

## Case Report

# A Case Report: Spontaneous Recovery of Type B Aortic Dissection

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## Abstract

Aortic dissection is a cardiac emergency which requires an urgent diagnosis and management. Aortic dissections are divided into type A and type B depending on location, with the former involving the ascending aorta independent of where the tear occurs. Complications of a Type B Aortic Dissection (TBAD) primarily include malperfusion syndromes, which can affect the spinal cord, bowel, kidneys and nervous system, as well as shock and aortic rupture. Uncomplicated TBAD is managed medically, with the goals of treatment being to maintain a systolic blood pressure of less than 120 mmHg and to optimise analgesia. However, follow-up scans are crucial, and these consist of serial imaging with Magnetic Resonance Imaging (MRI) or Computed Tomography (CT) to ensure no complications or aneurysmal formation.

Our case of 58 years old gentlemen presented with type B dissection and treated with aggressive blood pressure control therapy. Follow up CT aortogram of our patient's revealed that the type B dissection cured. Our case report illustrates the importance of aggressive blood pressure control in treating type B dissection and confirms the importance of following up dissection patients with CTA or MRA scans.

**Keywords:** Type B aortic dissection; Magnetic resonance imaging; Computed tomography

## Learning Points

1. Outline the importance of aggressive blood pressure control in type B aortic dissection treatment.
2. It is essential to follow up type B aortic dissection patients with scan to monitor improvements or complications.

## Introduction

Aortic dissection is a lethal condition caused by intramural bleeding within the Tunica media, resulting in a false lumen in the aorta. Traditionally, dissections are divided into type A and type B depending on location, with the former involving the ascending aorta independent of where the tear occurs. Complications of a Type B Aortic Dissection (TBAD) primarily include malperfusion syndromes, which can affect the spinal cord, bowel, kidneys and nervous system, as well as shock and aortic rupture. Uncomplicated TBAD is managed medically, with the goals of treatment being to maintain a systolic blood pressure of less than 120 mmHg and to optimise analgesia [1]. However, follow-up scans are crucial and these consist of serial imaging with Magnetic Resonance Imaging (MRI) or Computed Tomography (CT) to ensure no complications or aneurysmal formation [2].

**Citation:** Sherif MA, Witharana P, Farmer N, Chetty G. A Case Report: Spontaneous Recovery of Type B Aortic Dissection. *Cardiovasc Surg Int.* 2021;2(1):1013.

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**Publisher Name:** Medtext Publications LLC

**Manuscript compiled:** Apr 28<sup>th</sup>, 2021

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## Case Presentation

A 58-year-old gentleman with known hypertension and no other past medical or family history presented to Accident and Emergency (A&E) in January 2020 with sudden onset central chest pain which had started whilst eating food. The pain was stabbing in nature with radiation to the back but not to the jaw or arm. He was clammy and sweating profoundly on presentation. His hypertension was controlled in the community with ramipril 5 mg and amlodipine 10 mg daily. He was a non-smoker with a moderate alcohol intake. On arrival to A&E, his observations were as follows: HR 102, RR 20, BP 140/103, Temperature 37.1, BM 5.8, and GCS 15.

Chest and heart examination were unremarkable. There were no signs of deep vein thrombosis. His chest x-ray was clear and his ECG showed sinus tachycardia at 102 beats/min and no dynamic ECG changes. His serial troponin assays were not significantly elevated.

He was initially managed as an Acute Coronary Syndrome (ACS) and commenced on aspirin, ticagrelor, fondaparinux, atorvastatin and bisoprolol. He underwent echo assessment which showed good biventricular function with no wall motion abnormality and the cardiology team was planning to discharge the patient with a view to outpatient follow-up.

However, on day 3 of his admission, the patient developed further chest pain and required sublingual GTN hourly. He was subsequently started on nicorandil 10 mg BD and was listed for an urgent angiogram.

A D-dimer was taken due to no obvious cause for his chest pain, which was very high. An urgent CTPA was organized, which showed TBAD extending from just beyond the origin of the left subclavian artery to the diaphragm level with no evidence of PE (Figure 1 and 2). The patient was discussed with the cardiothoracic team who reviewed the images in their aortic MDT and advised the parent team to treat the patient conservatively with aggressive blood pressure control and

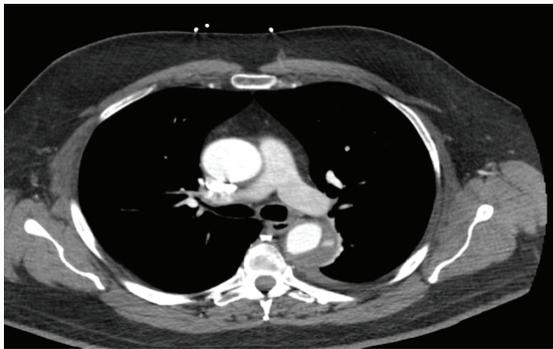
aim for a systolic pressure of less than 120 mmHg. His blood pressure remained elevated throughout his admission with a mean systolic range between 150 mmHg and 160 mmHg.

The patient was admitted to the Coronary Care Unit (CCU), where his pressure was controlled with intravenous labetalol and isosorbide dinitrate. He remained under aggressive blood pressure control and was monitored in CCU for two weeks. He was eventually discharged with oral antihypertensive medications including: bisoprolol, ramipril, indapamide and doxazosin.

After seven months, the follow-up CT aortogram showed significant improvement of the TBAD, which surprisingly appeared to have almost disappeared. The false lumen size had improved from 18 mm diameter in January to 2 mm in August scan, as shown in Figure 3 and 4.



**Figure 1:** CT aortogram (sagittal view) on January 2020: shows type B dissection.



**Figure 2:** CT aortogram, horizontal view in January 2020: type B dissection.



**Figure 3:** CT aortogram horizontal in August 2020 shows dramatic improvement of type B dissection.



**Figure 4:** CT aortogram, sagittal view, on August 2020 shows a dramatic improvement of type B dissection.

## Discussion

TBAD accounts for 25% to 40% of all aortic dissections [3]. Uncomplicated cases of TBAD are traditionally medically managed. Aggressive medical management of TBAD was first recommended in the 1960s [4]. According to the European Society for Vascular Surgery's 2017 guidelines, the conservative management for TBAD entails administering intravenous beta-blockers to reduce the systolic blood pressure to less than 100 mmHg to 120 mmHg and heart rate less than 60 bpm and impulse force (dP/dt). The anti-inotropic effect of beta-blockers reduces the stress on the aortic wall and therefore prevents further dilatation. Calcium channel antagonists and/or renin-angiotensin inhibitors can be used if the effects of beta-blockers alone are not sufficient [5].

However, a 2020 systematic review and meta-analysis of observational studies and randomized control trials, looking at surgery vs. best medical therapy for the management of uncomplicated TBAD, did not show any evidence to suggest that one or the other is better [6]. Despite this, a 2008 study concluded that tight heart rate control of less than 60 bpm improved medically managed patients' outcomes with aortic dissections. This was measured as the frequency of adverse aortic events, such as future surgical intervention, organ or limb ischemia, aortic expansion and aortic rupture for a median follow-up time of 27 months [7]. Clearly, there is some conflicting evidence. Although the case described above cannot be directly compared to this study given that a longer follow-up period is needed, the dramatic reduction in the size of the false lumen suggests a favorable patient outcome. Furthermore, perhaps predictably, late adverse events have been associated with increasing aortic diameter and false lumen [8], again highlighting the impressive result of vigorous blood pressure control and a potential lower likelihood of adverse events in this patient.

Aggressive control of blood pressure and heart rate comes with its disadvantages. It was shown that patients managed conservatively were more likely to develop renal failure (43%) than those having an endovascular repair. About half of these patients required surgical treatment [9]. Although rare, stroke is a recognised complication of intensive blood pressure control [10].

It has also been shown that, with acute TBAD, the rate of non-elective readmission is higher at 90 days, irrespective of the initial treatment received [11]. There will be aneurysmal growth in more than 60% of the patients with aortic dissection over the next five years [12], again highlighting the importance and necessity of follow-up.

The management goals for this patient relating to blood pressure and heart rate would need to be continued in the community, especially given that high night-time systolic blood pressure has been associated with a higher risk of new aortic events in subsequent follow up [13].

As evident from this case, rigorous management of blood pressure with IV labetalol and isosorbide can help in cases of TBAD resulting in good outcomes, including improvement of symptoms and reduced radiological size of the false lumen.

This patient will require annual monitoring with MRI scans to look for recurrence of disease or late complications. Due to MR scans' ability to distinguish between blood flow and vessel wall, these scans are suitable for the assessment of aortic pathology [14].

A further learning point to take from this case is that a high index of suspicion is needed for aortic dissection, particularly in chest pain cases presenting to A&E. In this case, the patient was misdiagnosed as having ACS and treated with aspirin, ticagrelor and fondaparinux. ACS is the most common misdiagnosis in cases of aortic dissection [15] and is important to rule out given its high prevalence, but committing to this diagnosis before performing critical investigations can be catastrophic for patients. The evidence to support giving immediate antiplatelet therapy in cases that subsequently turn out to be aortic dissection is often absent, with patients progressing to theatre having a greater risk of bleeding complications and early mortality [16]. In type A aortic dissection repair surgery, dual antiplatelet therapy is associated with an increased bleeding risk and need for transfusions [17]. A study published in 2007 found that 39% of aortic dissections were initially misdiagnosed, with an overall time to diagnose 29 hours. 100% of these misdiagnosed patients received inappropriate antithrombotic agents, resulting in a higher mortality rate or significant bleeding, whether managed medically or surgically [18]. The case study above highlights that misdiagnosis and inappropriate treatment are still common barriers to patients being managed correctly, with our patient receiving his diagnosis on the third day of his admission when the plan was to discharge him. It is disappointing to see that little progress has been made in this important area.

Ultimately, this case highlights the importance of accurate diagnosis and the potential benefits of strict management. Just several months on, our patient has had a good outcome despite initially receiving aspirin, fondaparinux and ticagrelor. It is essential for us to be diligent and continue with serial scans to ensure that any complications are caught early.

## Conclusion

Our case outlined the importance of aggressive blood pressure control in type B aortic dissection treatment. It is essential to follow up type B aortic dissection patients with scan to monitor improvements or complications.

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