

**SCREENING AND MANAGEMENT  
OF  
ABDOMINAL AORTIC ANEURYSM  
(AAA)  
IN  
HIGH RISK POPULATIONS**

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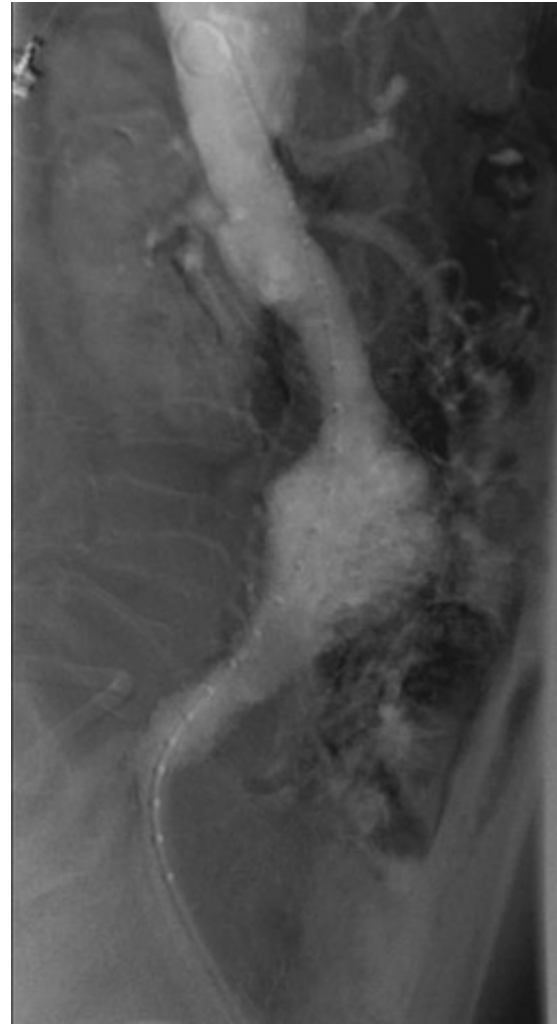
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# INTRODUCTION

- Aneurysm is a dilated area of the artery caused by a weakened arterial wall
- Aneurysm can occur anywhere along the aorta
- Abdominal aortic aneurysm (AAA) is an aneurysm located in the lower part of the aorta (from diaphragm down to abdomen)
- Aneurysm part can bulges like balloon
- Mainly affect men > 65 years old





## Arteriograms of Infrarenal AAA

(Pearce et al.

<http://emedicine.medscape.com/article/1979501-overview>)



# MECHANISM OF THE DISEASE

- 3 theories for the development of AAA
  1. ***Atherosclerosis***: increased plaque volume and accumulation of lipid core into the vessel lumen.
  2. ***Genotype***: systemic dilating diathesis
  3. ***Chronic inflammatory process***: weakening of the vessel
- Normal aortic diameter <2.5cm
- 3cm or greater qualifies as an aneurysm



# RISK FACTORS FOR AAA

- Men > 65 year old
- History of:
  - Smoking
  - High blood pressure
  - High cholesterol
  - Infectious inflammatory disease
  - First degree family history of AAA

Risk factors are modifiable through:

- Smoking cessation
- Healthy diet and weight
- Controlling pre-existing hypertension



# DISEASE CAUSATION

- Environmental Factors
  - Pathogens
- Trauma
- Chemical Factors:
  - Tobacco use
- Genetic Factors:
  - Genetic diseases: Ehlers-Danlos & Marfans syndrome
  - Gender, Age, Race
  - First degree family history of AAA
- Behavioral Factors:
  - High blood pressure
  - High cholesterol
  - Obesity



# DISEASE CAUSATION

## Environmental Factors

### Pathogens:

- Syphilis, arteritis, rheumatoid, Reiter's syndrome
- Group A streptococci, *Streptococcus pneumoniae*, or *Haemophilus influenzae*
- *Salmonella* species and *Staphylococcus aureus* (1/3 of AA infections)





# DISEASE CAUSATION

## Trauma

Blunt aortic trauma is an environmental factor that causes AAA rupture



# DISEASE CAUSATION

## Chemical Factors

The most significant risk factor associated with AAA is **smoking**



# DISEASE CAUSATION

## Genetic Factors

- Genetic diseases:
  - Ehlers-Danlos
  - Marfans syndrome
- Gender, Age, Race
- First degree family history of AAA



# DISEASE CAUSATION

## Behavioral Factors

- High blood pressure
- High cholesterol
- Obesity



# DISEASE BURDEN

## ○ Prevalence of AAA

- Men: 66% - 81%
- Women: 19% - 34%

## ○ Incidence of AAA

- 3-6% of men >65 years of age
- 8% at the age of 80 years of age
- 1.6% in men who ***DO NOT*** smoke, 6.3% in men who ***DO*** smoke
- 2-5 times higher in men with cardiovascular disease
- 12%-19% with 1<sup>st</sup> degree relatives with AAA



# DISEASE BURDEN CONTINUE

50% of those who suffer an AAA will die instantly from massive blood loss.

- Remaining 50% will make it to the emergency room but only half will survive surgery
- Overall survival rate is between 25%-35%  
(lowest survival rate of any surgical emergency)
- AAA is the - 10<sup>th</sup> leading cause of death in England  
- 13<sup>th</sup> leading cause of death in U. S.



## ○ **Survival rate**

- 50% of those who suffer ruptured AAA will die instantly from massive blood loss
- 25%-35% chance of surviving a ruptured AAA which constitutes as the lowest survival figures of any surgical emergency
- Aneurysms <5.5cm have <1% risk of rupture
- Aneurysms 5.5cm-6.5cm will have 5-10% of rupture
- Aneurysms 6cm-7cm will have 20%-50% of rupture



# DISEASE BURDEN CONTINUE

## ○ Mortality rate

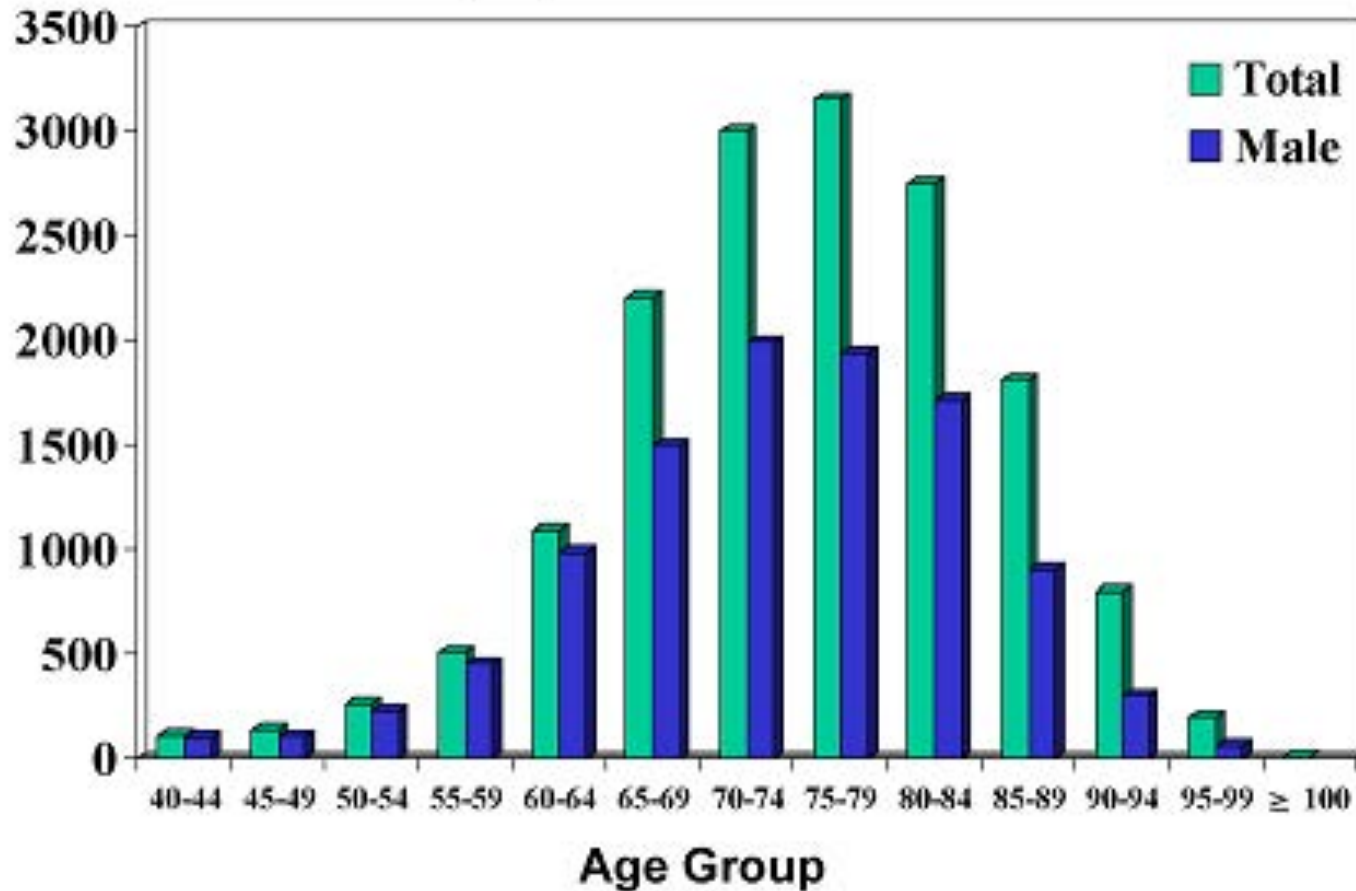
- Aortic aneurysms account for approximately 15,000 of deaths in 2000. 9,000 are attributed to AAA.
- Every 1 in 250 people over the age of 50 will die from rupture
- 50% who do not undergo treatment will die of rupture
- Most AAA related to deaths occur before the age of 80.



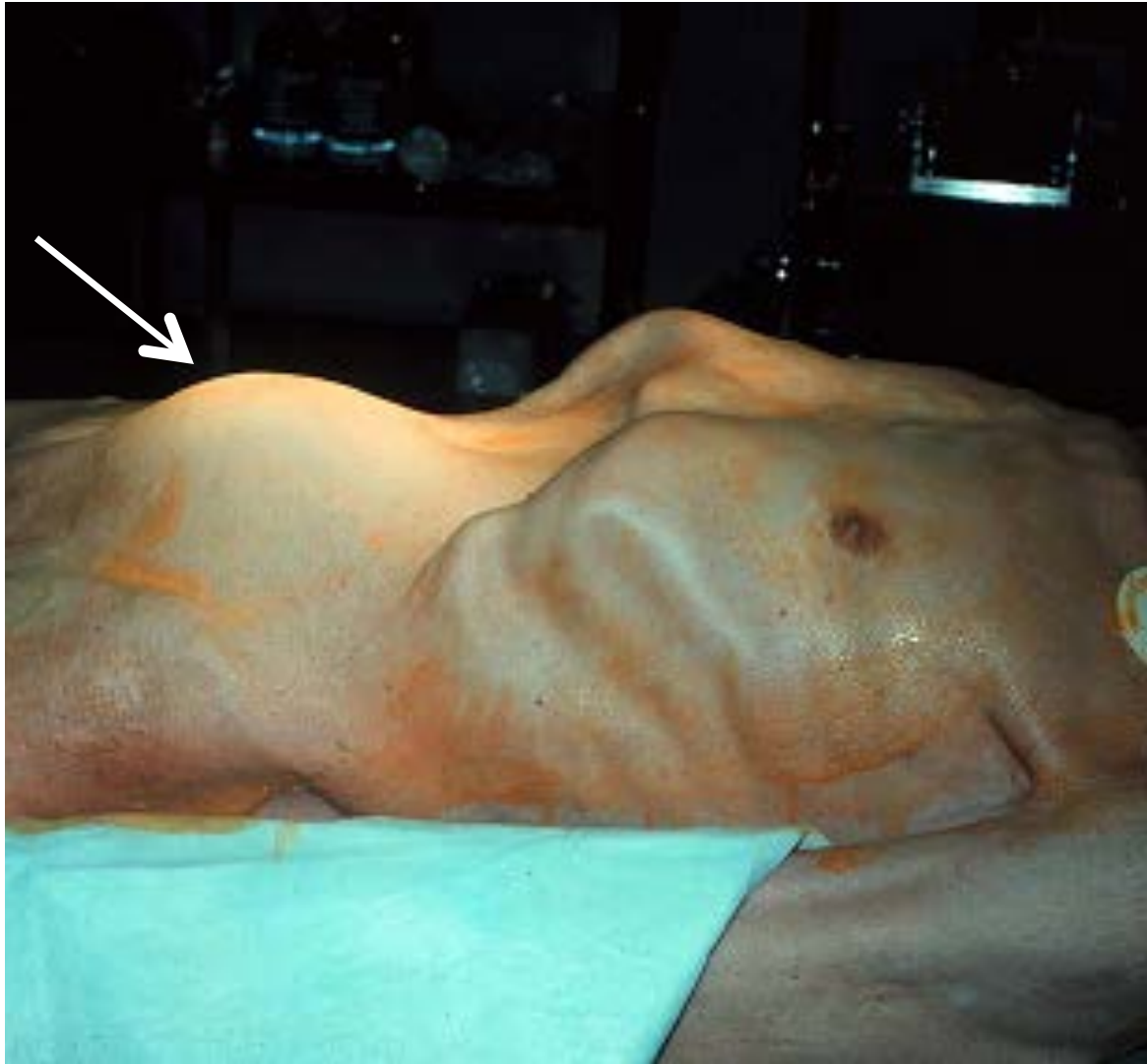


# Mortality Caused by Aortic Aneurysm

By Age - Total vs Male



(Pearce et al.: <http://emedicine.medscape.com/article/1979501-overview>)



## Pulsating abdominal mass

(Pearce et al.: <http://emedicine.medscape.com/article/1979501-overview>)



# STATISTICS

- AAA is the 13<sup>th</sup> leading cause of death in the U.S.
- AAA make up 98% of all aneurysms.
- 3% of all men will have an AAA by the age of 65.
- Mortality rate is up to 90%
- High risk populations include: men over the age of 65, long term tobacco use, unmanaged hypertension, high cholesterol, family hereditary



## Geographic Distribution of AAA

- United Kingdom 4.7% of Caucasian men older than 65
- Asian population of men >65 years is about 0.45%
- U.S.A incidence of AAA 2-4% in elderly men



## FUNDAMENTAL ISSUES

- Awareness of screening for high-risk populations
- Early detection with untrasonography
- Asymptomatic AAA
- Recommended Guideline:
  - “**one-time screening**” with an ultrasound for men - over the age of 65 and
    - have smoked at least 100 cigarettes in a lifetime



# PREVENTION AND INTERVENTION

## Prevention

- All men age 65-86 years should be screened for AAA. (Society of Vascular Surgery and Society of Vascular Medicine and Biology)
- **“One-time screening”** for AAA by ultrasonography in men age 65-17 who have smoked. (US Preventative Services Task Force)

**Ultrasonography has been proven 96-100% effective in diagnosing AAA.**



## Intervention

- Treatment goal for AAA: Prevent rupture by lowering BP to  $< 130/80$  mmHg
- Pharmacological treatment to halt aneurysm expansion:
  - Nonsteroidal anti-inflammatory drugs
  - Beta-blockers
  - Surgical Repair





Arteriogram after successful endovascular repair of an AAA

(Pearce et al.: <http://emedicine.medscape.com/article/1979501-overview>)



# EVALUATION

- <3cm      No further testing
- 3-4cm      Yearly follow ups
- 4-4.5cm    Every 6 months
- >4.5cm    Referred to a vascular subspecialist
- >5.5cm    Consider AAA repair



# CONCLUSION

- A one time ultrasonography screening for males over the age of 65 will decrease the chances of mortality in AAA rupture due to early detection.
- Males over the age of 65 can prevent themselves against AAA rupture with early screening and lifestyle modification by decrease risk factors such as tobacco cessation, weight loss, physical activity, and managing present medical conditions.



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**Mahalo**

