

New joy of cardiac disease

Coronary artery disease

- CT coronary angiography
- The bioabsorbable stent

Valvular heart disease

- Percutaneous aortic valve replacement
- Mitral clip for mitral incompetence

Arrhythmias

- 3-dimensional mapping
- MRI compatible pacemakers
- The subcutaneous implantable defibrillator



A Fully Bioabsorbable stent



BVS everolimus-eluting stent

*Ormiston JA et al,
Serruys PW et al,
Ormiston JA*

*Lancet 2008
Lancet 2009
Circulation Intervention 2009*

Conventional metallic stents

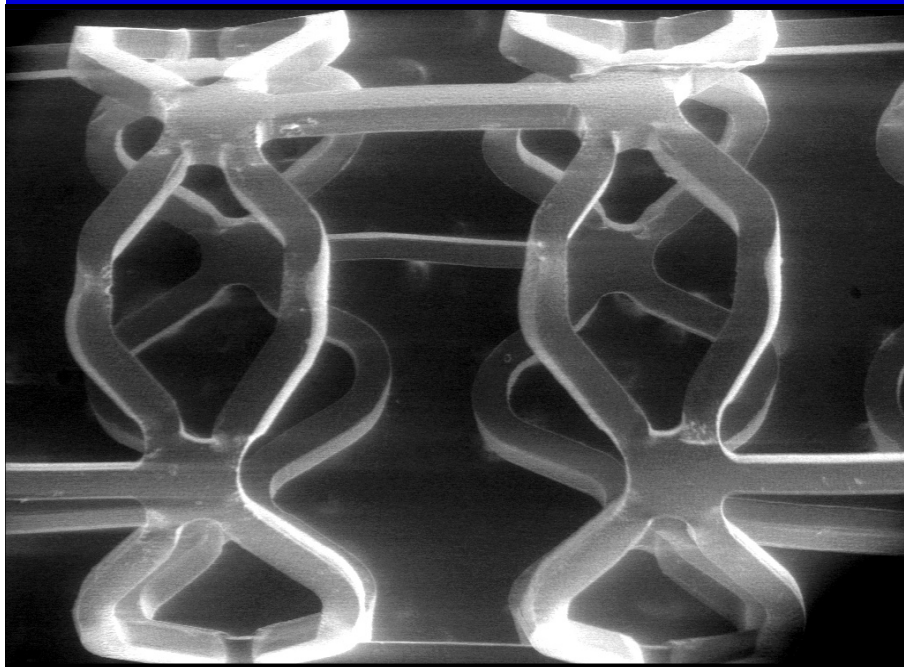
- ▶ ***Limit restenosis by controlling intimal flaps, optimizing initial lumen size, preventing constrictive remodelling and delivering antiproliferative drug***
- ▶ ***Radial support is needed to limit the negative remodelling for a few months***
- ▶ ***Why have a permanent implant when a temporary can do the job?***

Bioabsorbable stents may-

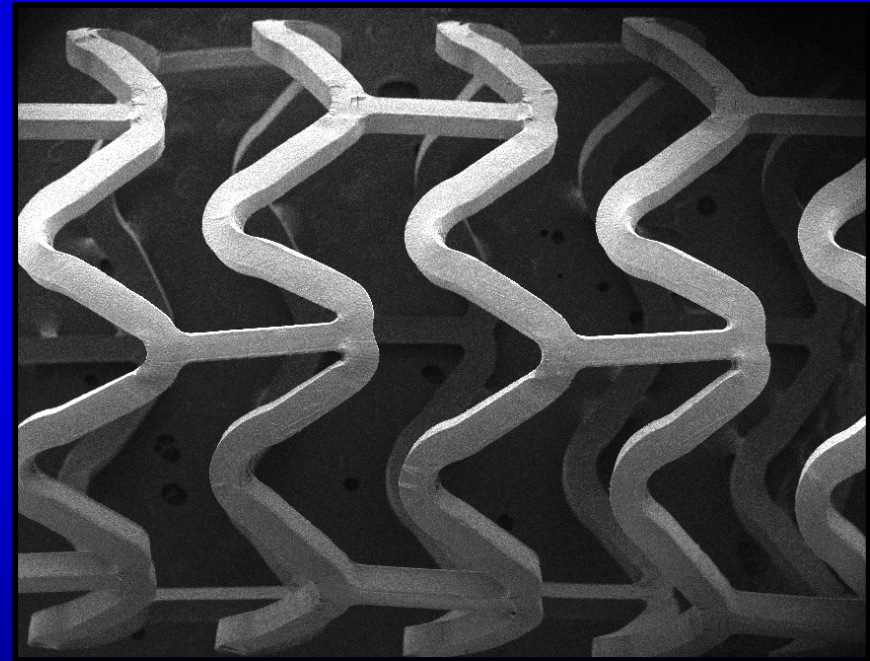
- ▶ Reduce late stent thrombosis and duration of DAT
- ▶ Restore normal vasomotion
- ▶ Facilitate re-intervention- no jailed sidebranches or "full metal jacket"
- ▶ Allow non-invasive follow-up with MRI and CT
- ▶ Potential pediatric role
- ▶ Satisfy patient desire not to have permanent implant

The BVS Everolimus-eluting bioresorbable stent has

- Struts constructed from Poly-Lactic Acid
- Coating releases everolimus
- More uniform support and longer lasting radial support

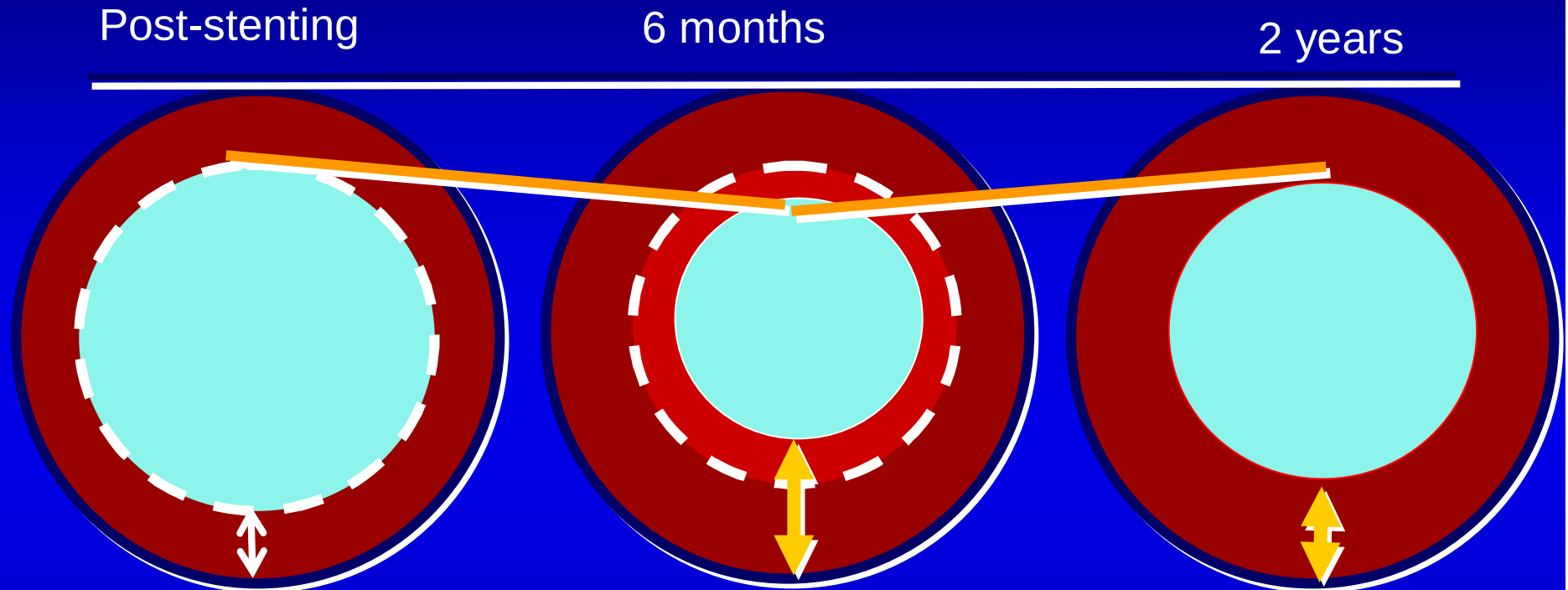


SEM Gen 1.0 Cohort A



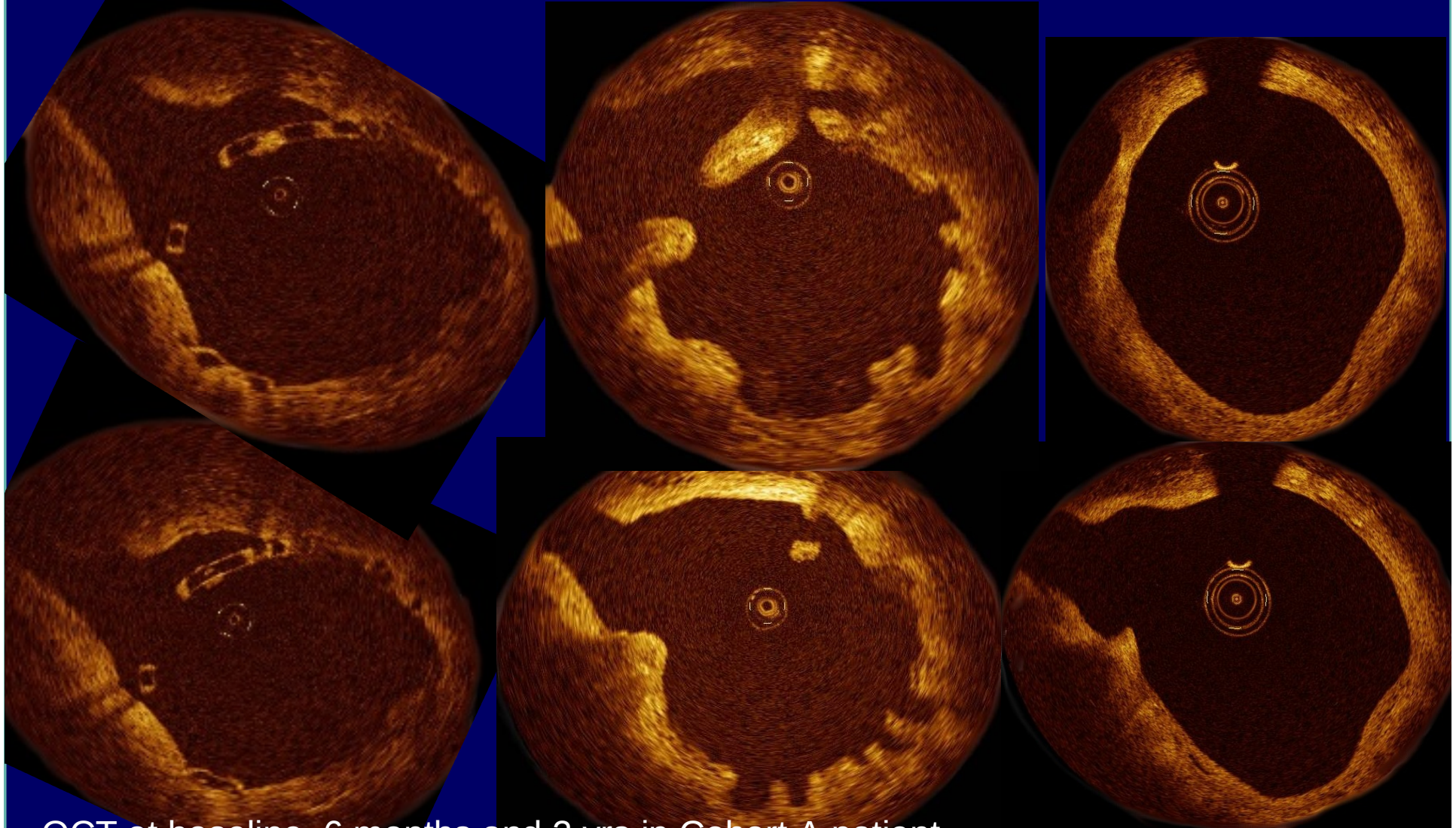
SEM Gen 1.1 Cohort B

Absorb. Serial changes on IVUS to 2 yrs



- 1. Vessel size (EEL) does not change (white)**
- 2. Stent (broken line) shrinks 11% by 6 months then disappears**
- 3. Lumen (blue) shrinks in area by 16% at 6 mo then increases**

BL

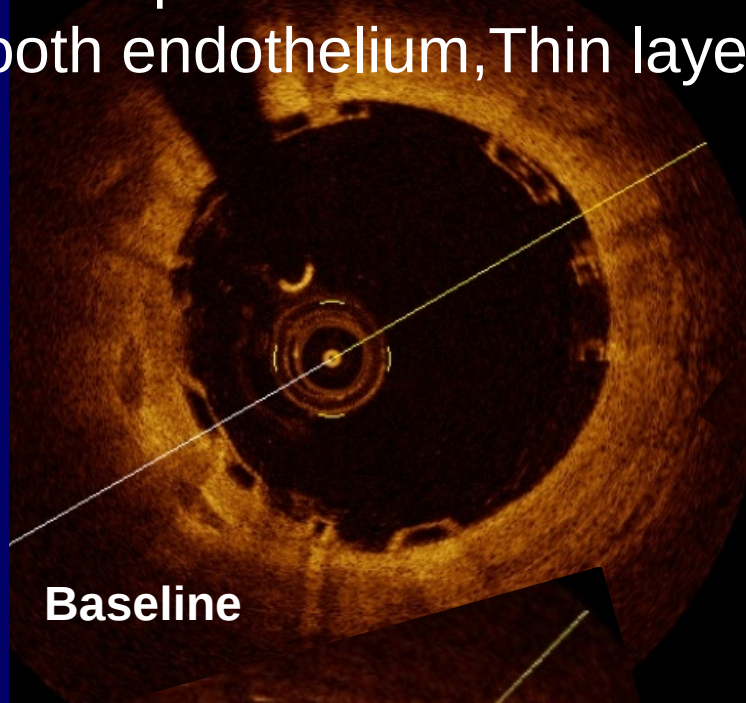


OCT at baseline, 6 months and 2 yrs in Cohort A patient

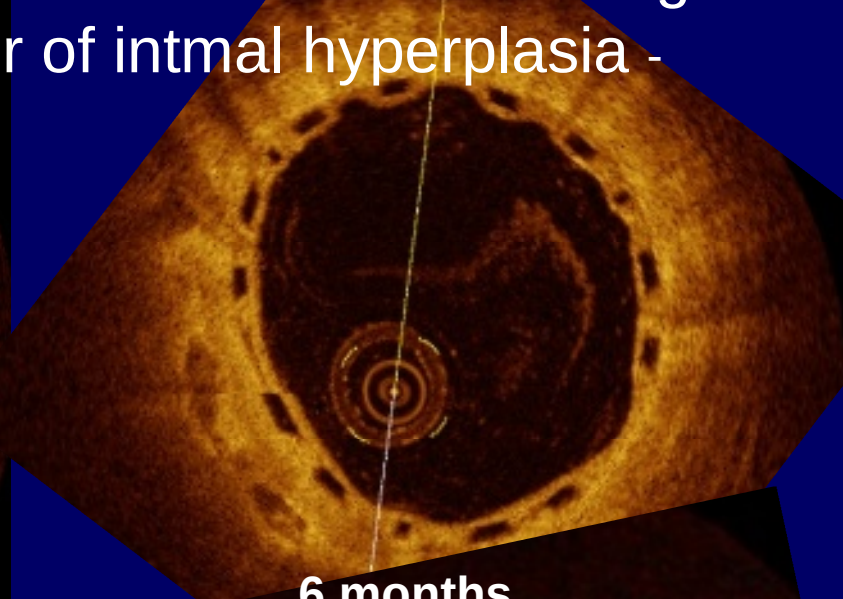
At 6 months there is a thin intimal layer, corrugated endolumen due to stent shrinkage and struts across a side-branch

At 2 yrs the struts have largely disappeared, lumen has enlarged, endolumen no longer corrugated, and no side-branch jail

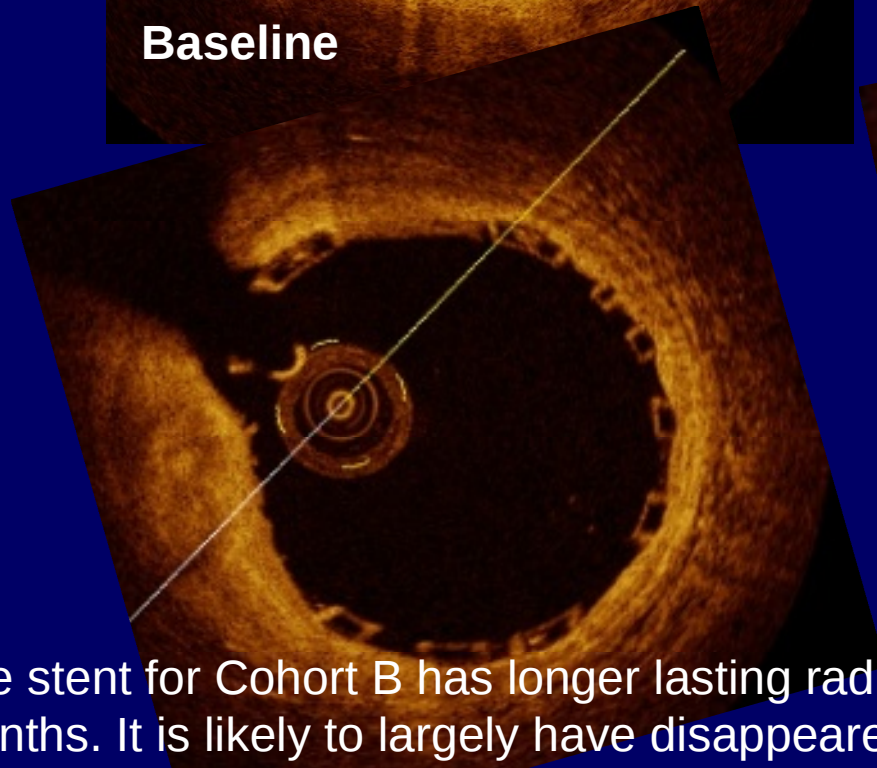
Cohort B patient- at 6 months there is no strut shrinkage
Smooth endothelium, Thin layer of intimal hyperplasia -



Baseline



6 months



The stent for Cohort B has longer lasting radial support so does not shrink by 6 months. It is likely to largely have disappeared by 2 yrs



Time will tell whether or not bioabsorbable stents represent a major breakthrough in treatment of coronary artery disease

In 10 yrs we may look back and laugh at how we used to leave metal in coronary arteries

MitraClip percutaneous treatment of mitral regurgitation

A major step in interventional cardiology

To be introduced to Asia Pacific Region by
Mercy Angiography this year (2010)

There is a current surgical technique with Edge-to-Edge Repair (Alfieri Stitch) for mitral regurgitation

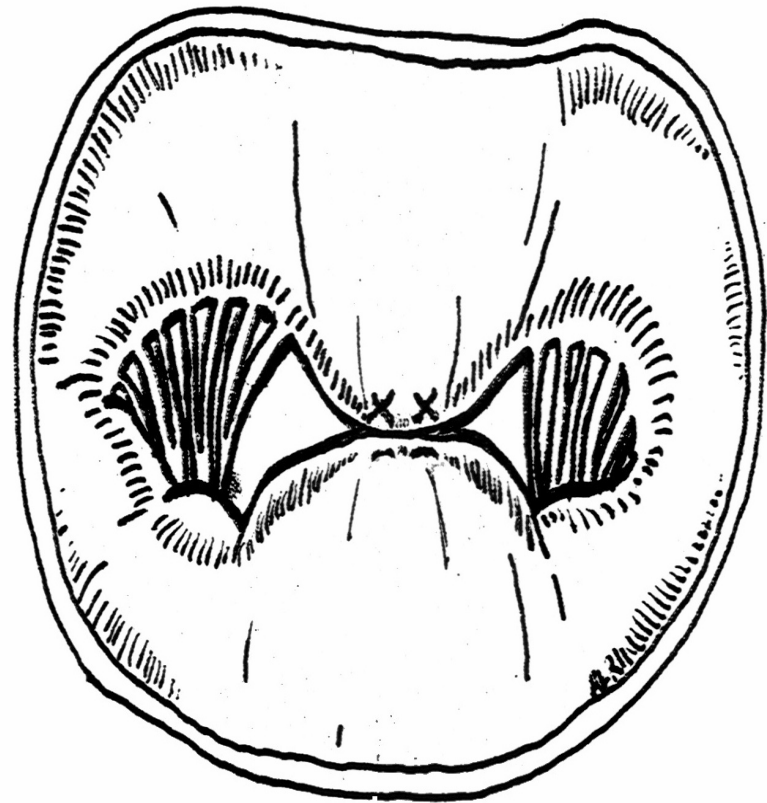
Accepted technique

Over 900 reported in PRL

**Outcomes equivalent to standard of
care surgical therapy**

Applicable to MR etiologies

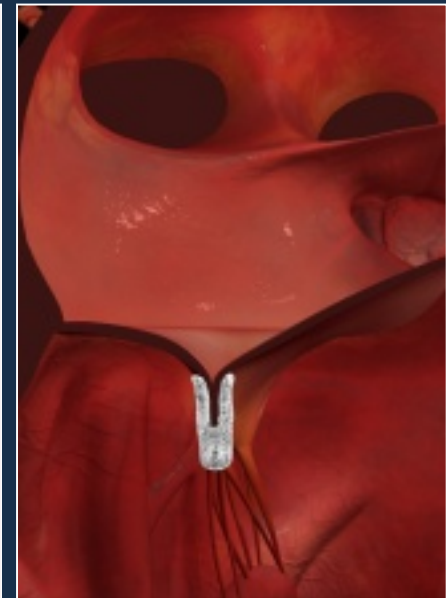
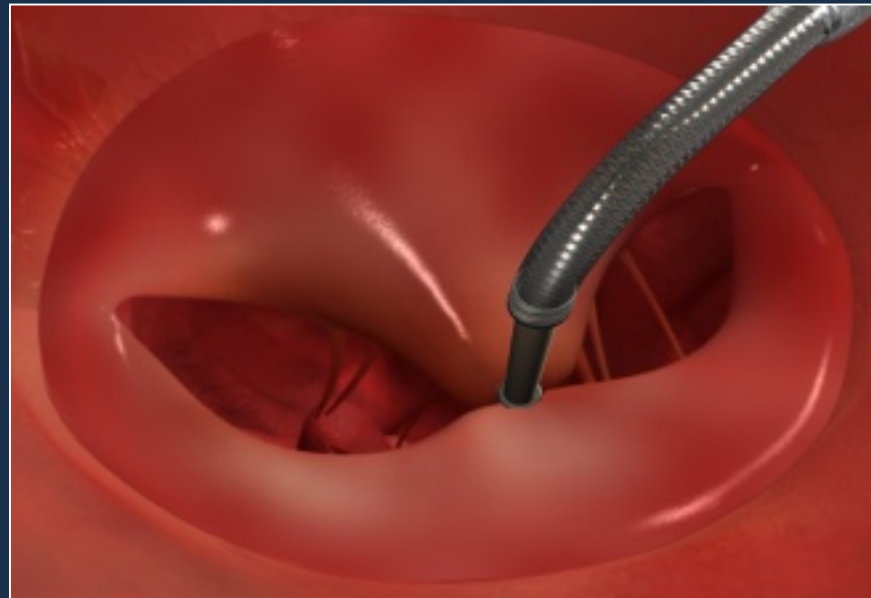
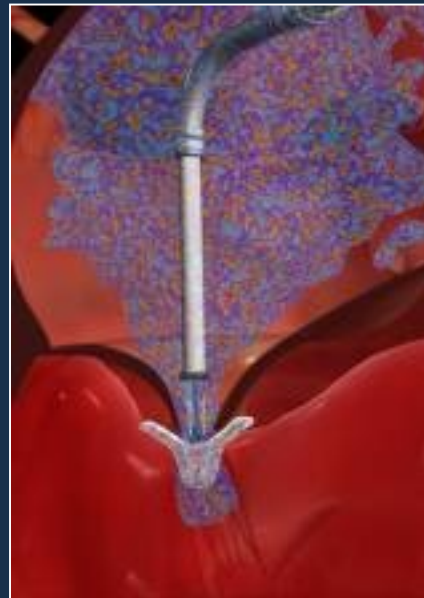
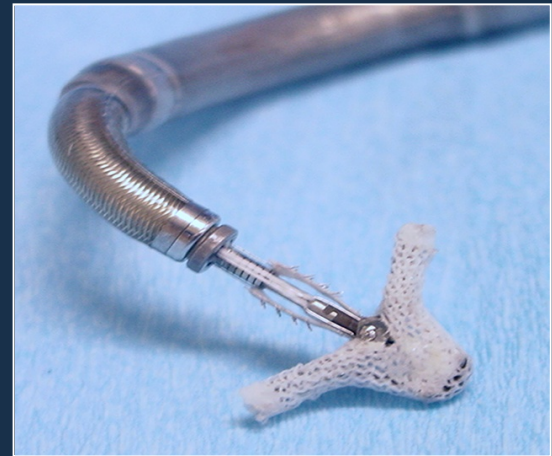
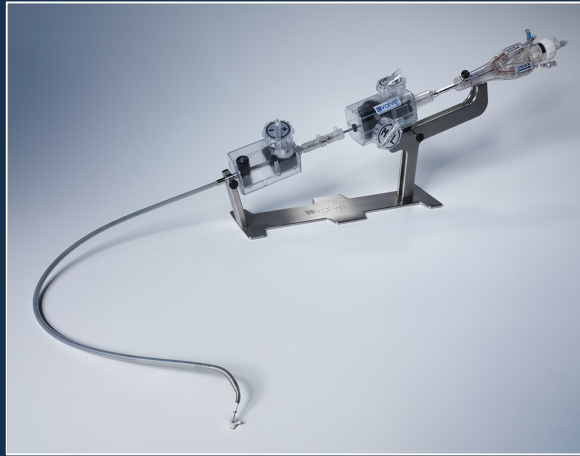
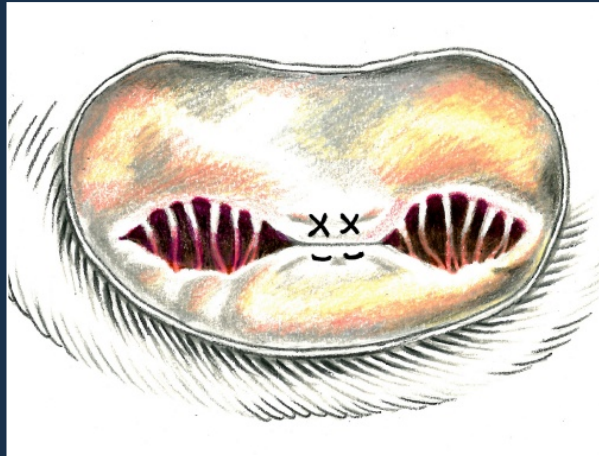
- **Structural (Degenerative)**
- **Functional**



The anterior and posterior leaflets
can be joined by a MitraClip
mimicking the surgical suture

Catheter-Based Mitral Valve Repair

MitraClip® System





The Everest II randomized trial of surgery vs MitraClip for mitral regurgitation showed that thet MitraClip was

1. Non-inferior for efficacy
2. Had a highly significant reduction in complications

Feldman ACC 2010





The Subcutaneous Defibrillator

From concept to reality



Margaret Hood and Warren Smith

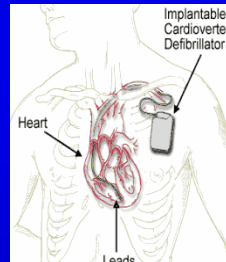
Evolving ICD Technologies

1985



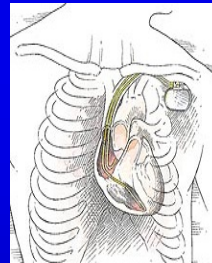
**Abdominal
ICD**

1990



**Transvenous
ICD**

1995



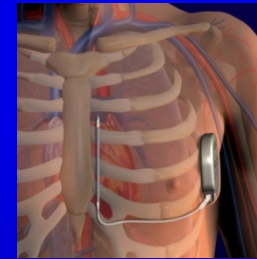
**Dual Chamber
ICD**

2001



CRT-D

2008

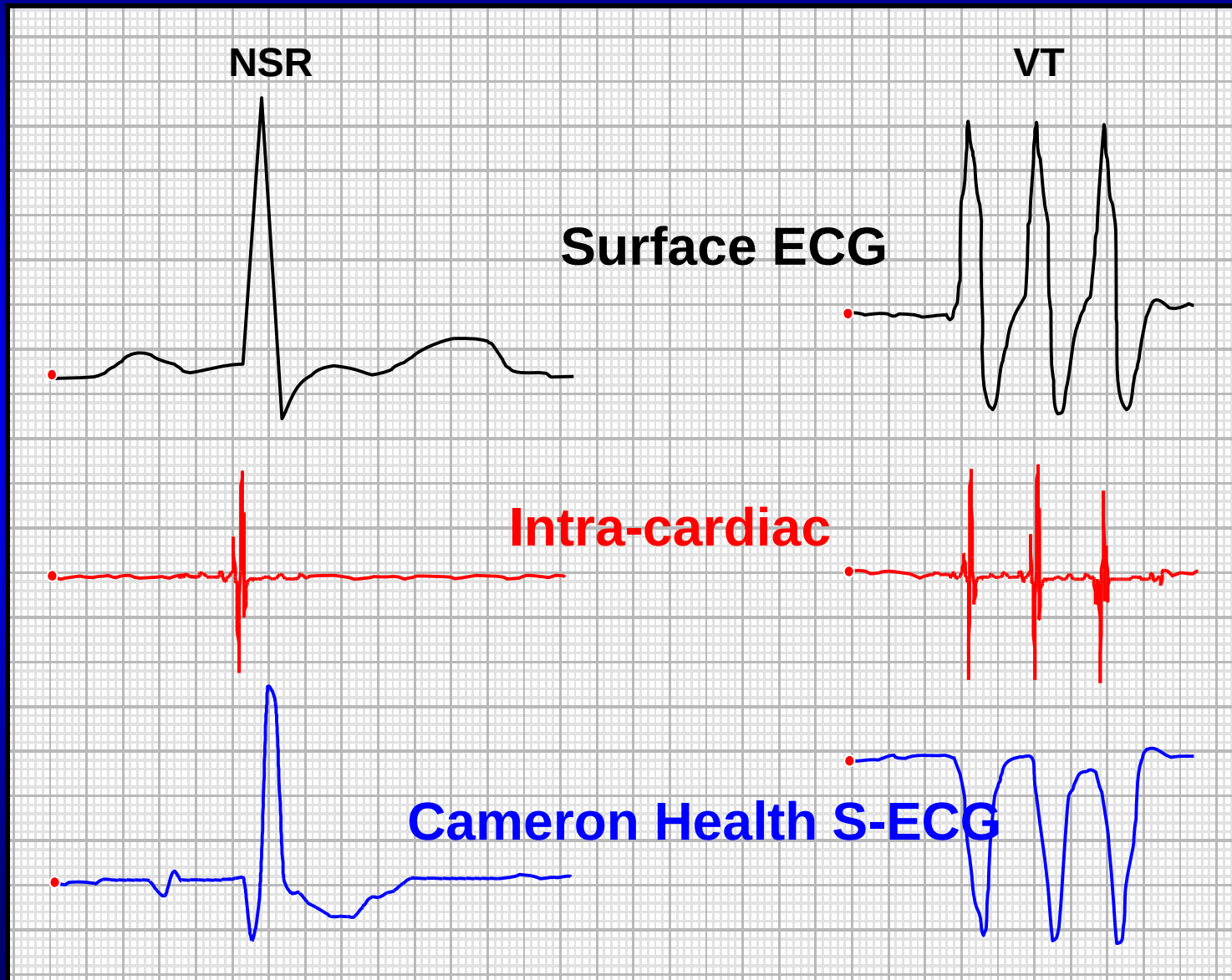


S-ICD®

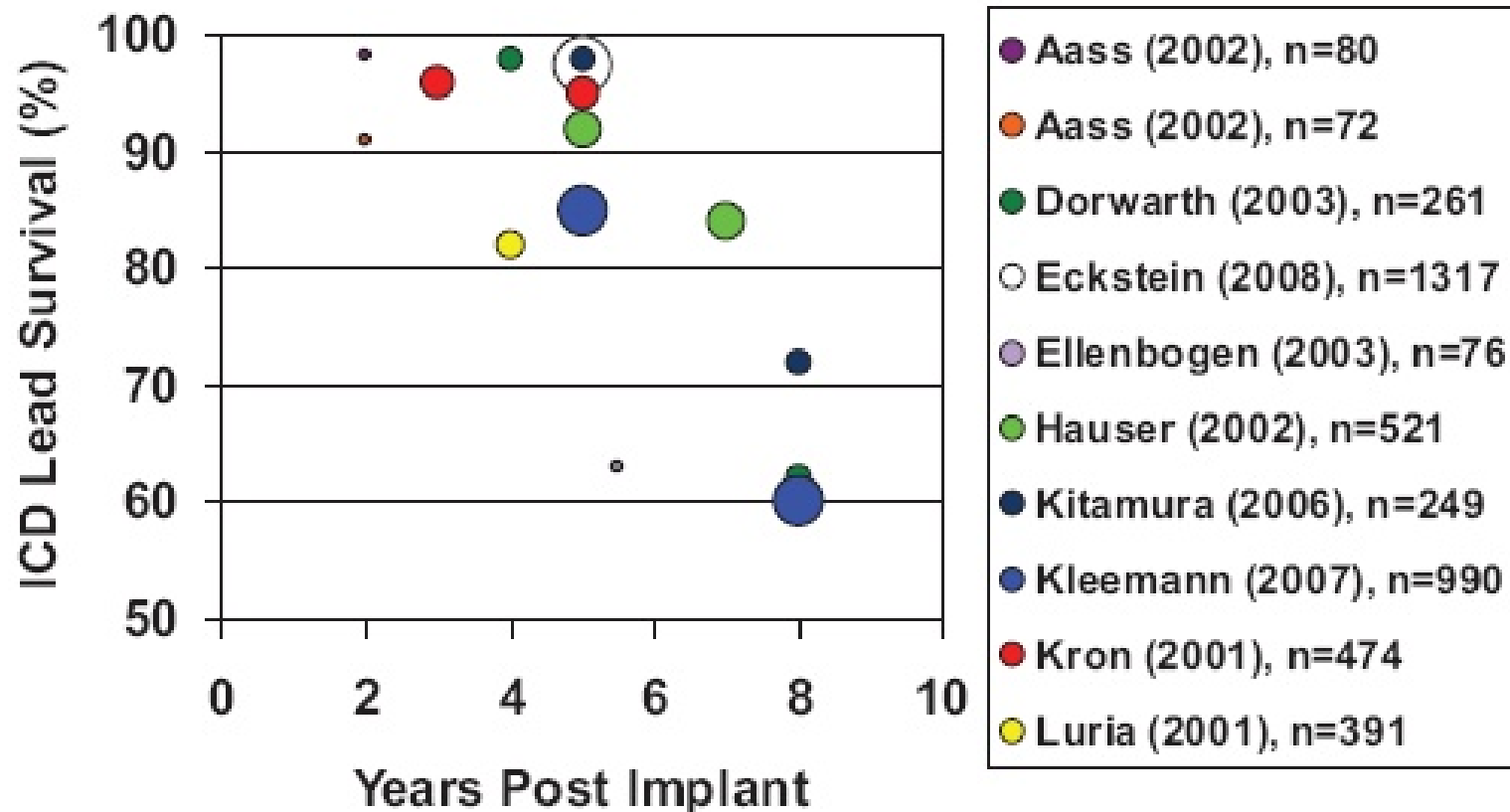
What does the S-ICD® System not possess?

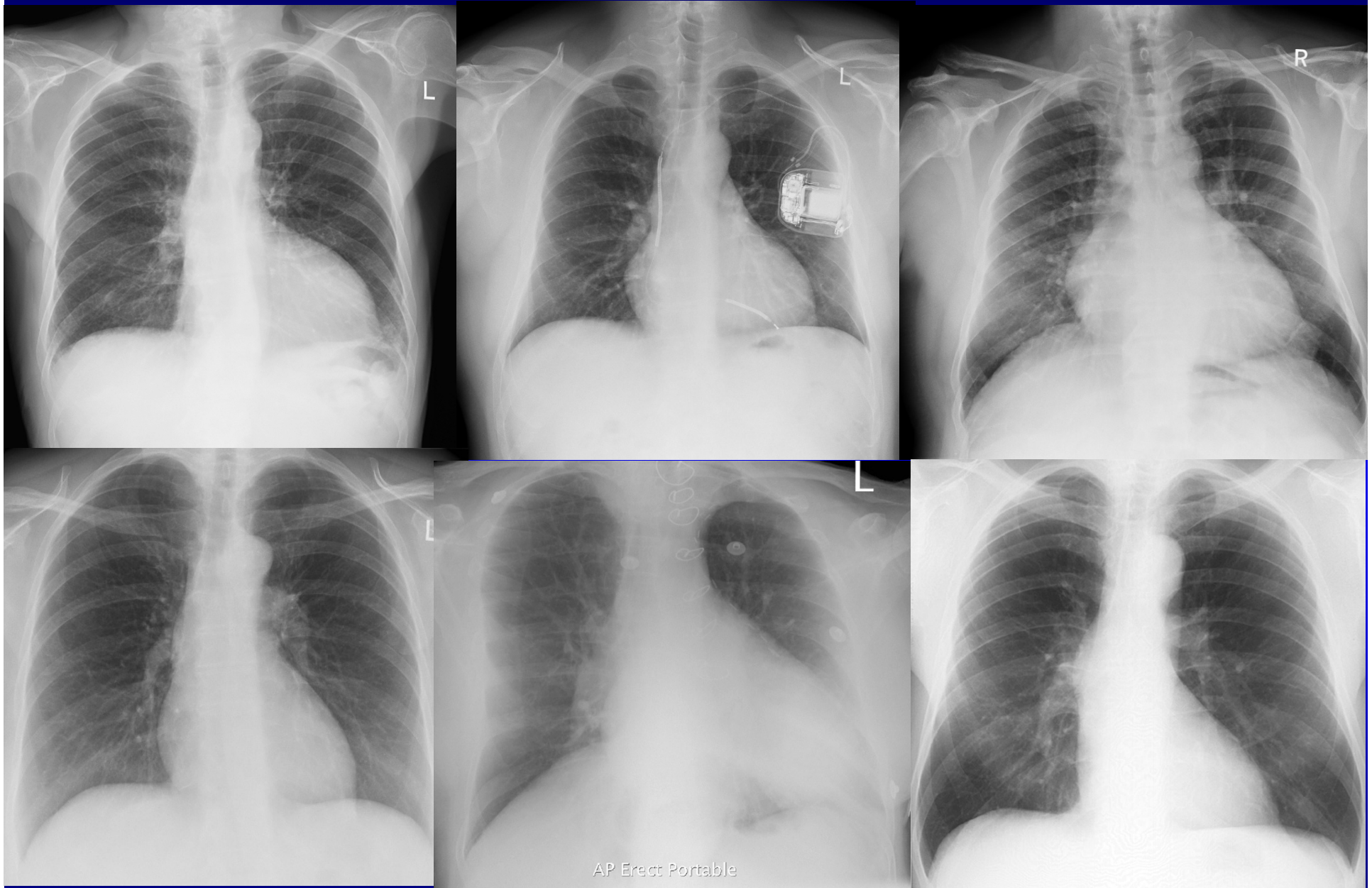
- No atrial or ventricular lead
- No long term pacing or CRT
- No ATP
- Unnecessary complexity

What does the S-ICD[®] see? Something like V_6-V_1



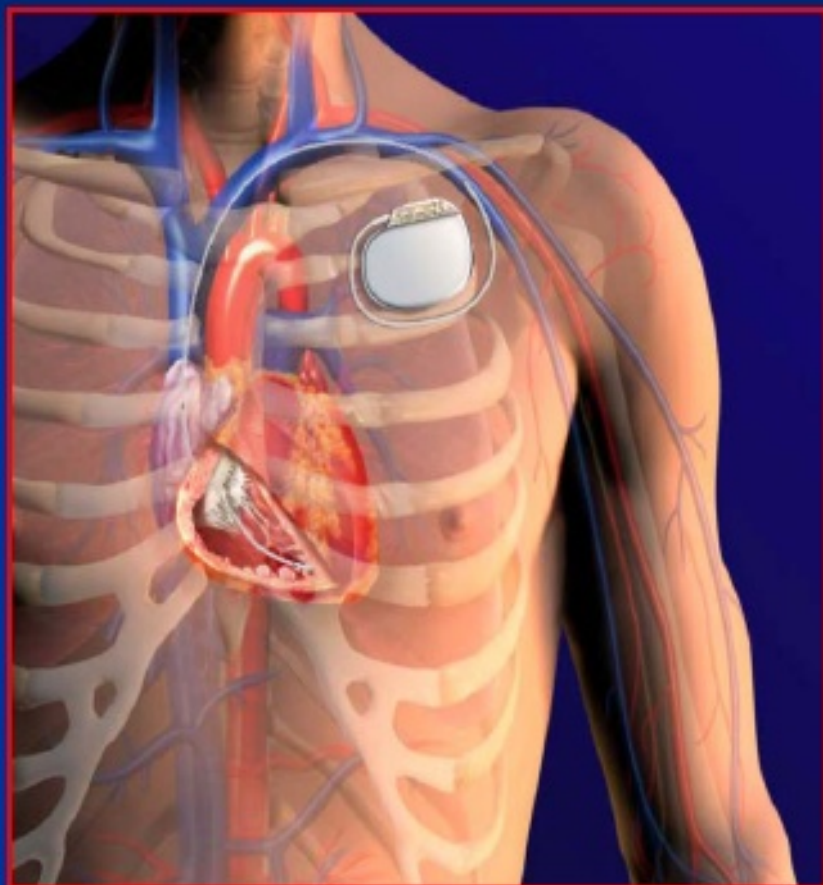
ICD Lead Performance



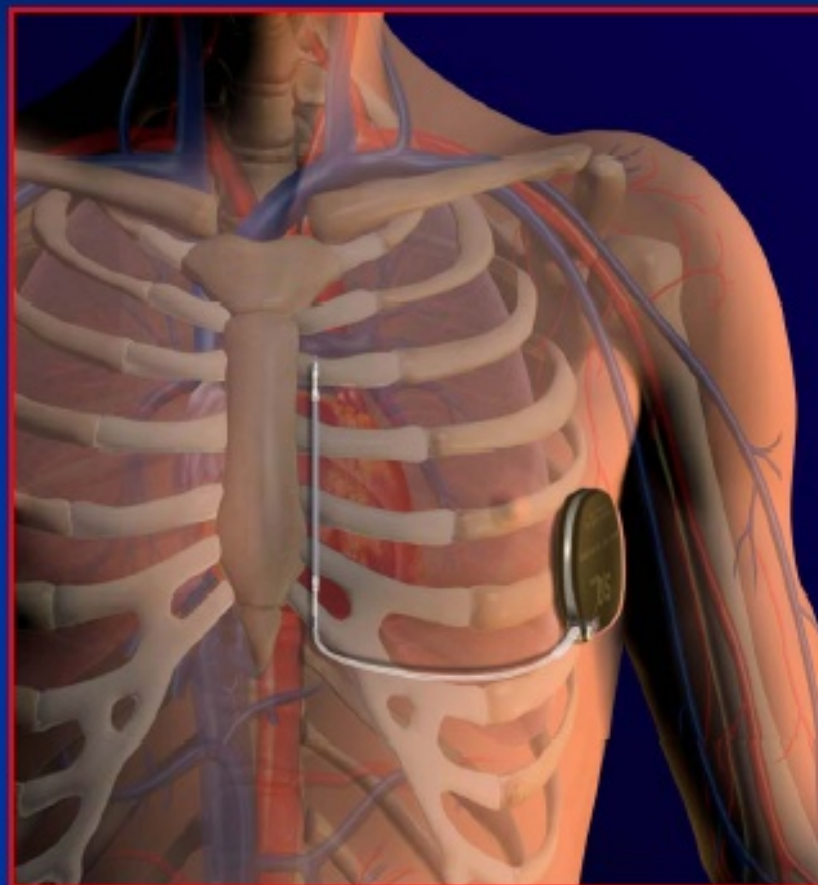


DFT's reasonable and repeatable in the face of variable anatomy

Defibrillator Options

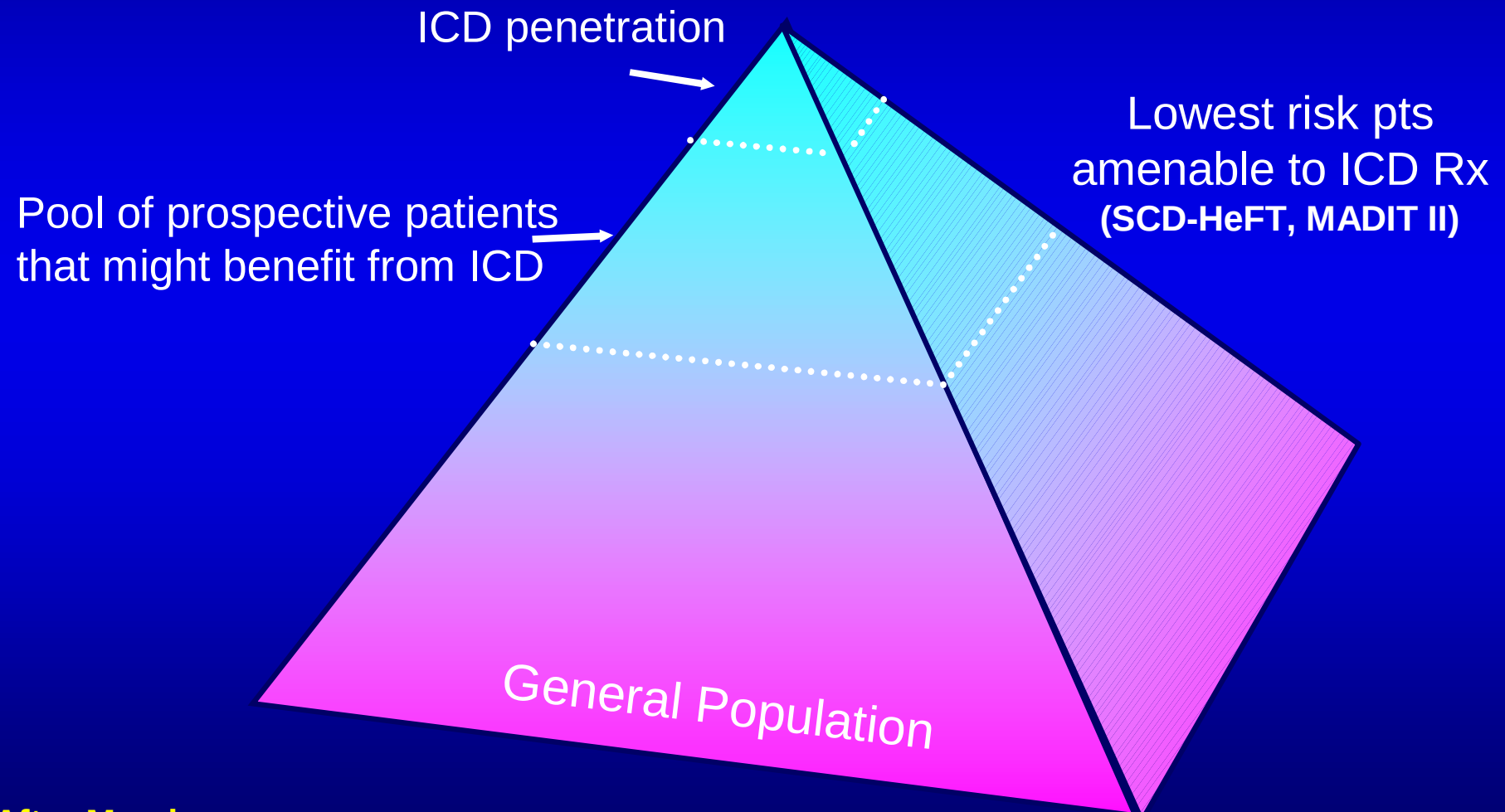


Transvenous



Subcutaneous

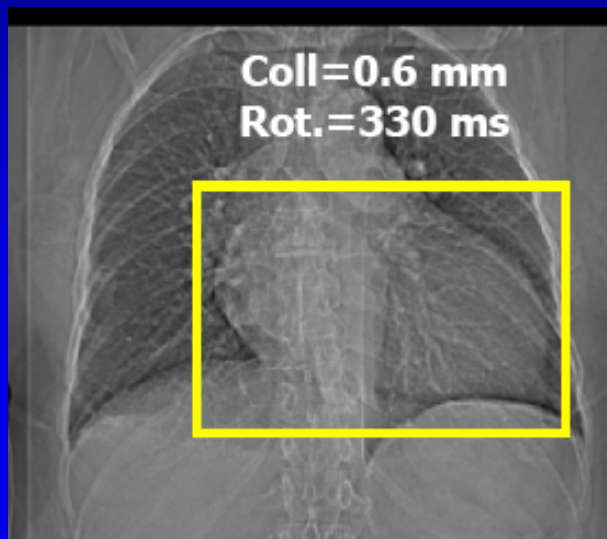
ICD Penetration vs. Population at Risk



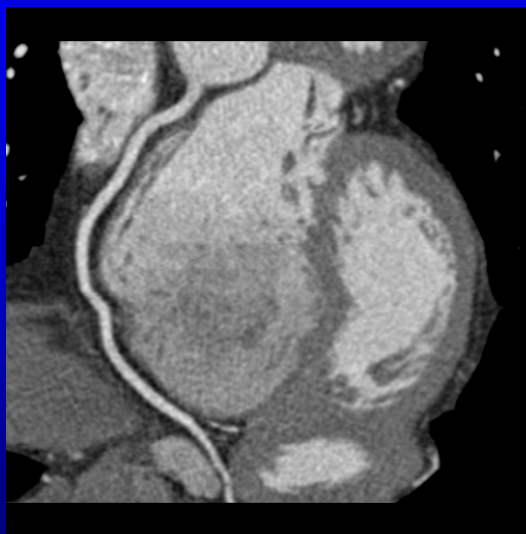
After Myerburg

CTA Patients have 3 'scans'

1. 'Scout' of Anatomy



2. Calcium Score



3. Main Scan



3D
Ex: 4664
Se: 4 +c
Volume Rendering No cut

RPI

Derriford Hospital

F 49 A175824

Mar 16 2004

DFOV 19.0cm
STND Ph:75%

32 L 127 RAO 80 CRA

A
R
S

P
L
I

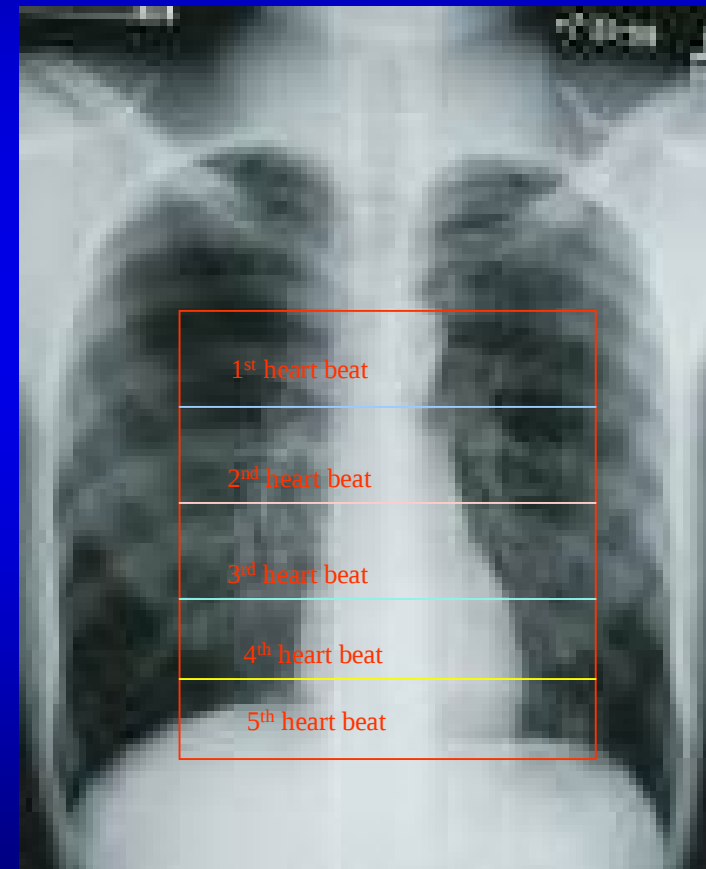
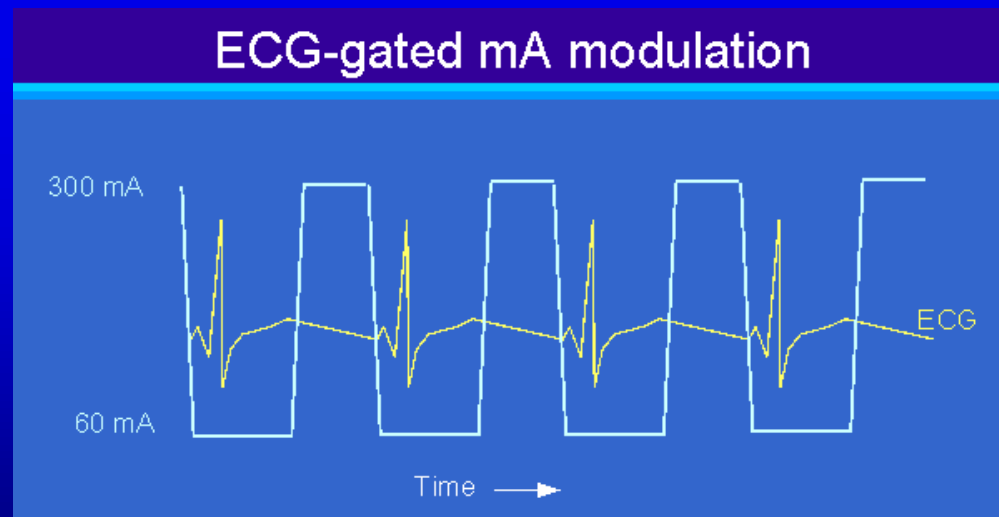
Cardiac 1
No VDI
kv 120
mA 440
Rot 0.50s/CH 3.2mm/rot
0.6mm 0.325:1 /0.4sp
Tilt: 0.0
10:05:21 AM
W = 4095 L = 2048

LAS



Multi-Slice CT (64 slice)

- ECG is 'gated'; requires slow and steady HR (50-70 bpm).
- Acquires a 3D data set of the whole heart, in 6-10 seconds



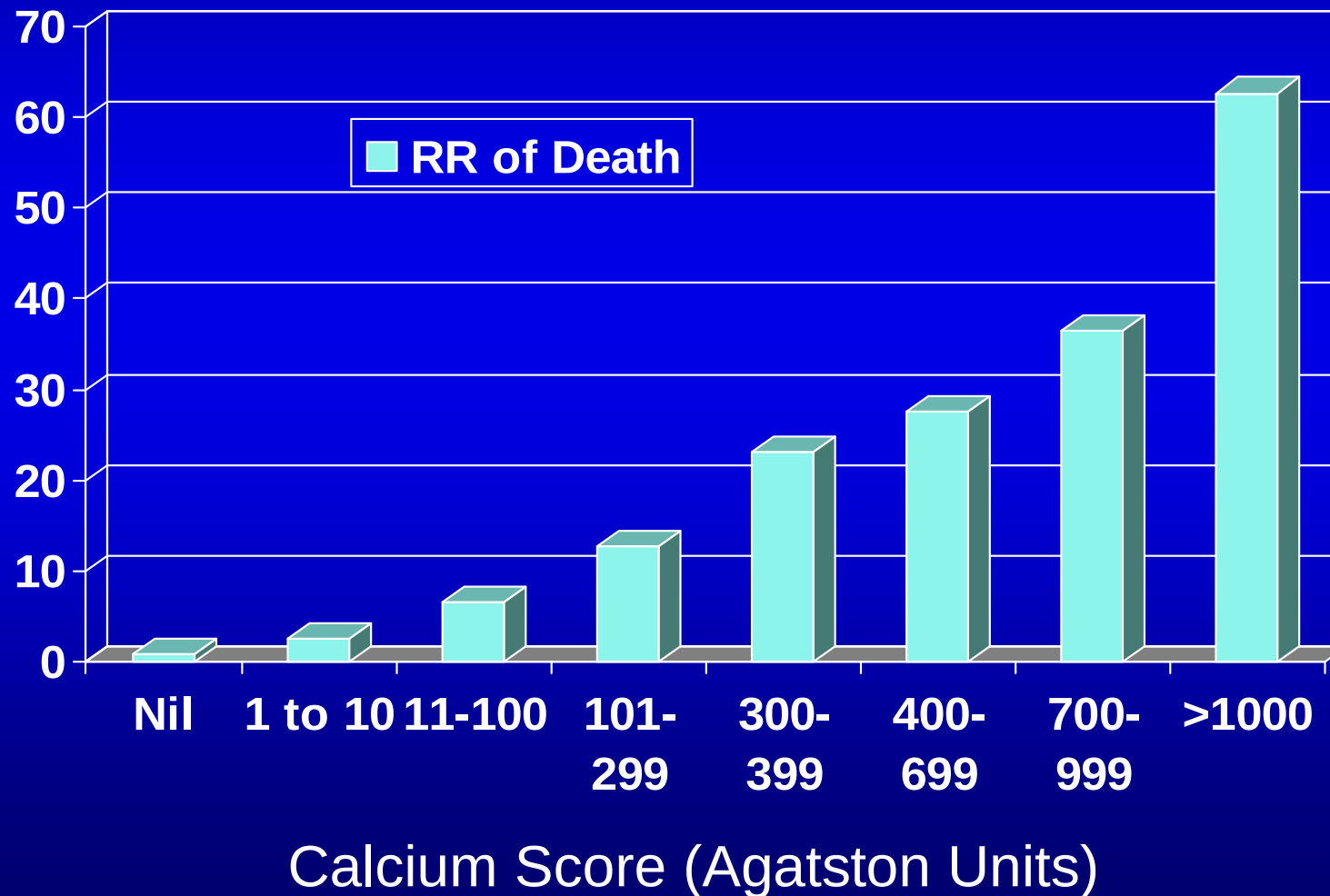
Calcified Coronary Arteries

- **Intuitive for CVS Risk**
 - Look for disease!
 - Concept used elsewhere
- **‘Calcium Score’**
 - Quantifies the density & degree in the coronaries
- **Seems more logical than coloured charts**



Relative Risk of Death (Unadjusted)

Budoff et al 2007 JACC



How many of your
pacemaker
patients
will need an
MRI
in the future?



