AORTIC DISSECTION
RED FLAGS FOR
EMERGENCY TRIAGE STAFF

FIRST RESPONDERS

A patient with an aortic dissection may not appear to be a "typical" chest pain patient – he or she may be younger, tall/thin, and have no known risk factors for heart disease.

Approximately 10,000 people experience aortic dissections annually, so it is likely that emergency first responders will encounter this condition. 50% of patients with undiagnosed aortic dissection die with 48 hours, a death rate of approximately 1% per hour. Dissections of the aortic root and ascending aorta require immediate surgical intervention.

As a result, it is extremely important that emergency first responders are prepared to evaluate symptoms that could be related to a dissection and expedite emergency treatment.

About aortic dissection

An aortic dissection is a tear in the inner layer of the aortic wall. This tear allows blood to enter and separate the inner and outer layers of the vessel. In addition, dissection can weaken the outer wall, resulting in instability or rupture; occlusion (blockage) of aortic branch vessels causing myocardial infarction, stroke, kidney failure, bowel ischemia, paraplegia or limb ischemia; and disruption of the aortic valve, resulting in valvular insufficiency and congestive heart failure.

Who is at risk?

Risk factors for thoracic aortic disease, aneurysm, and dissection include certain genetic connective tissue disorders, a family history of thoracic aortic aneurysm/dissection, bicuspid aortic valve, uncontrolled hypertension, heavy weight lifting, trauma to the aorta, and certain inflammatory diseases (Takayasu arteritis, giant cell arteritis, Behçet disease, ankylosing spondylitis).

There are genetic syndromes that affect multiple organ systems, including the skeleton, lungs, eyes, heart, and increase the risk for aortic dissections. Genetic syndromes that increase the risk for aortic dissection include:

- Familial Thoracic Aortic Aneurysms and Dissections
- Marfan Syndrome
- Loeys-Dietz Syndrome
- Ehlers-Dantos Syndrome-Vascular Type
- Turner Syndrome
- Bicuspid Aortic Valve

IMPORTANT

Take note if the patient tells you he/she has had an aneurysm, Marfan syndrome, Loeys-Dietz syndrome, Ehlers Danlos syndrome, Turner syndrome, bicuspid aortic valve, a mutation in a gene which predisposes to familial thoracic aortic aneurysms/dissections, or a family history of thoracic aortic aneurysms/dissections This should alert the EMS provider to consider rapid transport with treatment provided en route.

EMERGENCY DEPARTMENT TRIAGE STAFF

As the first point of contact in most emergency departments, triage staff plays a vital role in assuring that patients receive proper care. Recognizing potentially life-threatening conditions and moving patients along in the treatment process is imperative to preventing adverse outcomes.

Fifty percent of patients with undiagnosed aortic dissection die with 48 hours. Dissections involving the aortic root and ascending aorta require immediate surgical intervention. Therefore, it is extremely important that emergency department triage staff can recognize the signs of aortic dissection, including some that are less common, and consider the bigger picture.

Below is a brief overview of aortic dissection and its risk factors. It reviews the "red flags" that should prompt immediate consideration of aortic dissection.

When taking medical history, the following should raise suspicion of aortic dissection:

- Family history of aortic aneurysm/dissection or unexplained sudden cardiac death, especially under the age of 50
- Diagnosis of a genetic syndrome that predisposes to aortic dissection in patient or family member (Marfan, Loeys-Dietz, Ehlers-Danlos, or Turner syndrome) or a mutation in a gene known to predispose to aortic aneurysm/dissection: FBN1, TGFBR1, TGFBR2, COL3A1, ACTA2, SMAD3, MYH11, MYLK, TGFB2, PRKG1)
- Bicuspid aortic valve or family history of bicuspid aortic valve
- Past ascending aortic repair or aortic coarctation repair
- Known aortic aneurysm or aneurysm/dissection/rupture in another artery
- History of conditions predisposing to aortic dissection (Marfan syndrome, Loeys-Dietz syndrome, Ehlers-Danlos syndrome-vascular type, familial thoracic aortic aneurysms/dissections, Turner syndrome, bicuspid aortic valve, Loeys-Dietz syndrome)
- History of pectus repair, scoliosis treatment, cleft palate repair, or cranial surgery
- History of hypertension, mitral valve prolapse, or "heart murmur"
- History of spontaneous pneumothorax, early onset emphysema, or other lung problems
- History of rupture of the bowel/intestines, uterus, or other hollow organs or tendon/muscle rupture
- Chronic joint subluxations/dislocations
- Congenital hip dislocation, club foot
- Ectopia lentis (dislocated lens of the eye)
- Primary ovarian failure
- Joint hypermobility

Further assessment

Triage staff may also observe:

- Physical characteristics of genetic disorder
- Patient in distress or obvious pain
- Sense of doom or that something is terribly wrong
- Pain like she or he has never felt before
- Altered mental status

Keep in mind that a normal EKG or chest radiograph does not rule in or out the possibility of an aortic dissection. If aortic dissection is even remotely suspected, studies should be performed and read as soon as possible – waiting could be the difference between life and death.

Vital signs

A patient experiencing aortic dissection may have normal vital signs, or have:

- Tachycardia
- Elevated BP
- May indicate predisposing factor to aortic dissection
- Pain from the dissection may cause increase in blood pressure
- Partially or completely blocked artery to one or both kidneys may cause increase in blood pressure
- Low blood pressure
- Abnormally large difference between systolic and diastolic blood pressure
- Asymmetrical pulse as noted in both wrists, both legs, and/or both sides of neck over carotid arteries
- Asymmetry of blood pressure (measurement taken in both arms)
- Heart murmur

Additional findings

Additional findings that suggest aortic dissection include:

- The 5 Ps
  - Pain
  - Pallor
  - Pulselessness
  - Paresthesia
  - Paralysis
- Weakness in one or both legs or arms
- Fever
- Radiation of pain to back or stomach
- Bloody diarrhea or coughing up blood
- Stroke-like symptoms due to occlusion of carotid artery
- Neurologic signs, similar to those of a transient ischemic attack or stroke
- Hoarseness or a sensation of having a lump in the throat, wheezing, dyspnea, or cough

Aortic dissection is frequently referred to as "the great imitator" because of its tendency to look like more benign medical problems.

The initial observation of the patient may reveal physical features characteristic of a genetic syndrome associated with an increased risk for aortic dissections. These include:

- Marfan syndrome
- Facial features such as long, narrow face, underdeveloped cheekbones, deep set eyes, receding lower jaw, downward slanting eyes
- Ectopia lentis (dislocated lens of the eye)
- High arched palate and crowding of the teeth
- Tall stature, disproprionately long arms, legs, fingers and/or toes
- Pectus excavatum (sunken chest) or pectus carinatum (pigeon breast)
- Scoliosis or kyphosis
- Flat or inwardly rotated feet, hammer toes
- Joint hypermobility
- History of a pneumothorax
- Unexplained striae (skin stretch marks)
- Loeys-Dietz syndrome
- Facial features such as widely spaced eyes, downward-slanting eyes, underdeveloped cheek bones, small chin and/or receding chin
- Blue sclerae (blue tinge to the whites of the eyes)
- Craniosynostosis (early fusion of the skull bones)
- Cleft palate
- Bifid (split) or broad uvula
- Long fingers and/or toes, contractures of the fingers
- Pectus excavatum (sunken chest) or pectus carinatum (pigeon breast)
- Cervical-spine instability
- Scoliosis
- Clubfoot or skewfoot deformity
- Joint hypermobility
- Congenital heart defects (patent ductus arteriosus atrial or ventricular septal defect, bicuspid aortic valve)
- Ehlers-Danlos syndrome - vascular type
- Facial features such as thin lips and philtrum, small chin, thin nose, large and proptotic eyes
- Thin, translucent skin with prominent veins, particularly on chest and abdomen
- Joint hypermobility
- Acrogeria (aged appearance to the hands and feet)
- Clubfoot
- History of a pneumothorax
- Turner syndrome
- Short stature
- Webbed neck
- Low hairline at the back of the neck
- Lymphedema of the hands and feet
- Bicuspid aortic valve, coarctation of the aorta

Chief Complaint

Symptoms of aortic dissection are extremely variable, but are often described by patients as:

- Sudden onset severe pain along middling in chest, back, or abdominal
- Penetrating pain front to back
- Ripping, burning, or tearing sensation
- Migratory
- Pain like they have never experienced before or sense of impending doom