. All authors read and approved final version of the paper.

Authors Contribution

All authors contributed equally in this paper.

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