Thoraco-abdominal Aortic Aneurysms (TAAA) and Paravisceral Abdominal Aortic Aneurysms (PVAAA)

Thoraco-abdominal Aortic Aneurysm (TAAA) and Paravisceral Abdominal Aortic Aneurysms (PVAAA) is a challenging disease of the aorta because the aneurysm involves the arteries to the kidneys, liver and/or intestines. Successful treatment requires thorough clinical assessment, careful decision-making and special surgical, anesthetic and critical care expertise. Until recently the only treatment approach involved a complex operation with long hospital stays, high cost, high mortality, high morbidity, and reduced quality of life in treatment survivors.

There has been a recent innovation in TAAA/PAAA treatment: endovascular TAAA/PAAA repair. This has been shown to reduce mortality and morbidity rates, and the procedure is offered here at the San Francisco VA Medical Center.

Risk Factors for Aortic Aneurysms

• Atherosclerosis ("hardening of the arteries")
• Hypertension (high blood pressure) causes increased pressure on the weakened portion of the aorta leading to stretching and bulging of the artery wall over time and the development of an aneurysm.
• Infection or Inflammation
• Smoking (greater than 100 cigarettes in a lifetime)
• Age greater than 65 years old
• Male gender (Men are approximately 6 times more likely to get an abdominal aortic aneurysm than women)
• Inherited connective tissue disorders (Marfan syndrome, Ehlers-Danlos syndrome, collagen vascular diseases) are genetic defects in collagen and collagen is one of the main building blocks of artery walls, including the aorta
• COPD (chronic obstructive pulmonary disease)
• Patients with a 1st degree relative with an abdominal aortic aneurysm have a greater risk of developing an aneurysm themselves

What is a TAAA and PVAAA?

A TAAA is an abnormal enlargement (ballooning out) of the main artery (the aorta) and involves all or part of the aorta in your chest as well as all or part of the aorta in your abdomen. It also involves the part of the aorta where the arteries that bring blood to the liver, stomach and intestines and kidneys are attached. A PVAAA is an abnormal enlargement of the aorta in the abdomen, including the part of the aorta where the liver, stomach, intestine and kidney arteries are attached, but does not involve the part of the aorta in the chest.

Aortic Aneurysms - Signs and Symptoms

Unfortunately, most aortic aneurysms have no symptoms until the aneurysm ruptures. Many aneurysms are discovered by accident while a patient is being evaluated with a CT scan (computerized tomography) or MRI scan (magnetic resonance imaging) for another medical problem.

As the aneurysm enlarges in the chest or abdomen, the patient may experience mild discomfort or pain. Rapid expansion of a thoracic aortic aneurysm may cause a sudden onset of severe chest pain that radiates to the back. An abdominal aortic aneurysm that is rapidly expanding may cause abdominal, flank, or chest pain. On rare occasions, a rhythmically pulsating or vibrating mass may be felt in the abdomen when there is an abdominal aortic aneurysm.

Treatment Options

Most, arterial aneurysms require "watchful waiting" as the initial treatment of choice if they are discovered early and are still small. During this time, the benefit of fixing the aneurysm at a smaller size does not outweigh the risks and complications of the surgery itself. The vascular surgeon will monitor the growth of the aneurysm every 6 to 12 months by obtaining serial CT, MRI scans or ultrasounds. Once the aneurysm grows to a significant size and is at risk of rupturing, then surgical options are considered depending on:

- Patient's age, past medical and surgical history, current health status
- Aneurysm type, location, & size
- Anatomy of aorta & arteries branching off of aorta to visceral organs and legs

The usual treatment for TAAA/PVAAA involves replacement of the weakened part of the aorta with an artificial blood vessel (a graft) and reattachment of the arteries that bring blood to the liver, stomach, intestines, and kidneys to this graft. This standard operation, which requires an incision that extends from the back around the left side and down the middle of the abdomen, has certain risks, including death, heart attack, irregular heart rhythm, bleeding, stroke, kidney failure, intestine damage, leg paralysis, infection and pneumonia.

The newer endovascular procedure is an FDA-approved investigational study performed at SFVAMC and uses stent-grafts (cylindrical fabric tubes — the grafts — with metal springs attached — the stents). The stent-grafts are placed inside the weakened area of the aorta to re-line it. These customized stent-grafts have special branches attached to them that are used to keep blood flowing to the liver, stomach, intestines, and kidneys. Although there are still risks, compared with the standard operation, the potential advantages of this procedure include less pain, a lower mortality rate, lower rates of heart, lung, intestine, kidney, and spinal cord complications, a shorter hospital stay, and a shorter recovery time.

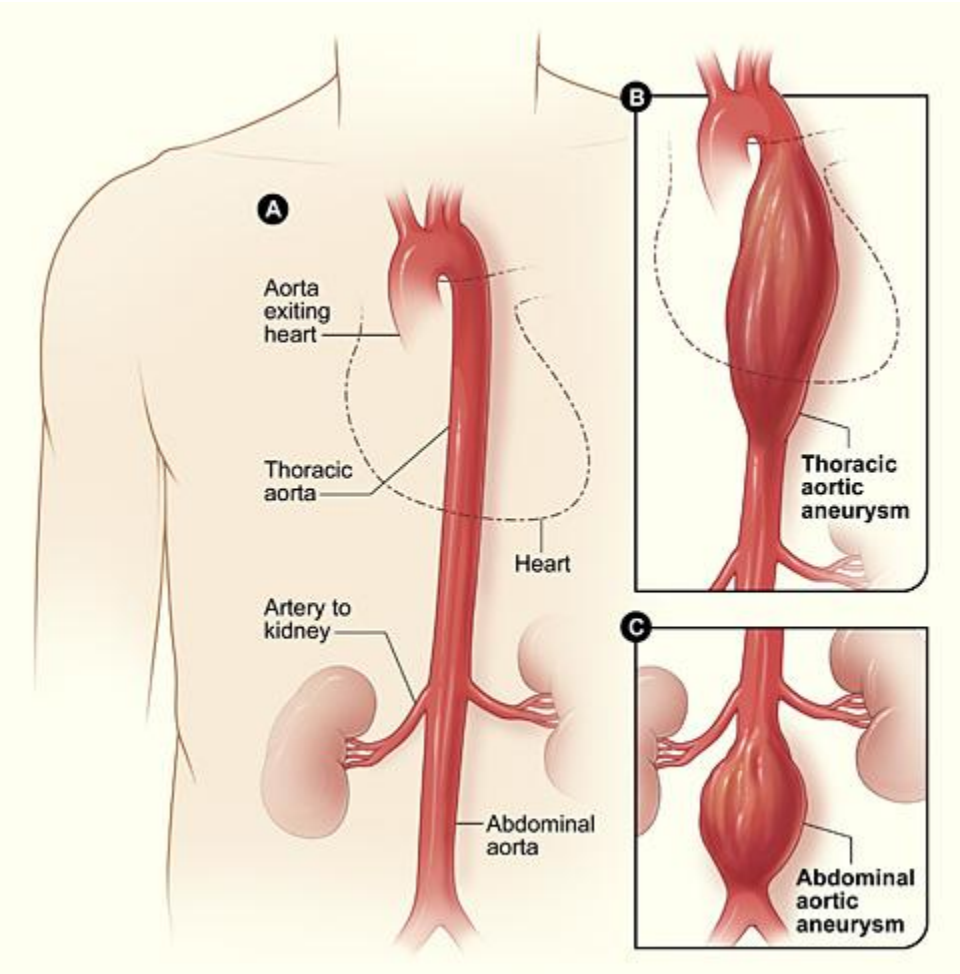

Figure A shows a normal aorta. Figure B shows a thoracic aortic aneurysm (which is located behind the heart). Figure C shows an abdominal aortic aneurysm located below the arteries that supply blood to the kidneys.