

# Abdominal Aortic Aneurysm (AAA)

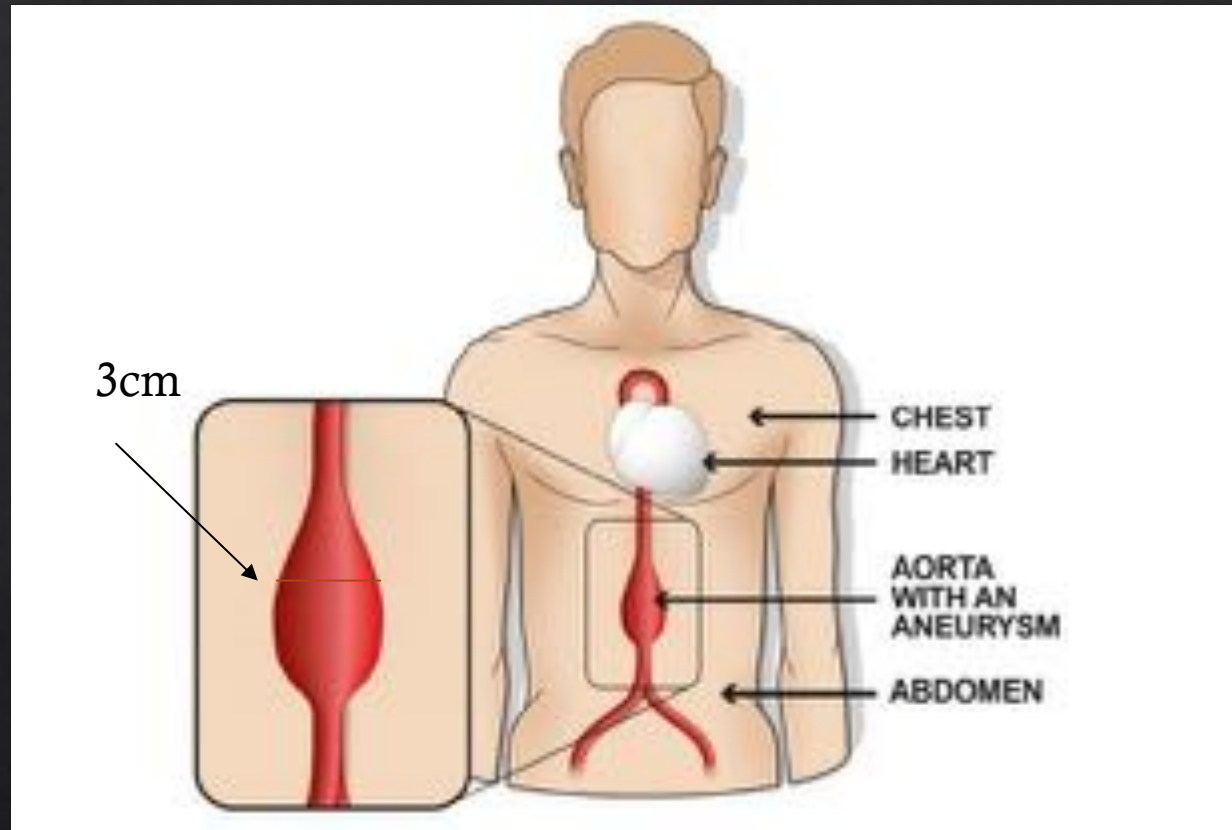
EPIDEMIOLOGY

DEVELOPMENT

EXPANSION

CASE STUDIES

# AAA Introduction



# AAA Rupture

- ◇ <1% rupture risk for AAA baseline diameter 4.0 – 4.9cm at 12 months
- ◇ 1-11% rupture risk for AAA baseline diameter 5.0 – 5.9cm at 12 months
- ◇ 10-22% rupture risk for AAA baseline diameter 6.0 – 6.9cm at 12 months
- ◇ 30-33% rupture risk for AAA baseline diameter >7.0cm at 12 months



- ◇◇ For AAA baseline diameter >8.0cm

# AAA Mortality Rate

50-75% dead before they reach the hospital

50% of those who manage to reach the hospital will die before they reach the operating table

60% of those who manage to reach the operating table will die within 30 days of the operation

Early diagnosis and treatment critical before rupture





# AAA EPIDEMIOLOGY

4 original screening studies

- Multicentre Aneurysm Screening Study (MASS)
- Good- quality Viborg Country, Denmark, screening trial
- Fair-quality Chichester, UK, screening trial
- Fair-quality Western Australia Screening Trial

Prevalence of AAA in males over 65 years of age: 4.0 – 7.6%

Prevalence of AAA in females over 65 years of age: 1.3%

# AAA Epidemiology



# AAA & Tobacco Use

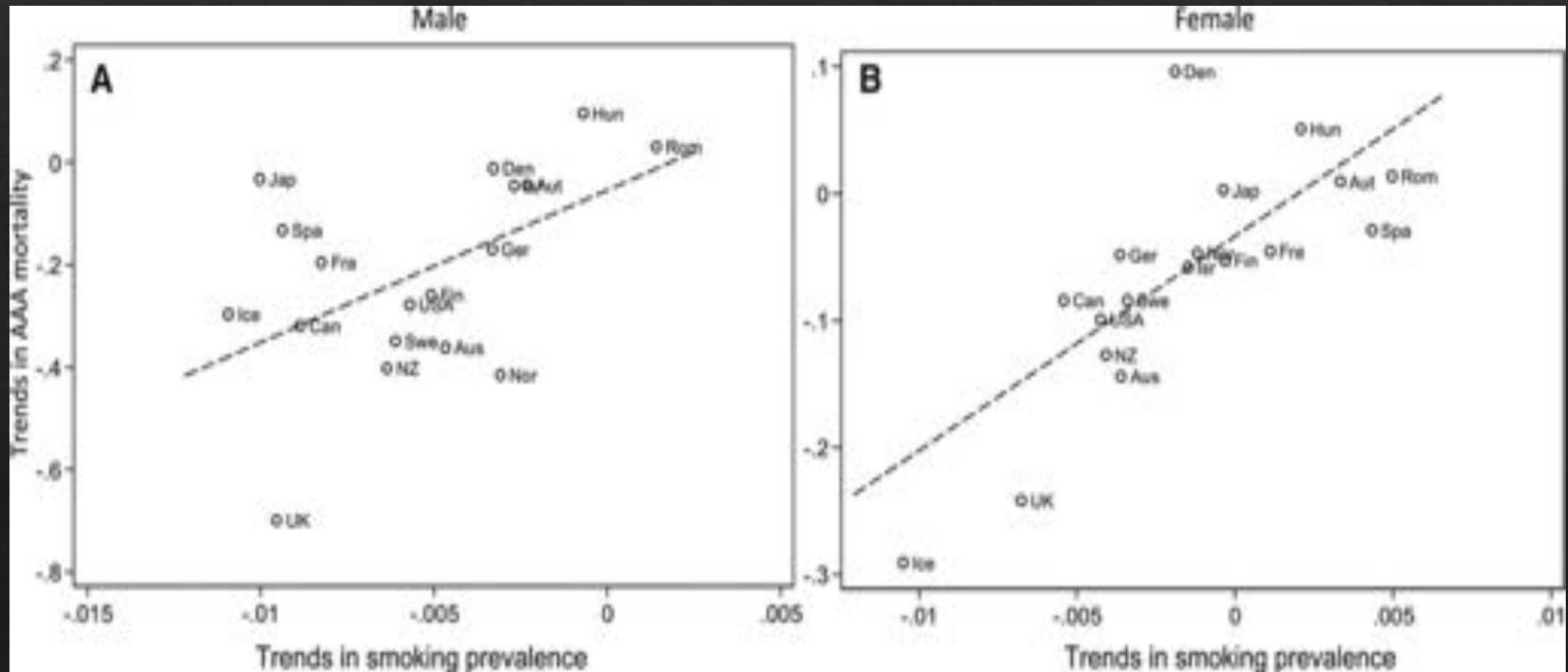
## GLOBAL TOBACCO USE (WHO):

- ◆ 1.337 billion people used tobacco in 2018 compared to 1.397 billion people in 2000
- ◆ 60 million people reduction.

## AUSTRALIAN TOBACCO USE (AIHW):

- ◆ 1991 – 25% of adults smoked
- ◆ 2016 – 12.8% of adults smoked
- ◆ 2019 – 11.6% of adults smoked

# AAA & Tobacco Use





# Risk Factors – Development of AAA

Advanced age

Male sex

Caucasian race

Family history

Tobacco use

Atherosclerosis

The presence of other large vessel aneurysms



# AAA & Tobacco Use

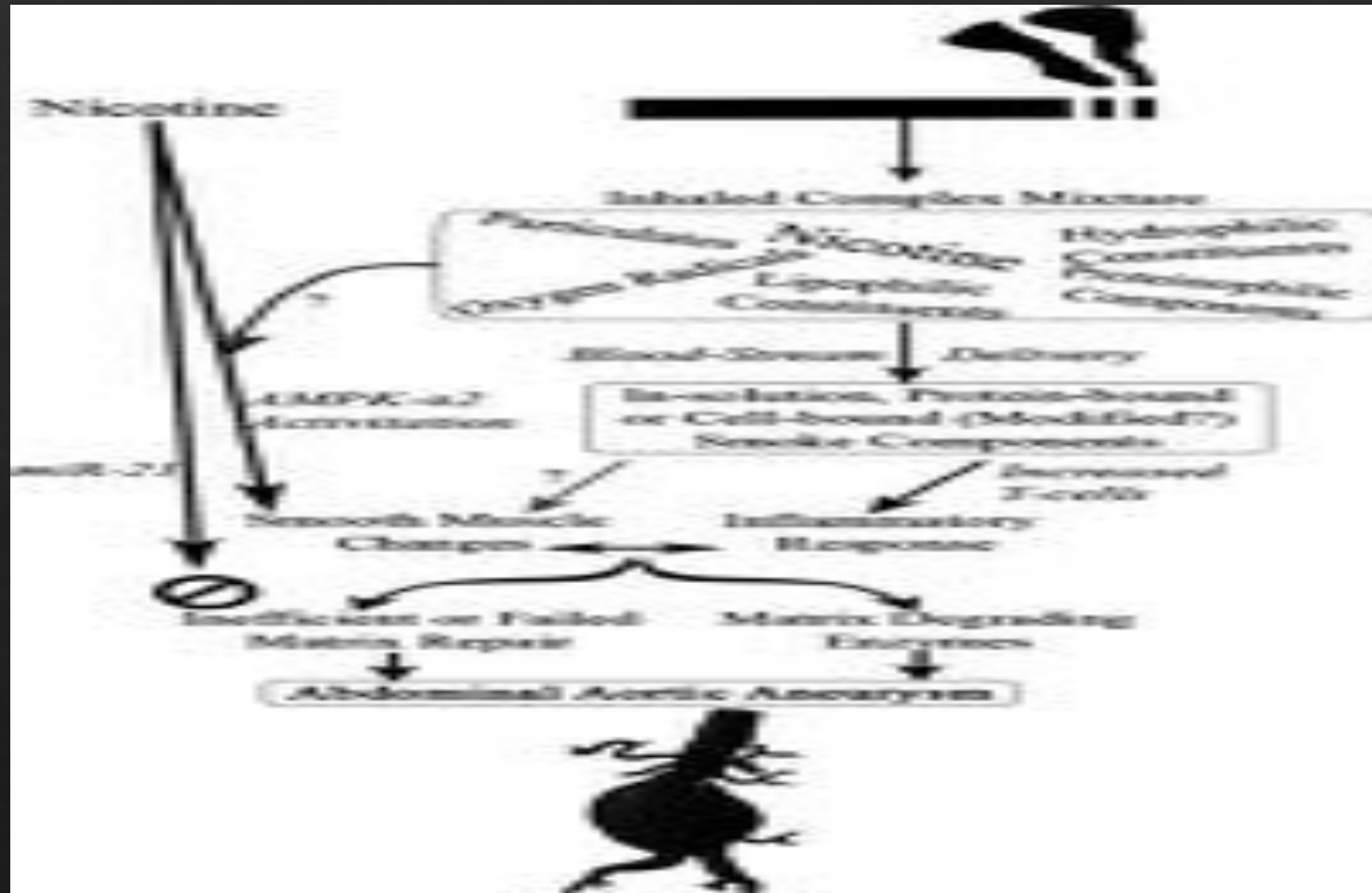
90% of all AAA patients have a history of tobacco use

Current male smokers have a 5-8 fold increased risk

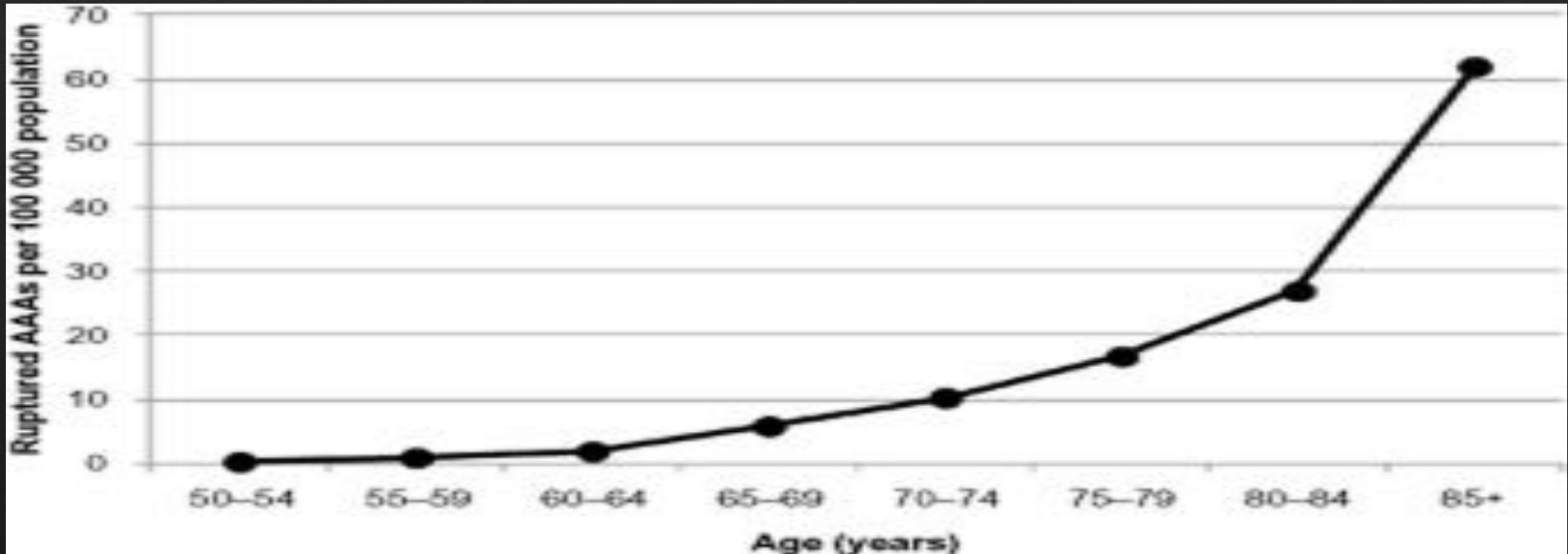
Current female smokers have a 15 fold increased risk

Males who smoke over 1 pack a day have a 15 fold increased risk

# AAA & Tobacco Use



# AAA Risk Factors: Advancing Age



# AAA Risk Factors: Males

5 - 6 times more likely to develop a AAA

# AAA Risk Factors: Family History

<b>Individuals with AAA</b>	<b>20% with family relative with AAA</b>
Individuals with no AAA	2 – 10% with family relative with AAA

At least a 2 fold increased risk of developing a AAA with a positive family history

11:45

TIS: 0.5  
TIB: 0.5  
MI: 0.9

SIEMENS

8C2 / \*AORTO-ILIACS

General

2D 100%

THI / H6.00 MHz

8 dB / DR 70

ASC 5 / DTCE H

Map D / ST 3

E 1 / P 2

T 12 / B 0

D=16.8 mm

D=21.8 mm

GASTRODUODENAL ARTERY ANEURYSM

16cm

15cm

Z

Fr214



Leser (1:44)

TIS: 0.5  
TIB: 0.5  
MI: 0.9

SIEMENS

6C2 / \*AORTO-ILIACS

General

2D 100%

THI / H8.00 MHz

6 dB / DR 70

ASC 5 / DTCE H

Map D / ST 3

E 1 / P 2

T 12 / B 0

D=16.5 mm

GASTRODUODENAL ARTERY ANEURYSM

Fr132

# AAA Risk Factors: Race

Most common among;

- Caucasians of European descent &
- Non-Hispanic white Americans

10-fold lower in Asian populations.

0.45% Asian men develop AAA over 65 years of age

# AAA Risk Factors: Atherosclerotic disease

Coronary artery disease is present in over 25% of individuals with a AAA

Peripheral arterial disease is present in over 12% of individuals with a AAA

Incidence of AAA as low as 0.6% in patients with no known cardiovascular disease

Diabetes is a negative risk factor

## AAA Risk Factors: Other Large Vessel Aneurysms

Femoral artery aneurysm – concomitant AAA 85% of the time

Popliteal artery aneurysm – concomitant AAA 60% of the time

AAA also found to coexist with intracranial aneurysm

# AAA Expansion

Large aneurysm diameter

Smoking

Female sex

History of cardiac or renal transplant

Decreased forced expiratory volume

Hypertension

# AAA – Aneurysm Diameter

AAA size	AAA growth rate
3.0cm – 4.0cm	0.22cm/year
4.0cm – 6.0cm	0.37cm/year
>6.0cm	0.69cm/year



# AAA Expansion: Tobacco Use

Increased expansion rate of 15-20% per annum

2-fold increase risk of aneurysm rupture

# AAA Expansion – Female Sex

More rapid expansion

Higher tendency to rupture at smaller diameters

3 x higher mortality from rupture

# AAA Expansion: Cardiac or renal transplant

Increase in prevalence of AAA with transplant

AAA expansion rates were higher relative to pretransplantation rates

# AAA Expansion – Decreased Forced Expiratory Volume

COPD

Emphysema

Asthma

# AAA Expansion: Hypertension

Increased risk of AAA rupture in hypertensive patients.

Risk of rupture from hypertension is considered 4 fold higher in woman then men

# ANEURYSM CASE STUDY 1

- ◊ Former Junior Australian Open Tennis Champion
- ◊ Competed in multiple grand slams
- ◊ Relatively young and healthy
- ◊ No known health problems
- ◊ Myocardial infarction
- ◊ Spontaneous coronary artery dissection
- ◊ Fibromuscular Dysplasia
- ◊ Renal Artery Aneurysm



TIB: 0.7  
TIB: 0.7  
MI: 1.4

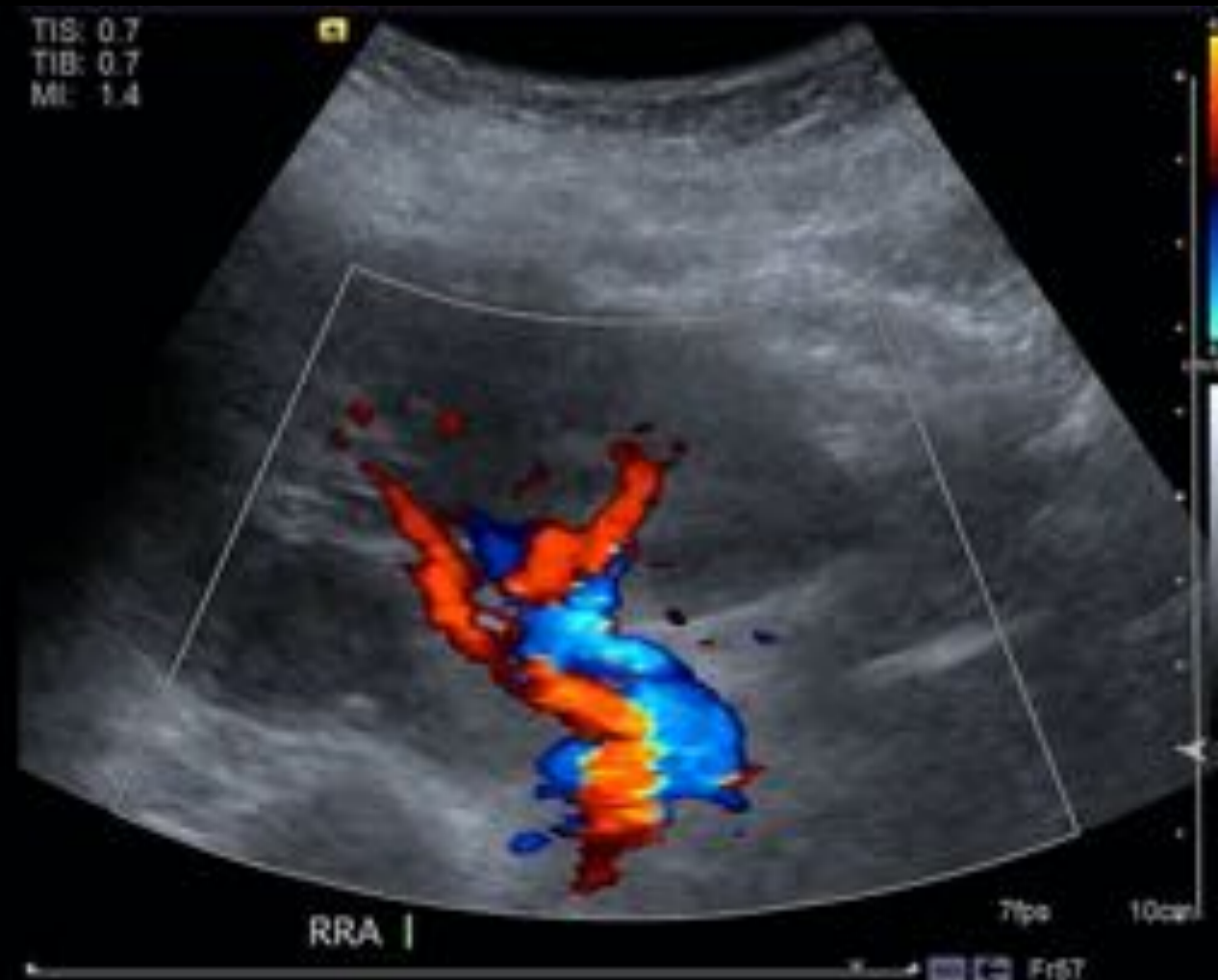


**SIEMENS**  
6C1 HD / \*ACRTO-ILIAC  
General  
20 100%  
THI / H5.50 MHz  
19 dB / DR 70  
SC 2 / DTCE M  
Map E / ST 2  
E 2 / P 2  
C 100%  
GDV / 2.50 MHz  
7 dB / Flow Gen  
PRF 4340 / F 1



Color (1.4)

TIS: 0.7  
TIB: 0.7  
MI: 1.4



**SIEMENS**  
6C1 HD / \*ACRTO-ILIAC  
General  
20 100%  
THI / H5.50 MHz  
19 dB / DR 70  
SC 2 / DTCE M  
Map E / ST 2  
E 2 / P 2  
C 100%  
GDV / 2.50 MHz  
2 dB / Flow Gen  
PRF 3125 / F 1

Sample D1-40

TIS: 0.8  
TIB: 0.8  
MI: 1.2



**SIEMENS**  
6C1 HD / \*ACRTO-ILIAC  
General  
20 \_\_\_\_\_ 100%  
THI / H5.50 MHz  
19 dB / DR 70  
SC 2 / DTCE M  
Map E / ST 2  
E 2 / P 2  
C \_\_\_\_\_ 100%  
GDV / 2.50 MHz  
2 dB / Flow Gen  
PRF 2700 / F 1  
D=23.5 mm

RRA DST

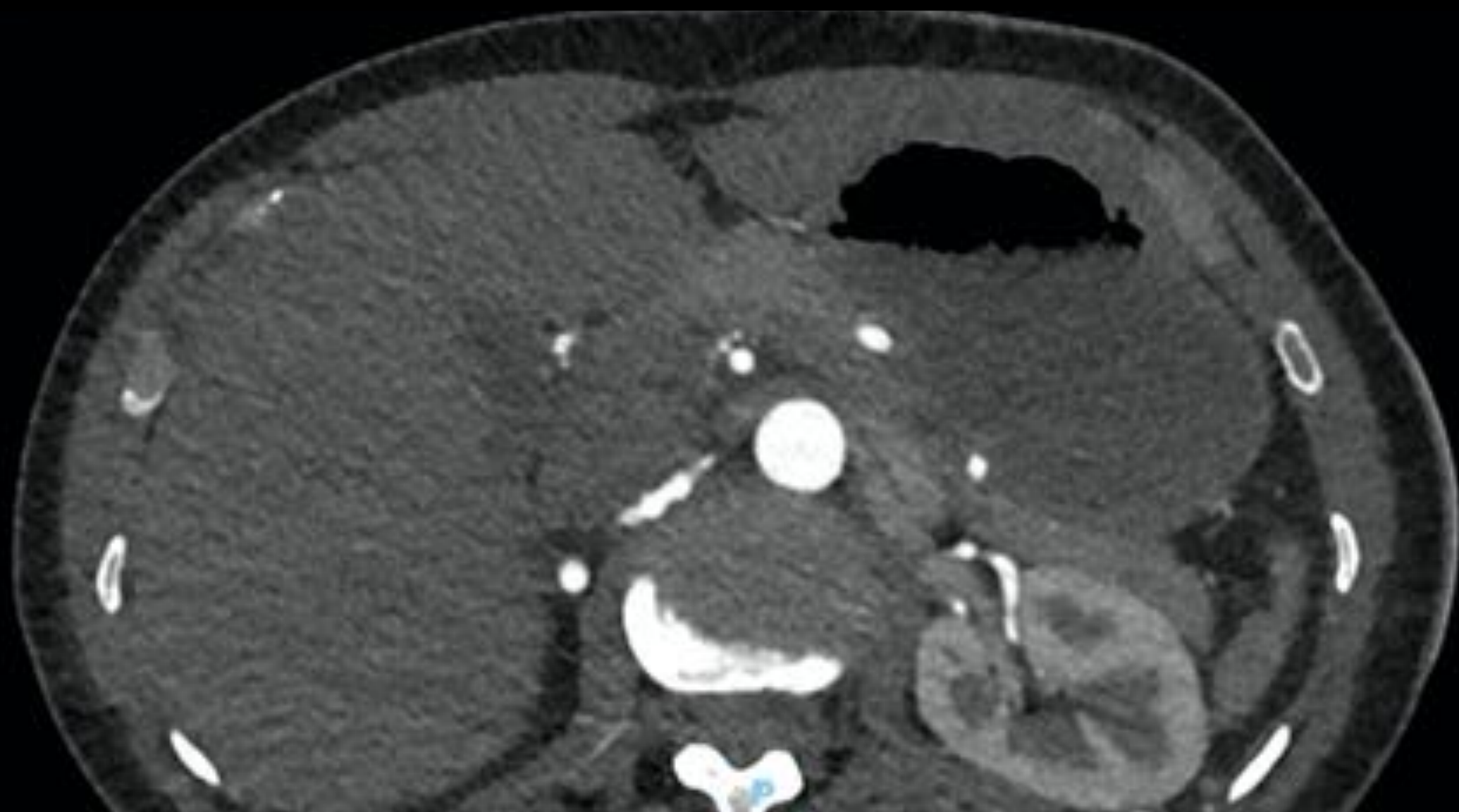
10fps

11cm

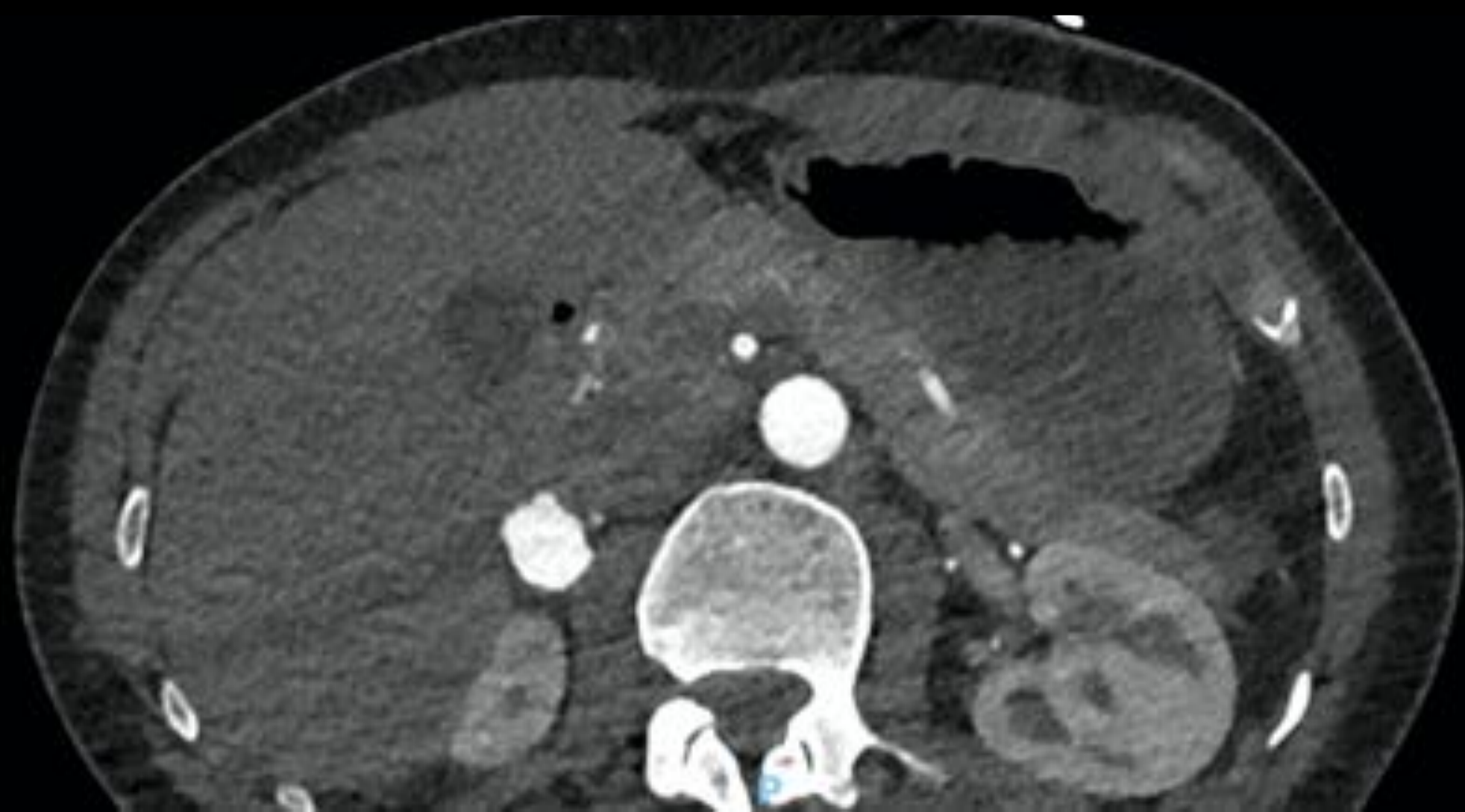
Fr23



R



R





# ANEURYSM CASE STUDY 2

- ◆ Right below knee amputation
- ◆ Left diabetic foot ulcer
- ◆ Incidental finding of ?mycotic pseudoaneurysm of the suprarenal abdominal aorta

(1)



Resona 6  
B

F 10.0

G 18.0

G 47

FW 22

DM 120

IClear 5

IBeam 2

Z 1.10

SSI 1540

-8

-

-

-

-

-

-

-1

-

-

-

-

-

-10

-

-

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-

-

-15

-

-

-

-

-

Aorta Prox

10/10

P 43.32% M 1.3 T 0.6

mindray

Recon 5

B

F 48.0

D 20.0

G 60

PR 20

DR 120

IClear 5

IBeam 2

Z 2.00

GB 1540

1 Dist 3.26 cm

AORTA SUPRARENAL OUTPOUCH

5/17/20





Resona 6

8

F 145.0

D 14.0

O 55

FR 12

DR 120

IClear 5

iBeam 2

Z 1.10

SD 15.00

1 Dist 5.66 cm

2 Dist 2.31 cm

# ANEURYSM CASE STUDY 3

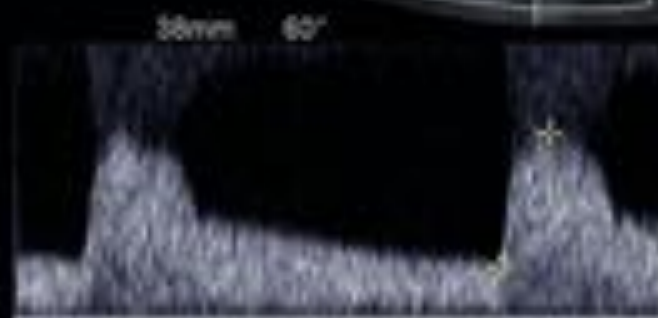
- ◆ Renal artery transplant
- ◆ Surveillance scan
- ◆ Recent imaging at a general radiology practice
- ◆ Renal artery anastomosis not seen







TIS: 1.0  
TIB: 3.0  
MI: 0.7



LT TX RA DST \_

Col412

**SIEMENS**  
6C2 / \*AORTO-ILIACB  
General  
20 \_\_\_\_\_ 100%  
THI / H5.00 MHz  
4 dB / DR 70  
SC 2 / DTCE H  
Map D / ST 3  
E 2 / P 2  
C \_\_\_\_\_ 100%  
GDV / 3.25 MHz  
-2 dB / Flow Gen  
PRF 1220 / F 1  
14 cm/s  
D \_\_\_\_\_ 100%  
PW / 2.50 MHz  
78 dB / DR 55  
Map F / GS 2.5  
PRF 4340 / F 130  
RI=0.72  
PS=147.4 cm/s  
ED=41.2 cm/s

R



R



P

THANK YOU