Endovascular Treatment of an Aortic Dissection

BY DR. VIRENDRA I. PATEL

An aortic dissection is a tear in the lining of the aorta that creates two blood flow channels. One channel, called the true lumen, feeds blood to most of the important branches of the aorta and is surrounded by the normal aortic lining. The second channel, called the false lumen, may only feed a few (if any) important branches.

Aortic dissection is a very complicated condition. Untreated, an aortic dissection can lead to death.

A dissection that involves the ascending aorta almost always requires emergency open-heart surgery to repair the vessel and prevent death. ONLY ENDOVASCULAR TREATMENTS for distal dissections occurring beyond the left subclavian artery (feeds the left arm) are described here.

Why It's Done

Treatment of an aortic dissection may be needed if:

- Your aorta begins to dilate rapidly.
- After your blood pressure and heart rate are well controlled, you experience sharp pain or a tearing sensation in your chest and back.
Your aorta leaks or ruptures, in which case emergency treatment is in order. Important branches of your aorta become distressed or dysfunctional. Over many years your aorta dilates and a thoracic or thoracoabdominal aortic aneurysm forms.

Whether endovascular or open surgery treatment is best for you depends on multiple factors, including the anatomy of the dissection, and your age and health condition.

### Description

1. Treatment is first given to control your blood pressure and heart rate, usually in the emergency room.

2. A CT angiogram is used to determine the location and extent of the dissection, and to evaluate what part of the aorta and which aortic branches may be involved.

3. If endovascular treatment is appropriate, one of the two procedures below will likely be recommended.

**TEVAR** or stent grafting is a minimally invasive treatment for an aortic dissection or aneurysm. In the case of a dissection, a cloth-covered stent graft is used to seal the tear in the aorta. One or more uncovered stents may be added to support and expand the true lumen in order to improve blood flow to your abdominal organs, pelvis and legs.

- You will be sedated or be given general anesthesia.
- Once you are comfortable, a puncture will be made in a femoral artery. With the help of X-ray images, guide wires and a thin tube (catheter) are advanced through the artery to the dissection.
- Angiogram images of the aorta are taken to decide where the covered stent should be placed. The stent graft is then advanced into position.
- Confirming X-rays are taken. If needed, the covered stent is adjusted to form a seal. Additional angiogram images are taken to confirm whether the position and length of the covered stent is adequate or additional uncovered stents are needed. Intravascular ultrasound may also be used to assess progress.
- After all needed stents are in place, any wires or catheters are removed and access punctures or wounds are closed.

**ENDOVASCULAR FENESTRATION** is done to improve blood flow to a specific branch artery or to help equalize pressure between the true and false lumens.

- You will be sedated or be given general anesthesia.
- Once you are comfortable, a puncture will be made in a femoral artery. Through the puncture, the vascular surgeon inserts a thin tube (catheter) and administers blood thinners. Assisted by X-ray images, a wire and angled catheter are advanced to the affected area.
- Angiogram images are taken to find any natural holes (fenestrations) in the dissection flap. If no holes are found, the vascular surgeon will create one.
- Under X-ray guidance, a wire is sent through the true lumen, across the dissection flap to the false lumen. Another angiogram or intravascular ultrasound is taken to confirm progress.
- A balloon angioplasty is performed to enlarge the hole/s. A support stent may be placed (stented fenestration) to assist blood flow through the enlarged hole. This may help normalize pressure across both sides, and improve blood flow to organs and legs.
- After all needed fenestrations have been created, wires and catheters are removed and access punctures or wounds closed.
Risks

Though the incidence of side effects and complications is low with both TEVAR and endovascular fenestration, there are risks to consider.

TEVAR

Major or minor stroke (up to 5–7% of cases); insufficient blood supply to the spinal cord, which can lead to leg paralysis (up to 3%), and extension of the dissection (up to 3%).

If your kidneys are damaged prior to TEVAR, contrast injury may occur, which can affect kidney function and lead to temporary or permanent dialysis.

ENDOVASCULAR FENESTRATION

If the procedure fails to improve blood flow to artery branches, bypass surgery or open surgery treatment of an aortic dissection may be necessary.

FOR EITHER PROCEDURE

Bleeding at the puncture/access site may occur; this can be treated with pressure or surgical repair.

Bruising and swelling at the puncture/access site may occur and will resolve on its own.

A pseudoaneurysm or leakage of blood outside the puncture site may occur. This occasionally requires repair, or may resolve on its own.

How to Prepare

- Understand your health condition, the specifics of your procedure and what to expect during recovery.
- Don’t smoke.
- Walk for 30–60 minutes each day.
- Take medications as prescribed, especially for blood pressure and cholesterol.
- Keep a log of your blood pressure readings.

What Can I Expect After Treatment?
- Discomfort or pain, usually minimal, can occur at groin access sites.
- Wounds will need to be checked for a few weeks by a visiting nurse or by your vascular surgeon.
- Expect minor restrictions in activity level and diet.
- Don’t smoke, keep blood pressure logs, take medications as prescribed and follow other instructions from your doctors.
- See your vascular specialist regularly. Additional procedures may be necessary.