



BASIC INFORMATION

WHAT IS ABDOMINAL AORTIC ANEURYSM?

- A potentially life-threatening condition, abdominal aortic aneurysm is characterized by a ballooning of a section of the wall of the aorta
 - The aorta is the largest artery in the body, and it has the thickness of a common garden hose
 - The aorta is the main blood vessel that supplies the body's circulation system with oxygenated blood
 - The aorta originates from the top-most portion of the heart, and ends at about the level of the umbilicus (belly button)
 - An aneurysm can develop anywhere along the course of the aorta
 - This topic however focuses on the clinical manifestations related to the portion of the aorta that is located within the abdominal cavity
- Abdominal aortic aneurysm is a relatively common disease affecting roughly 15,000 persons per year in the United States alone

WHAT ARE COMMON SIGNS AND SYMPTOMS?

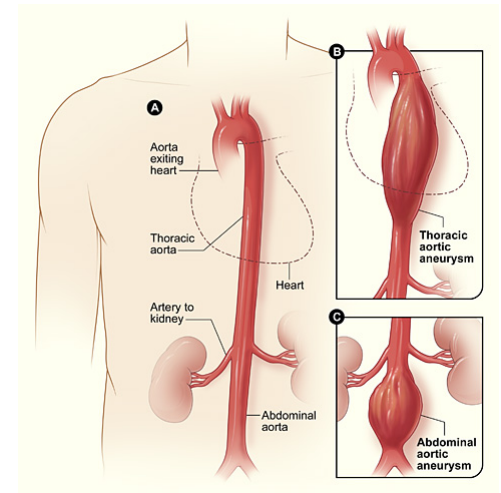
- Most cases are asymptomatic (absence of signs and symptoms) and thus are discovered incidentally when seeking medical attention for other reasons such as a routine physical examination
- When signs or symptoms are present (but in the absence of a rupture), any of the following may be noted
 - Abdominal pain
 - Middle back pain
 - Flank pain
 - Characterized by pain beginning along the back below the ribs or sides of the body, and radiates down towards the front near the groin area
 - A pulsating abdominal mass may or may not be present
- In the presence of a rupture, any of the following may be noted
 - Severe abdominal pain
 - Severe middle back pain
 - Severe flank pain
 - Grey Turner sign (bruising along the flanks; retroperitoneal hemorrhage) a sign of bleeding behind the peritoneal membrane
 - The peritoneal membrane forms the lining of the abdominal cavity and covers abdominal organs
 - The function of the peritoneal membrane is to provide a mechanism for peritoneal fluid transport, to provide a pressure gradient within the abdominal cavity, and it may also serve as a natural prevention against visceral (internal organ) adhesion formation following surgery
 - A pulsating abdominal mass is more commonly seen with a ruptured abdominal aorta
 - Syncope (partial or complete loss of consciousness due to very low blood pressures) and collapse
 - Signs and symptoms consistent with hypovolemic shock may also be seen, including
 - General weakness
 - Lightheadedness, confusion
 - Pallor, clammy skin
 - Low blood pressure
 - Decreased or no urine output
 - Rapid breathing
 - Sudden death
- Other non-specific signs and symptoms may be seen, including
 - Fever
 - Fatigue
 - Early satiety
 - Nausea, vomiting
 - Groin pain
 - Leg pain or weakness with walking (claudication)

WHAT CAUSES ABDOMINAL AORTIC ANEURYSM?

- Structural protein failure of the vessel wall has been attributed to many factors, including
 - Genetic predisposition
 - Vessel wall inflammatory processes
 - Biomechanical forces as would occur in a motor vehicle accident

WHAT INCREASES MY RISK?

- Risk factors for this condition have been well established, and include
 - Family history (genetic predisposition)
 - Caucasian race followed by African Americans
 - This condition is not as common in other racial groups (Hispanics, Asians, Native Americans)
 - Current or past smoking
 - Advanced age
 - Hypertension (abnormally high blood pressure)
 - Hyperlipidemia (abnormally high levels of fats or lipids in the blood)
 - Obesity
 - There tends to be a male predilection up to 70 years of age (2:1 vs female)
 - Gender predilection disappears after 70 years of age
 - Other vascular disorders can also increase risk
- Risk for rupture increases when the following are present
 - Aneurysm diameter exceeds 5 cm
 - Fast rate of expansion (more than 0.5 cm in six months)
 - Female gender



WHAT ARE POSSIBLE COMPLICATIONS?

- Complications depend on the location and size of the aneurysm; also listed are some complications that may stem from surgical intervention
 - Heart attack
 - Infection
 - Pulmonary embolism (blood clot in the lungs)
 - Aortoenteric fistula
 - An uncommon and catastrophic complication
 - Due to pressure, the aneurysm of the aorta erodes the bowel wall of the abutting intestine
 - Patients may present with minor traces of blood in the stool, and recurrent septicemia (bacterial infection in the blood)
 - The aortoenteric fistula may also cause massive, life-threatening bleeding
 - This complication may present as a primary manifestation from a growing aneurysm, or it may occur as a secondary process following aneurysmal repair
 - Graft or stent (surgical treatment) failure
 - Treatment-induced vasculopathy (injury to the aorta and/or iliac/femoral arteries due to treatment; iatrogenic)
 - Spinal cord ischemia
 - This is due to decreased distal aortic perfusion pressure or surgical intervention
 - Blood flow interruption of segmental spinal arteries causes tissue death of the affected spinal cord section
 - May lead to
 - Lower extremity paralysis (loss of ability to move)
 - Lower extremity motor and sensory deficits (partial loss of motor and/or sensory nerve function)
 - Loss of bladder and bowel control
 - Erectile dysfunction
 - Mesenteric ischemia
 - Embolus, or clot, to the mesenteric arteries impeding blood supply to the affected region of the intestines
 - May cause tissue death of the affected region of the intestine
 - Kidney damage
 - Contrast-induced nephropathy (kidney exposure to contrast media can lead to kidney damage)
 - Stent-induced inflammatory changes
 - Perianeurysmal fibrosis of ureteric vessels
 - Scarring around the aneurysm affecting ureteric vessels can reduce blood supply to the kidney

- Lower extremities
 - Distal embolization (clot) of atherosclerotic (fatty) debris
 - May lead to livedo reticularis of the feet (mottled discoloration of the skin of the feet)
 - Livedo reticularis also known as "blue toe syndrome"
- There is a high mortality rate with rupture of an abdominal aortic aneurysm

WHAT CAN I EXPECT?

- In non-ruptured cases, surgical repair may be required if signs and symptoms are present, and if optimization of medical therapy has failed
- More than 80% of patients who experience a rupture outside of the hospital do not survive

HOW DO I REDUCE MY RISK?

- Reduce risk by focusing on modifiable risk factors
 - Quit smoking
 - Consume a healthy diet
 - Exercise regularly

DIAGNOSIS AND TREATMENT

WHAT GENERAL MEASURES SHOULD I TAKE?

- A detailed medical history will be obtained, and a thorough physical examination will be performed
- Additional tests may be needed to confirm the diagnosis and to rule out other conditions that may present similarly
- Self-care
 - Follow recommendations on reducing risk
 - Keep all follow-up appointments
- Activity
 - Individualized physical activity recommendations will be provided
 - Patients with abdominal aortic aneurysm are encouraged to participate in an exercise program for the prevention of further cardiovascular disease
 - Activities such as the following do not precipitate rupture of the aneurysm
 - Running
 - Biking
 - Swimming
 - Hiking
 - Sexual activity
 - Or other activities such as golfing, horseback riding or gardening
- Diet
 - Consume a healthy diet
- Helpful link
 - To learn more: Centers for Disease Control and Prevention
 - Website: http://www.cdc.gov/dhdsp/data_statistics/fact_sheets/fs_aortic_aneurysm.htm
 - Phone: (800) 232-4636

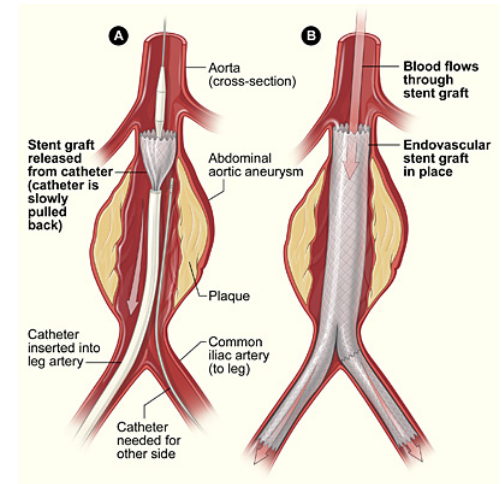
WHAT ARE COMMON LABS AND TESTS?

- Laboratory tests
 - Pre-operative lab tests that may be required include
 - Complete blood count (CBC)
 - Urinalysis , including urea and urine electrolyte measurements
 - Provides an overview of kidney function
 - Erythrocyte sedimentation rate
 - A nonspecific test that tends to be elevated during inflammatory and infectious disease
 - Cardiac enzymes
 - Measures protein blood levels that are linked to heart injury
 - Complete metabolic panel
 - This is a broad screening tool to evaluate a wide-range of body functions by measuring the following parameters
 - Glucose level
 - Electrolyte and fluid status
 - Kidney function
 - Liver enzyme levels
 - Coagulation profile
 - Screens for abnormal bleeding/clotting patterns
 - Fecal occult blood test
 - Checks for blood in the stool which may be a sign for gastrointestinal bleeding (aortoenteric fistula)
 - Women of child-bearing age will likely need a pregnancy test
- Imaging studies
 - Electrocardiography (ECG or EKG)
 - Detects abnormal electrical activity of the heart
 - Identifies patients who may be at risk of developing heart problems during or after surgery
 - Chest x-ray
 - Recommended as part of risk assessment for perioperative and post-operative morbidity and mortality
 - Ultrasound
 - Provides the quickest imaging test in the urgent care setting
 - Ultrasound is also the best imaging test for screening purposes

- CT scan and MRI
 - Provides detailed images of the aorta and the surrounding tissues and organs
 - Considered a necessity, especially for surgical planning
 - CT with 3D reconstruction provides even greater detail
- Angiogram
 - Contrast-enhanced x-ray used to assess various anatomic characteristics of an aneurysm
 - Less often used nowadays as a way to diagnose aortic aneurysms due to advances in CT technology with 3D reconstruction
 - Angiograms are however frequently used intra-operatively to facilitate aneurysm repair

WHAT ARE MY TREATMENT OPTIONS?

- Initial management depends on hemodynamic stability of the patient
 - Hemodynamic stability is defined as having normal blood pressure and adequate perfusion to vital organs
- Patients who are hemodynamically unstable and who are candidates for surgery are taken to the surgical room as soon as possible
 - Open surgical repair
 - Endovascular surgical repair (placement of graft material through a remote location such as the blood vessels located near the groin)
- Goal of surgery
 - Prevent aneurysmal rupture
 - Relieve signs and symptoms
 - Restore adequate blood flow to other organs of the body
- Patients who are stable but without risk of rupture are treated with an unspecified period of observation which includes
 - Medical therapy optimization
 - Blood pressure control
 - Lipid/cholesterol management
 - Glucose (diabetes) management if indicated
 - Risk assessment at specified intervals with a cardiovascular specialist
 - Aneurysmal expansion is assessed with imaging studies, typically with an ultrasound
 - Modifiable risk factors are targeted
 - Smoking cessation
 - Weight loss program if indicated
 - Avoidance of a sedentary lifestyle



WHAT MEDICATIONS MAY BE PRESCRIBED?

- Antihypertensive medications are typically prescribed
 - Goal is to reduce hemodynamic tension on the weakened wall of the aorta
 - The selection of antihypertensive medications must be individualized given a person's medical history

WHAT CAUTIONS SHOULD I TAKE?

- Follow all recommendations that relate to the modifiable risk factors (e.g., smoking, obesity, physical activity)
- Follow recommended screening intervals if indicated
- Take all prescription medications as prescribed; report any intolerable effects
- Keep all follow-up appointments

WHEN SHOULD I SEEK MEDICAL HELP?

- Seek medical attention if signs and symptoms of abdominal aortic aneurysm develop

MY HEALTHCARE PROVIDER'S COMMENTS

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- Image of Endovascular Treatment courtesy of National Institutes of Health. [Public Domain]. Available at: <https://www.nlm.nih.gov/health/health-topics/topics/arm/types>

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