

C05: Acute Aortic Dissection

Richard Armour

Updated: August 18, 2021

Reviewed: March 01, 2021

Introduction

The incidence of acute aortic dissection is reported to be as high as 4.6/100,000 and appears to be increasing. Although infrequent, approximately 80% of patients experiencing an acute aortic dissection will arrive in the emergency department by ambulance. Mortality increases by 2% for every hour of delay in diagnosis, and fully half of all patients die within 3 days of the onset of their symptoms.

Despite the severity of the disease, 1 out of every 6 patients will be misdiagnosed. Acute aortic dissection often masquerades as a number of other conditions, including acute coronary syndrome and stroke. Out-of-hospital care is focused on early recognition, expedient conveyance, analgesia, and judicious resuscitation.

Essentials

- Paramedics and EMRs/FRs must consider acute aortic dissection in any patient experiencing a sudden onset of chest, back, or abdominal pain. Patients commonly describe pain as "sharp" or "tearing" with the maximal intensity at onset. The pain tends to radiate into the back, abdomen, or along the path of the aorta. Up to 17% of patients will not experience pain and will instead present with a decreased level of consciousness, transient syncope, or focal neurological deficits.
- A tear in the aorta can interrupt blood supply to any organ. In patients with pain suggestive of an aortic dissection who also have stroke-like symptoms, such as paralysis, voice hoarseness, or limb ischemia, paramedics and EMRs/FRs should consider the possibility that these symptoms are a result of the dissection.
- Differences in blood pressure between arms are not a consistent indicator of an aortic dissection and must not be used to exclude the diagnosis.

Additional Treatment Information

- Tachycardia can significantly worsen the clinical trajectory of acute aortic dissection. Control of the heart rate is not indicated for paramedics or EMRs/FRs. Every effort must be made to avoid patient exertion during movement.
- Patients with acute aortic dissections may initially present with hypertension. In patients who are hypotensive, fluid resuscitation must be undertaken carefully so as to not exacerbate the dissection. A mean arterial pressure (MAP) of 65 mmHg is sufficient.
- Analgesia should be provided to patients but carefully titrated given the patient's hemodynamic status.

General Information

- An acute aortic dissection occurs when the intima of the aorta tears and blood enters the medial layer of the aortic wall, creating a false lumen.
- Risk factors for aortic dissections include a family history of dissections, hypertension, and/or cardiovascular surgery. Dissections are more common in older males. Individuals with Marfan or Ehler-Danlos Syndrome are at higher risk.
- A new aortic regurgitation murmur, and/or a pulse deficit in the setting of pain suggestive of an aortic dissection, is strongly suggestive of the diagnosis.
- Patients with a widening pulse-pressure are in a critical stage of their disease and paramedics and EMRs/FRs should make preparations for an impending cardiac arrest.
- Acute aortic dissections are described using the Stanford Classification:
 - Type A dissections involve the ascending aorta, with or without the involvement of the arch or descending aorta
 - Type B dissections involve the descending thoracic and/or abdominal aorta
- Do not confuse acute aortic dissection with abdominal aortic aneurysms.

Interventions

First Responder

- Keep the patient warm and protect from further heat loss
- Place the patient in a position of comfort, as permitted by clinical condition; consider supine positioning to optimize blood pressure
 - **Warning: do not exert the patient**
- Provide supplemental oxygen where indicated
 - [→ A07: Oxygen Administration](#)
- Conduct ongoing assessment and gather collateral information, such as medications and identification documents
- Establish ingress and egress routes from the patient's location
- Communicate patient deterioration to follow-on responders

Emergency Medical Responder – All FR interventions, plus:

- Provide supplemental oxygen to maintain $\text{SpO}_2 \geq 94\%$
 - [→ A07: Oxygen Administration](#)
- Convey to appropriate facility with early notification
- Consider analgesia
 - [→ E08: Pain Management](#)
 - [Nitrous oxide](#)

Primary Care Paramedic – All FR and EMR interventions, plus:

- Establish vascular access:
 - Consider fluid bolus if hypotensive and without signs of pulmonary edema
 - Caution: target blood pressure to MAP of 65 mmHg; do not over-resuscitate
 - [→ D03: Vascular Access](#)
- Consider analgesia
 - [→ E08: Pain Management](#)

Advanced Care Paramedic – All FR, EMR, and PCP interventions, plus:

- Consider analgesia
 - [→ E08: Pain Management](#)
 - [FentaNYL](#)

Critical Care Paramedic – All FR, EMR, PCP, and ACP interventions, plus:

- Consider blood pressure lowering agents in cases of confirmed or highly suspected dissection where the patient is hypertensive. Goals are heart rate < 60 beats per minute and a systolic pressure of 100 - 120 mmHg.
 - Consider beta blocker
 - [LABETalol](#)
 - Propranolol
 - Esmolol
 - Calcium channel blocker
 - Consider if beta blockers are not tolerated
 - Verapamil
 - [Diltiazem](#)
 - Nitrates
 - Beta blockade must be started prior to nitrates to avoid reflex tachycardia.
 - Nitroprusside can be added if target systolic blood pressure cannot be reached with beta-blockers alone.
 - [Nitroglycerine](#)

Leaking /ruptured AAA

- This is a surgical emergency. Do not delay transport to a surgical center for any intervention.
- Consider permissive hypotension
- Consider blood product administration
- Avoid intubation due to further decrease in preload when possible.

References

1. Diercks D, et al. Clinical policy: Critical issues in the evaluation and management of adult patients with suspected acute nontraumatic thoracic aortic dissection. 2015. [\[Link\]](#)
2. CORE Emergency Medicine. Aortic Dissection. 2016. [\[Link\]](#)
3. Imamura H et al. Painless acute aortic dissection - Diagnostic, prognostic and clinical implications. 2011. [\[Link\]](#)
4. Milewicz DM. Stopping a killer: Improving the diagnosis, treatment, and prevention of acute ascending aortic dissections. 2011. [\[Link\]](#)
5. Rosman HS, et al. Quality of history taking in patients with aortic dissection. 1998. [\[Link\]](#)
6. Hiratzka L, et al. 2010 ACCF/AHA/AATS/ACR/ASA/SCA/SCAI/SIR/STS/SVM Guidelines for the diagnosis and management of patients with thoracic aortic disease: A report of the American College of Cardiology Foundation/American Heart Association task force on practice guidelines. 2010. [\[Link\]](#)
7. Burke CR. et al. Overview of open surgical repair of the thoracic aorta. UpToDate. 2020.
8. Burke CR. et al. Management of thoracic aneurysm in adults. UpToDate. 2020.
9. Burke CR. et al. Clinical manifestations and diagnosis of thoracic aortic aneurysm. UpToDate. 2021.
10. Jim J. et al. Management of symptomatic (non-ruptured) and ruptured abdominal aortic aneurysm. UpToDate. 2019.
11. Lexicomp. (2021). Copyright 1978-2021 Lexicomp, Inc. Esmolol: Drug information. UpToDate. 2020 .
12. Lexicomp. (2021). Copyright 1978-2021 Lexicomp, Inc. Propanalol: Drug information. UpToDate. 2020.
13. Lexicomp. (2021). Copyright 1978-2021 Lexicomp, Inc. Verapamil: Drug information. UpToDate.2020.
14. Lexicomp. (2021). Copyright 1978-2021 Lexicomp, Inc. Diltiazem: Drug information. UpToDate.2020.
15. Lexicomp. (2021). Copyright 1978-2021 Lexicomp, Inc. Nitroprusside: Drug information. UpToDate.2020.
16. Lexicomp. (2021). Copyright 1978-2021 Lexicomp, Inc. Nitroglycerine: Drug information. UpToDate.2020.

