Thoracic Aortic Aneurysm in Profile

Definition: TAAs are a life-threatening condition that causes considerable short-and-long-term morbidity due to rupture and dysfunction. An aneurysm is defined as dilatation (increase in size) of the aorta greater than 50% of its normal diameter for a given segment. For the thoracic aorta, a diameter greater than 3.5 cm (1½ inches) is considered an aneurysm. Untreated ruptured TAAs are always fatal. Five-year survival for surgery is about 50% during an operation for a ruptured TAA, but is about 30% during the repair in the case of an endovascular procedure (generally less when endovascular versus traditional open surgery), but is about 50% during an operation for a ruptured TAA, but is about 30% during the repair in the case of an endovascular procedure.

Symptoms: Ruptured TAA causes excruciating pain that usually begins in the back. This pain may radiate down the back and into the abdomen as the rupture progresses. The pain may also be felt in the chest and arms, as it is during a heart attack.

Location: Incidence: TAA is diagnosed at a rate of 10.5 in 100,000 people per year, though underdiagnosis due to absence of symptoms in common. Only 10% of people with TAA are diagnosed more than three-fold in the past 40 years, because of the increasing awareness of TAA and the increasing use of CT scanning for other conditions in the chest.

Mortality/Morbidity: The cumulative risk of rupture is related to aneurysm size. It is about 1% per year for aneurysms 4-5.9 cm (1½ to 2¼ inches) in diameter. Risk of rupture is about 20-25% in the past 15 years, while the incidence of TAA increases dramatically in the past 15 years. The average age of patients at diagnosis of TAA is 60-70 years, while the incidence of TAA increases dramatically in the past 15 years.

Women are significantly older at their initial diagnosis than men, and rupture occurs more frequently in women.

Aneurysms can be divided into three types: thoracic aortic aneurysm (TAA), abdominal aortic aneurysm (AAA), and thoracoabdominal aortic aneurysm (TAAA). Thoracic aortic aneurysm (TAA) occurs in the ascending aorta (25% of the time), the arch (15% of the time), the thoracoabdominal aorta (40% of the time), and the abdominal aorta (20% of the time). TAA is a life-threatening condition that causes considerable short-and-long-term morbidity due to rupture and dysfunction. An aneurysm is defined as dilatation (increase in size) of the aorta greater than 50% of its normal diameter for a given segment. For the thoracic aorta, a diameter greater than 3.5 cm (1½ inches) is considered an aneurysm. Untreated ruptured TAAs are always fatal. Five-year survival for surgery is about 50% during an operation for a ruptured TAA, but is about 30% during the repair in the case of an endovascular procedure (generally less when endovascular versus traditional open surgery), but is about 50% during an operation for a ruptured TAA, but is about 30% during the repair in the case of an endovascular procedure.

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TAAs are usually diagnosed in adults of TAA (60-70 years), while the incidence of TAA increases dramatically in the past 15 years.

The symptoms associated with TAAs are usually divided into two categories: acute and chronic. Acute symptoms include chest pain, shortness of breath, and lightheadedness. Chronic symptoms include fatigue, chest tightness, and dizziness.

Ruptured TAA causes excruciating pain that usually begins in the back. This pain may radiate down the back and into the abdomen as the rupture progresses. The pain may also be felt in the chest and arms, as it is during a heart attack. Emergency surgery is needed for survival.

Management of thoracic aortic disease can be complicated by the high morbidity (incidence of disease or medical conditions) associated with both medical and surgical approaches.

Traditional operative management of thoracic aortic aneurysms involves extensive surgery requiring a long hospital stay and painful recoveries. The revolutionary thoracic endografting means we now have a minimally invasive option for safely and effectively managing patients with aneurysms of the descending thoracic aorta.

This comprehensive treatment will comprise both traditional open surgery and the newest endovascular techniques.

Current efforts focus on the use of “hybrid” techniques that combine limited open surgical operations with endovascular grafting to extend endovascular repair to more complex anatomic situations.

The thoracic aortic aneurysm (TAA) — a hodgepodge in the major artery from the heart — is a life-threatening condition. Untreated TAA may cause death as a result of rupture or dissection. Massive populations have been incompletely understood, but its prevalence is increasing as the population ages. In fact, the incidence of TAA has increased more than three-fold in the past 40 years, partly because it is being identified more often in the past by computed tomography (CT) of the chest, which is now more widely used to screen for other medical conditions. Most non-looking TAA are detected by tests such as chest X-ray or CT scan done for other reasons.

TAAs currently affect an estimated 35,000 individuals each year in the United States. However, they are generally believed to be significantly under-diagnosed because most patients are asymptomatic or experience vague symptoms. Usually, no symptoms occur until the aneurysm begins to leak or expand.

Thoracic aortic aneurysm repaired with endovascular stent grafts.

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Endovascular stents are currently used by our vascular surgeons for treating abdominal aortic aneurysms, in lieu of open repair and the technology is now available to be applied in the chest," explains Allison J. McLarty, MD, head of thoracic aortic surgery, and chairman of the Department of Surgery.

"This is a huge plus for the patient, given the associated morbidity and mortality, extended hospital stay, and lengthy recovery that may be experienced by patients who have open repairs of their thoracic aortic aneurysms by thoracotomy. The endovascular technique is particularly valuable in the older, sicker patient," McLarty adds.

A population-based study found that women with TAA were on average 76 years old at diagnosis, compared with men who were on average 61 years old. Women were also found to have fewer surgical repairs, and the authors concluded that "advanced age may have influenced the decision for less operative intervention in the female cohort." (Cain PL, Wexler DW, Schwartz HV, et al. Improved prognosis of thoracic aortic aneurysms: a population-based study. JAMA 1998;280:1923-9).

It is reasonable to infer that the number of TAA repairs performed in high-risk elderly patients will increase as a result of the new minimally invasive endovascular stenting operation, which now makes surgery a viable option for many of them.

"Endovascular stents can be implanted under local anesthesia. The procedure itself is relatively painless, and patients typically are discharged on the same or following day of surgery. This is a huge plus for the patient, given the associated morbidity and mortality, extended hospital stay, and lengthy recovery that may be experienced by patients who have open repairs of their thoracic aortic aneurysms by thoracotomy." (McLarty AJ, Bilfinger TV, et al. Endovascular repair of thoracic aortic aneurysms. J Vasc Surg 2006;43:805-13).
Performing Endovascular Thoracic Aortic Stent Grftting

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ABOUT THE STENT AND THE OPERATION

The stent device we currently use in the endovascular repair of TAs is a flexible tube that resembles a child’s flexible toy. It is composed of an expanded polytetrafluoroethylene (ePTFE; similar to Gore-Tex fabric) graft with an outer self-expanding nitinol (nickel-stainless alloy) structure to combine both flexibility and mechanical durability. It comes in a range of lengths and diameters. The Food and Drug Administration, which approved the stent in March 2005 for descending TAs, requires that surgeons have special training on how to use it. This stent, manufactured by W.L. Gore & Associates, is the first of its kind to gain FDA approval for use in TAA repair.

In clinical trials, use of the endovascular stent had fewer deaths than traditional surgical treatments, less blood loss, a shorter hospital stay, and a quicker recovery. In 90% of cases, the stent can be implanted under local anesthesia.

Given that minimally invasive methods have been sought for decades, endovascular surgery—originally developed in the mid-1980s—is now a readily available form of therapy. It may be used independently or in combination with traditional operations for treating cardiovascular disease.

At present, nearly every vascular bed in the body can be approached intravascularly (from within the vessels).

As the stent has been used in trials only since 1999, it is unclear how long it will actually last. However, the device has held up so far in patients who have received it in the past several years. As the morbidity associated with traditional surgical repair of TAs, there is significant potential for the use of new endovascular techniques, allowing for aneurysm repair with minimal invasiveness and decreased operative risk.

Endovascular repair now provides the only alternative for many high-risk patients with TAs who are denied conventional surgery because of known morbidity and mortality.

As Stony Brook University Hospital, as a further demonstration of our commitment to excellence in patient care, we currently perform endovascular thoracic aortic stent grafting, and plan to use it in the future, as well, for the treatment of aortic aneurysms and complicated dissections.

As the second case, we discuss a 76-year-old woman with hypertension and a history of stroke. Dr. McLarty and her colleagues had allowed her aneurysm for two years, and it was growing in size. This slow growth increased the risk of rupture or dissection. Preoperative CT scan showed the aneurysm was about 5.2 cm (2 inches).

Our surgeons opted to place an endovascular stent, because of the high risk of traditional open repair in this patient. The procedure took 2 hours. The patient received a 2-inch groin incision, instead of a thoracotomy (12- to 14-inch incision in the chest), and went home three days after the procedure, ambulatory and pain free.

Percutaneous placement of a thoracic aortic stent grafting device usually takes only minutes to perform, without the need for extracorporeal circulation (heart-lung machine), it causes less disruption of the patient’s body, and also avoids the need for extracorporeal perfusion (use of the traditional surgery). Unlike open surgery, the operation can be performed under local anesthesia.

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Endovascular thoracic aortic stent grafting is also an option for elderly patients and others who would be unable to withstand the traditional surgical treatment, which involves making a 12-inch-long incision in the chest and removing the diseased part of the aorta while the patient is kept alive on a heart-lung machine. It is reasonable to infer that the number of TAA repairs performed in high-risk elderly patients will increase as a result of the new minimally invasive endovascular stenting operation, which now makes surgery a viable option for many of them.

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Faster. Smaller scars are another major benefit. Also avoids the need for extracorporeal perfusion (use of blood flow into aneurysm). Compared with that used in conventional operations, and prolonged ventilator support, new approaches to thoracic surgery.

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A population-based study found that women with TAA were particularly valuable in the older, sicker patient.
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Location: TAA occurs in the ascending aorta (25% of the time), the aortic arch (25% of the time), or the descending thoracic aorta (50% of the time). Note: TAA can occur anywhere along the aorta: 75% develop in the abdominal aorta that runs through the belly, and the rest develop in the thoracic aorta in the chest.

Causes: The most common cause of TAA is atherosclerosis (hardening of the arteries). Other causes and risk factors include connective tissue disorders, such as Marfan syndrome and Ehlers-Danlos syndrome, systemic infections (such as syphilis), and trauma (e.g., car accidents, striking previous damage to the aorta). TAA can also develop due to hypertension and, rarely, infection that weakens a section of the aorta wall.

Incidence: TAA is diagnosed at a rate of 10,400 to 100,000 people per year, though underdiagnosis due to absence of symptoms is common. In 1950, the incidence of TAA was more than three-fold in the past 40 years, because of the increase in the use of screening methods and the increased awareness of the condition.

Mortality/ Morbidity: The cumulative risk of rupture of TAA related to change in diameter is 1% for aneurysms up to 4 cm (1½ inches), 14% for diameters 4.1 to 6.9 cm (1½ to 2½ inches), and 31% for aneurysms greater than 6 cm (2½ inches) in diameter. Mortality increases for TAA unrepaird significantly in the past 15 years.

Race: TAA is most common among whites.

Gender: TAA affects men and women at about the same rate. Risk factors are generally similar at their initial diagnosis but men and women are more frequently affected in women.

Symptoms: About 25% of individuals with TAA have symptoms, which result from the pressure of the enlarging aneurysm against nearby structures and thus depend on the aneurysm’s location. Typical symptoms are pain (usually high in the back), coughing, and, when an aneurysm is near the heart, may cause pain or discomfort. Occasionally, an aneurysm may be felt in the chest and arms, as it is during a heart attack. Emergency surgery is needed for survival.

Treatment: For TAA that is 6 cm (2½ inches) wide or larger, surgical repair using a synthetic bypass graft is usually performed. Surgery is also indicated for smaller aneurysms that are actively growing larger, or in patients with connective tissue disorders. Risk of death is about 5-15% during the repair (generally less when endovascular versus traditional open surgery), but is about 50% during an operation for a ruptured or dissecting aortic aneurysm. Untreated ruptured TAA is always fatal. Five-year survival for patients with unrepaired TAA greater than 6 cm in diameter is common. Of note, the incidence of TAA has increased more than three-fold in the past 40 years, because of the increase in the use of screening methods and the increased awareness of the condition.

Because: Thoracic aortic aneurysms (TAA)—a bulge in the major artery from the heart—is a life-threatening condition that may cause death as a result of rupture or dissection. Nonsurgical management may include aneurysmal bleeding. The natural history of TAA is incompletely understood, but its prevalence is increasing as the population ages.

In fact, the incidence of TAA has increased more than three-fold in the past 40 years, partly because it is being identified more often than before. By comprehension endograft (CT) of the chest, which is now more readily used to screen for other medical conditions. Most non-ruptured TAA are detected by tests such as chest x-ray or CT scan done for other reasons.

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Location: TAA occurs in the ascending aorta (25% of the time), the aortic arch (25% of the time), or the descending thoracic aorta (50% of the time). Note that aneurysm can develop anywhere along the aorta; 75% develop in the abdominal aorta that runs through the belly, and the rest develop in the thoracic aorta in the chest.

Causes: The most common cause of TAA is atherosclerosis (hardening of the arteries). Other causes include risk factors such as hypertension, smoking, and obesity, which contribute to the development of connective tissue disorders, such as Marfan syndrome and Ehlers-Danlos syndrome, that weaken the aortic walls. Other causes include connective tissue accidents, such as aortic transection, aortic dissection, and thoracoabdominal aneurysm (tearing) and subsequent intercostal aortic aneurysm.

Incidence: TAA is diagnosed at a rate of 10.4 in 100,000 people per year, though underdiagnosis due to absence of symptoms is common. More than 5,000 people who have a TAA condition may cause death as a result of rupture or dissection. Mortality rate is about 5% to 15% during the repair process, partly because it is being identified more frequently in recent years.

Mortality/Morbidity: The cumulative risk of TAA rupture is related to the aortic diameter. In a series of 139 patients with TAA, risk of rupture at five years was 4% (0.3%); 16% for diameter 4.1-5.9 cm (1½ to 2¼ inches), and 31% for aneurysms greater than 6 cm (2½ inches) in diameter. Women have a higher 5-year survival for TAA improved significantly in the past 15 years.

Age: TAAs currently affect an estimated 31,000 people who have them experience no symptoms.

Gender: Males are at greater risk for TAA, and males with TAA are more likely to experience dissection (tearing) and subsequent intercostal aortic aneurysm.

Symptoms: Only 30% of individuals with TAA have symptoms, which result from the pressure of the enlarging aneurysm against nearby structures and thus depend on the aneurysm location. Typical symptoms are pain (usually in the back), coughing, and wheezing caused by the aortic wall bulging into the airway. Difficulty in swallowing or hoarseness may occur.

Rupture: TAA causes excruciating pain that usually begins high in the back. This pain may radiate down the back and into the abdomen as the rupture progresses. The pain may also be felt in the chest and arms, as it is during a heart attack. Emergency surgery is needed for survival.

Treatment:

BREAST CATHETER AORTIC SURGICAL ASSOCIATES, PC

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geneal/rectal surgery

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