

A Fortunate Patient with an Unfortunate Aortic Dissection

Authors: Daniel Hellmann, DO, PharmD¹, Christopher Tangen, DO²

Affiliations:

- 1) University Hospitals, Geauga Medical Center, Chardon, OH, 2) University Hospitals, Richmond Medical Center, Richmond Heights, OH.

Keywords: Aortic dissection, chronic aortic dissection, type B aortic dissection, cTBAD

Article History: Date received: 04/25/2023 Date revised: 08/10/2023 Date accepted: 08/10/2023

Corresponding Author: Daniel Hellmann **E-mail:** daniel.hellmann@uhhospitals.org

Introduction:

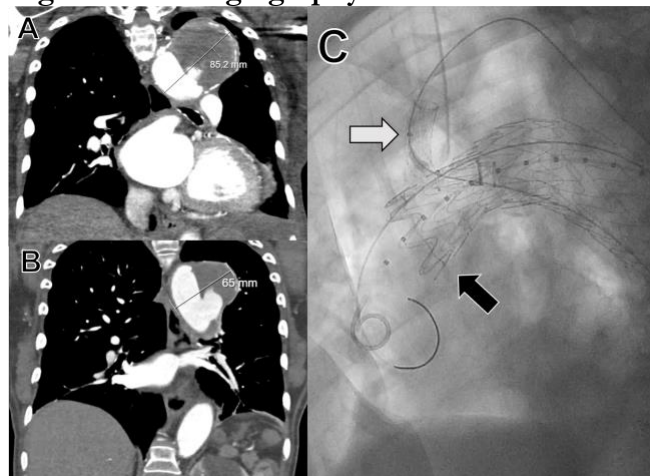
Aortic dissection is a catastrophic event that occurs in anywhere from 3 to 16 in 100,000 patients.¹⁻³ Chronic aortic dissection is often overshadowed by the volume of literature on acute aortic dissection, but with proper treatment, a large portion of patients will survive the acute phase and require regular follow up.^{4,5} Aortic dissection often presents in the acute phase due to the severity of morbidity and mortality, while chronic dissection is often asymptomatic and can go undetected for long periods. Patients presenting in the acute phase of dissection often have involvement the ascending aorta, known as a Stanford type A dissection, of which few survive without intervention.^{4,6} About one-third of acute dissections are Stanford type B, which spare the ascending aorta.^{4,7} Patients with type B dissection have a low in-hospital mortality rate, and the majority progress to the chronic phase, defined as 3 months following presentation.^{4,8} Uncomplicated type B dissections have traditionally been managed medically with beta blockers and afterload reducing drugs, known as anti-impulse therapy.^{3,4} Only 20-40% require intervention to reduce the feared complication of rupture, which occur at rates of up to 30% per year when the aortic diameter reaches 6 cm or greater.^{6,9} This is a case of a patient presenting with chronic type B aortic dissection (cTBAD) approximately 10 years after initial documentation that was able to evade rupture despite the large size and sub-optimal anti-impulse therapy.

Case description:

An 82-year-old female with a past medical history of cTBAD presented to the emergency department with bilateral leg swelling. The swelling

had increased over the past several days, decreased after elevating her legs at night, and was not associated with pain. She denied chest pain, abdominal pain and back pain. The patient denied taking any antihypertensive medications at the time of presentation. Computed tomography angiography (CTA) of the chest demonstrated an interval increase in a saccular aneurysm and dissection of the proximal descending aorta (Figure 1A). The dissection was discovered 10 years prior during a hypertensive emergency incident where a CTA of the chest was done. Imaging revealed an aortic diameter measuring 6.5 cm at the time (Figure 1B).

Figure 1: CT Angiography of the chest



A) CTA of the chest after patient presented to the ED for leg swelling with proximal descending aorta diameter measuring 8.5 cm. B) CTA of the chest done 10 years prior demonstrating aortic diameter of 6.5 cm. C) Stent placement of the thoracic aorta just distal to the left common carotid artery (black arrow) and the left subclavian artery with stent (white arrow).

It was recommended to the patient that she be admitted for medical optimization and possible

surgical intervention, but the patient refused any further treatment.

Several months later, the patient presented to the emergency department again, but with complaints of abdominal pain. Imaging redemonstrated the aortic dissection with aneurysm which was stable, and additionally a new epigastric abdominal hernia. The abdominal hernia was reduced in the emergency department, and the patient was counseled on the importance of intervention for the dissection. After talking with family about the benefits, they were agreeable to move forward with surgery. The patient was taken to the operating room where right common femoral artery was used as the access point for the thoracic endovascular repair (TEVAR). A stent was advanced with the leading edge just distal to the left common carotid artery, extending 15 cm down the thoracic aorta. Revascularization with stenting of the left subclavian artery was also completed (Figure 1C). The patient tolerated the procedure well without complications and was transferred to the ICU in stable condition.

Chronic aortic dissection leads to inevitable increased growth in size of the aorta, resulting in a greater risk of rupture over time that necessitates monitoring and possible intervention.⁴ Aortic dissections with a diameter of greater than 6 cm have at least 30% risk of rupture per year.⁹

Conclusion:

The lack of rupture in this case over a span of 10 years represents an outcome with <3% likelihood of occurrence. It was achieved despite sub-optimal anti-impulse therapy. The current case highlights the value of individualized decision making in the surveillance and intervention due to the unpredictable rate of progression in some individuals.

Author Contributions:

Both authors contributed to the conception or design of the work and the acquisition, analysis, critical revision of the case report. Both authors approve the final version of the manuscript to be published.

Funding Sources: None.

Potential Conflicts of Interest Disclosures:

The authors disclose that there were no conflicts of interest or financial support in the development of this project. All data is authentic and accurate.

References:

- 1) Goldfinger JZ, Halperin JL, Marin ML, Stewart AS, Eagle KA, Fuster V. Thoracic aortic aneurysm and dissection. *J Am Coll Cardiol.* 2014 Oct 21;64(16):1725-39. doi: 10.1016/j.jacc.2014.08.025.
- 2) McClure RS, Brogly SB, Lajkosz K, Payne D, Hall SF, Johnson AP. Epidemiology and management of thoracic aortic dissections and thoracic aortic aneurysms in Ontario, Canada: A population-based study. *J Thorac Cardiovasc Surg.* 2018 Jun;155(6):2254-2264.e4. doi: 10.1016/j.jtcvs.2017.11.105. Epub 2018 Feb 27.
- 3) MacGillivray TE, Gleason TG, Patel HJ, Aldea GS, Bavaria JE, Beaver TM, Chen EP, Czerny M, Estrera AL, Firestone S, Fischbein MP, Hughes GC, Hui DS, Kissoon K, Lawton JS, Pacini D, Reece TB, Roselli EE, Stulak J. The Society of Thoracic Surgeons/American Association for Thoracic Surgery Clinical Practice Guidelines on the Management of Type B Aortic Dissection. *Ann Thorac Surg.* 2022 Apr;113(4):1073-1092. doi: 10.1016/j.athoracsur.2021.11.002. Epub 2022 Jan 25.
- 4) Fleischmann D, Afifi RO, Casanegra AI, Elefteriades JA, Gleason TG, Hanneman K, Roselli EE, Willemink MJ, Fischbein MP; American Heart Association Council on Cardiovascular Radiology and Intervention; Council on Arteriosclerosis, Thrombosis and Vascular Biology; Council on Clinical Cardiology; and Council on Cardiovascular Surgery and Anesthesia. Imaging and Surveillance of Chronic Aortic Dissection: A Scientific Statement From the American Heart Association. *Circ Cardiovasc Imaging.* 2022 Mar;15(3):e000075. doi: 10.1161/HCI.0000000000000075. Epub 2022 Feb 17.
- 5) Shen J, Mastrodicasa D, Tse JR, Fleischmann D. Imaging Challenges in Chronic Dissection. *Semin Roentgenol.* 2022 Oct;57(4):345-356. doi: 10.1053/j.ro.2022.06.002. Epub 2022 Jul 30.
- 6) Papakonstantinou PE, Benia D, Polyzos D, Papakonstantinou K, Rorris FP, Toulgaridis F, Manousiadis K, Xydonas S, Sideris A. Chronic Thoracic Aortic Dissection: How to Treat, When to Intervene. *Life (Basel).* 2022 Sep 28;12(10):1511. doi: 10.3390/life12101511.
- 7) Shen J, Mastrodicasa D, Al Bulushi Y, Lin MC, Tse JR, Watkins AC, Lee JT, Fleischmann D. Thoracic Endovascular Aortic Repair for Chronic Type B Aortic Dissection: Pre- and Postprocedural Imaging. *Radiographics.* 2022 Oct;42(6):1638-1653. doi: 10.1148/rg.220028.
- 8) Loskutov A, Cooley M, Scheidt M, Mansukhani N, Hart J, Hieb RA, Rossi PJ, Patel PJ. Endovascular Management of Chronic Type B Aortic Dissection. *Tech*

Vasc Interv Radiol. 2021 Jun;24(2):100752. doi:
10.1016/j.tvir.2021.100752. Epub 2021 Jul 27.

- 9) Singh S, Nassiri N, Vallabhajosyula P. All type B aortic dissections should undergo thoracic endovascular aneurysm repair. JTCVS Tech. 2021 Aug 9;9:17-24. doi: 10.1016/j.xjtc.2021.05.029.