

The Evolution of Interventional Cardiology: Past, Now and Future Perspectives

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TCTAP 2015

A-12

EXPERIMENTAL REPORT
200
1974

PERCUTANEOUS DILATATION OF CORONARY ARTERY STENOSIS

CATHETER SYSTEM



PERFUSION OF THE MYOCARDIUM

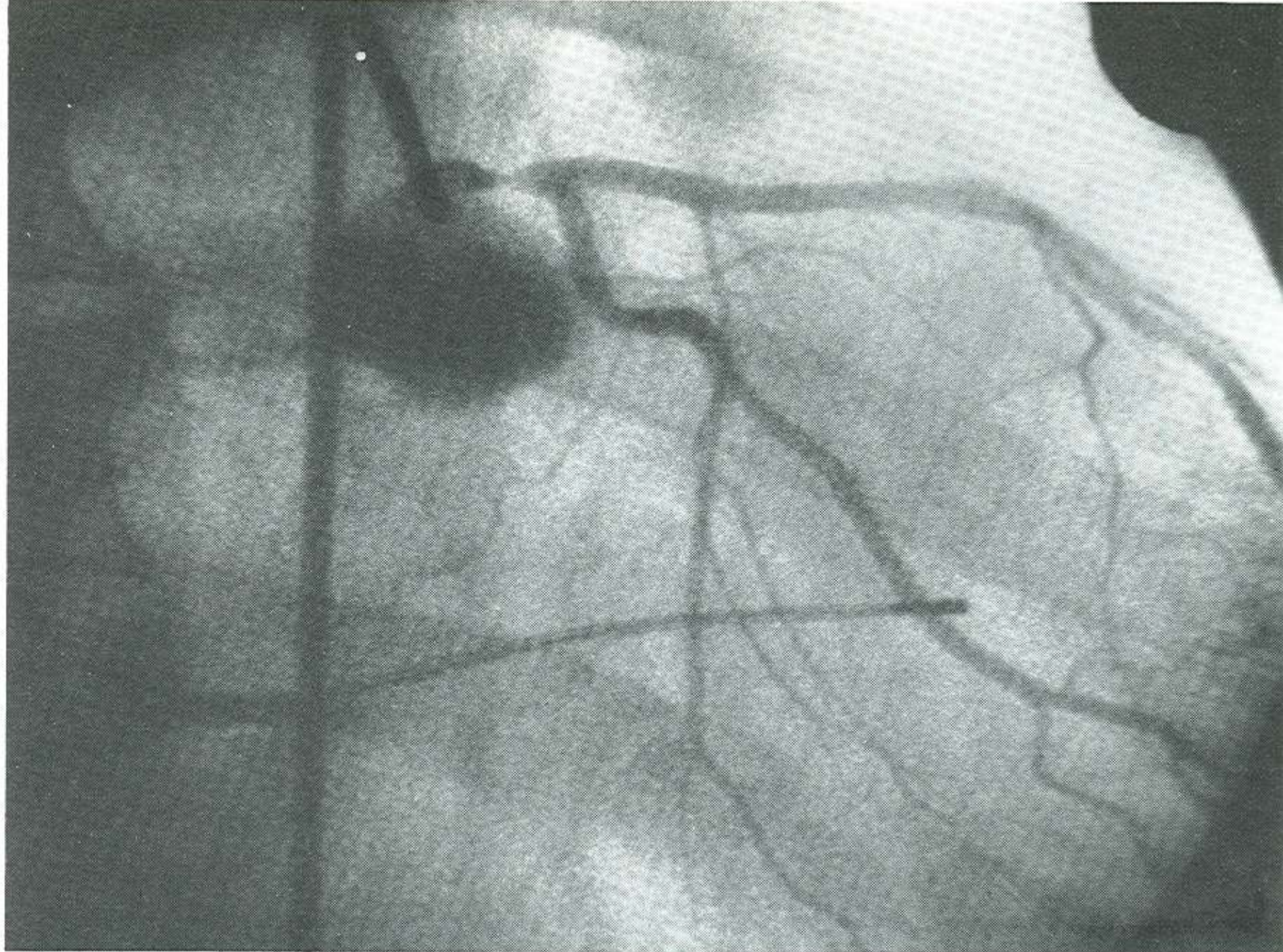


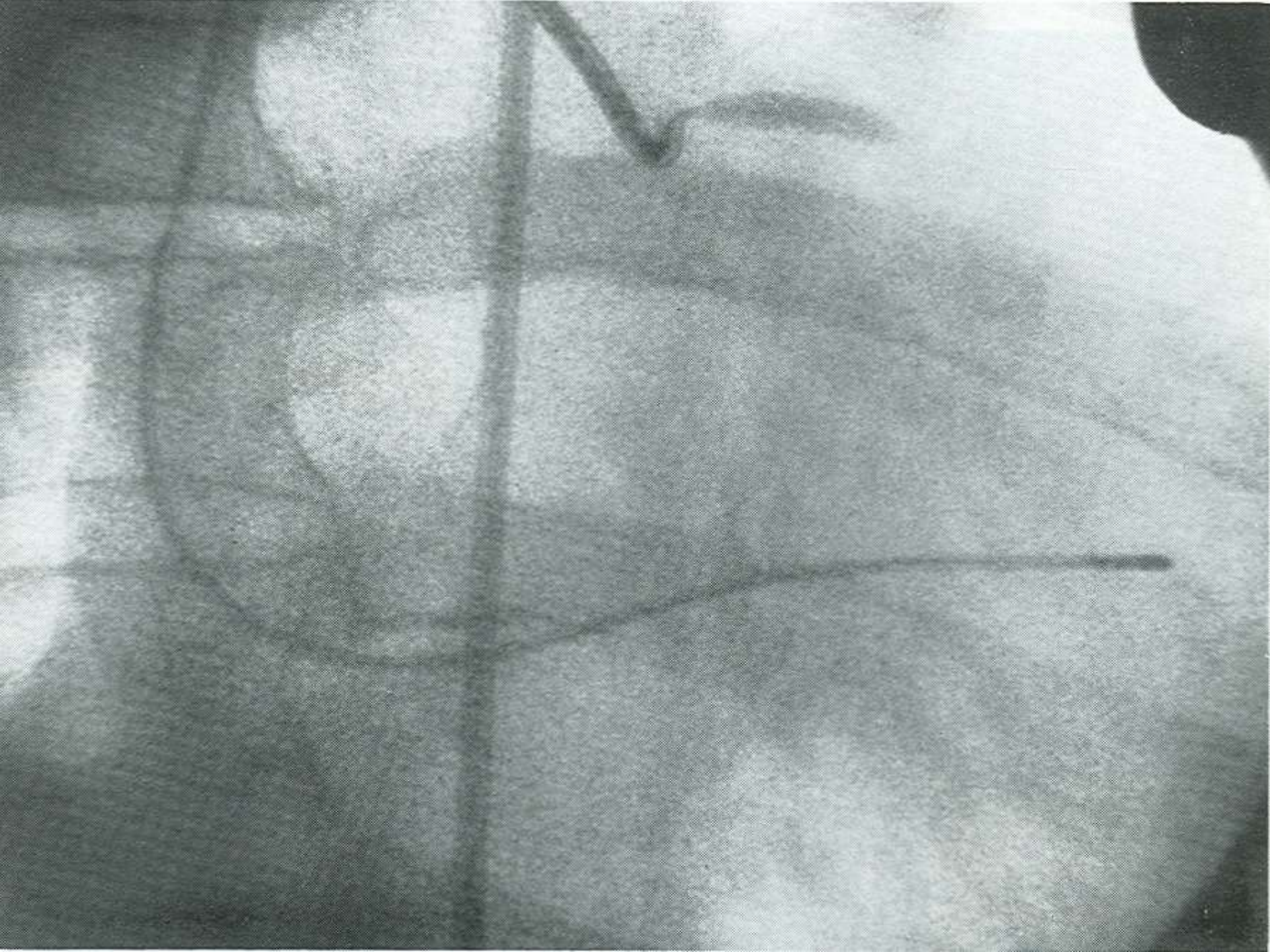
STEP BY STEP DILATATION

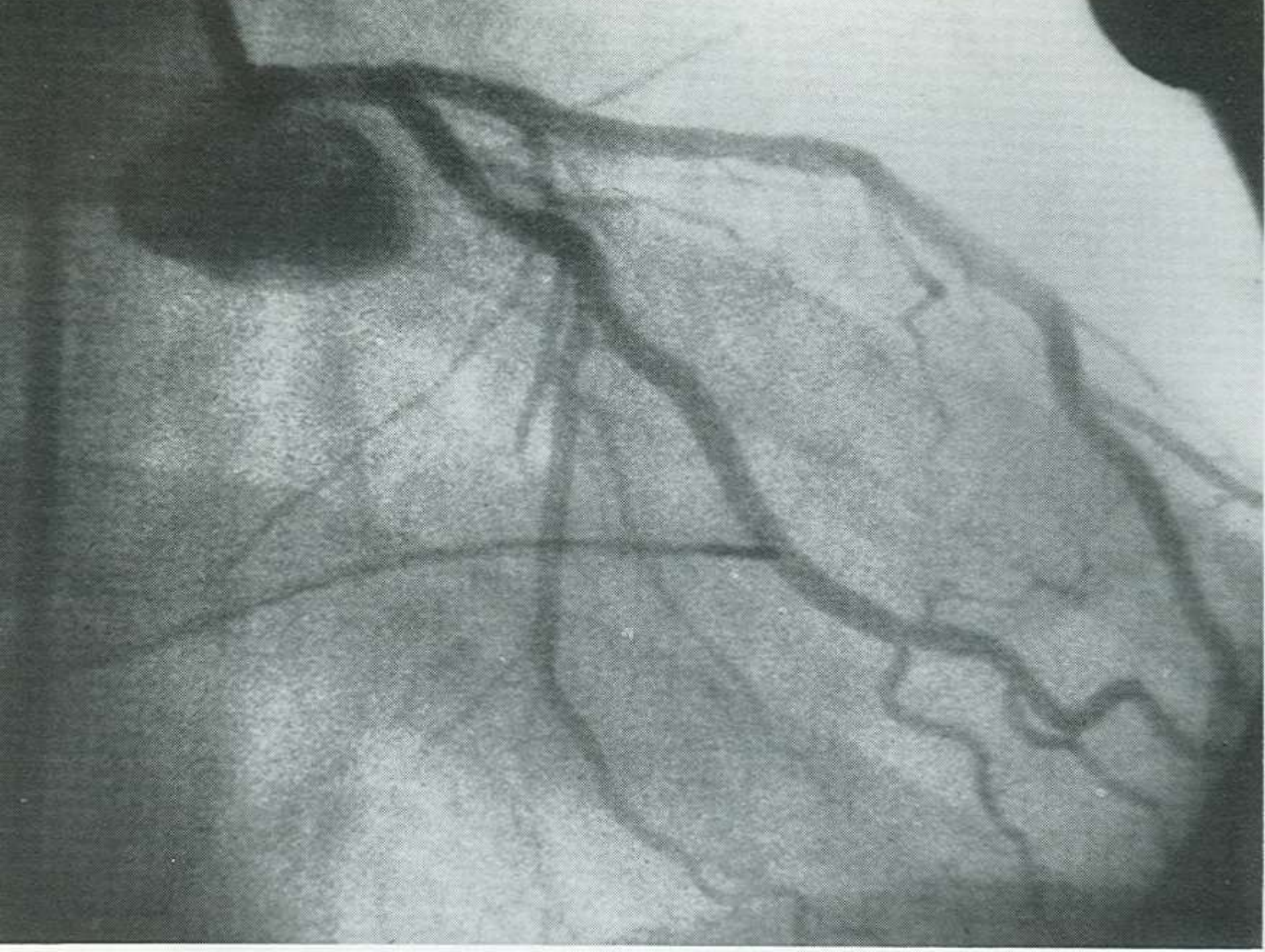


HISTOLOGY





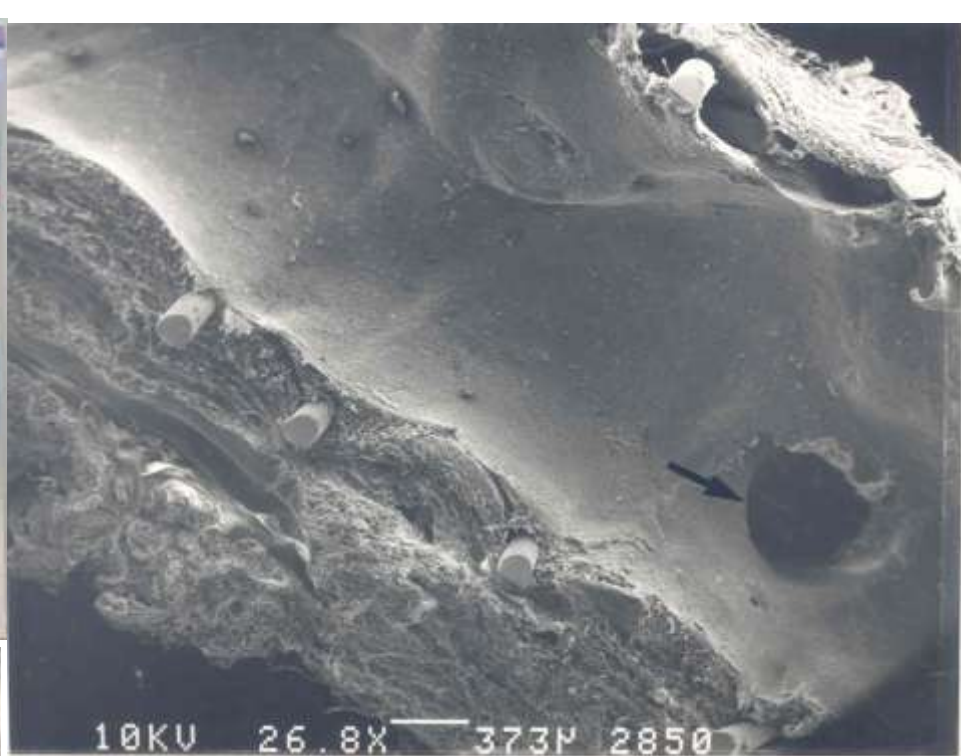


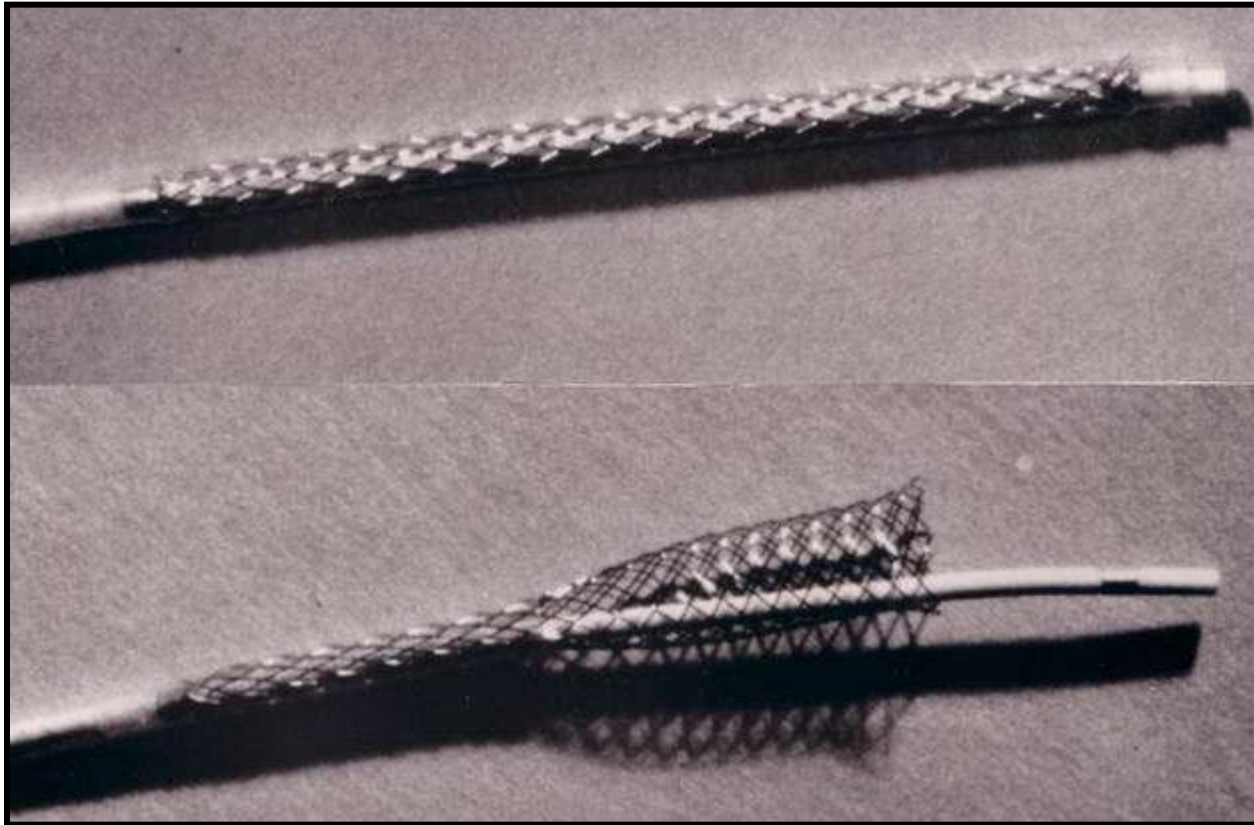












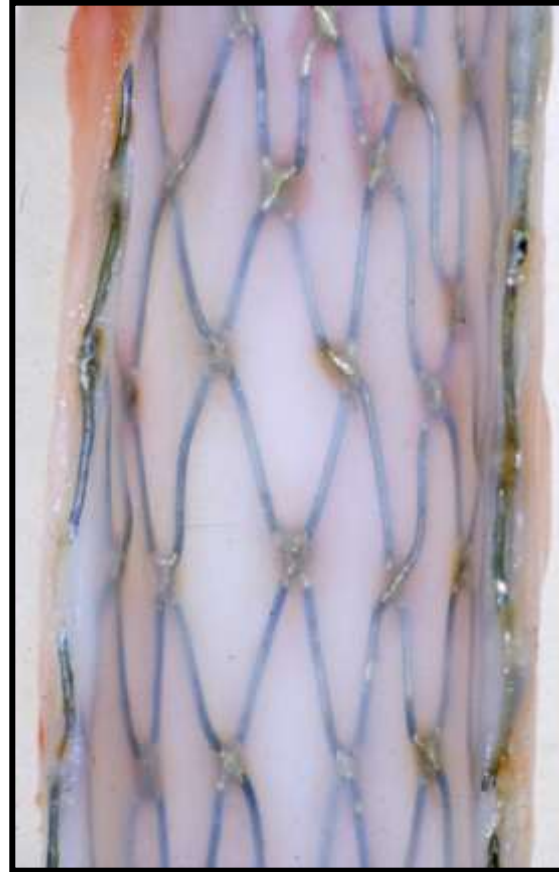
- The self-expanding Wallstent constrained by a doubled-over membrane on the
- delivery device and half-way through delivery

History of vascular stenting



- Dr Sigwart and his group in Lausanne

Development of the Palmaz stent



- Three-month specimen of a hand-woven balloon-expandable stent in the canine abdominal aorta

Development of the Palmaz stent



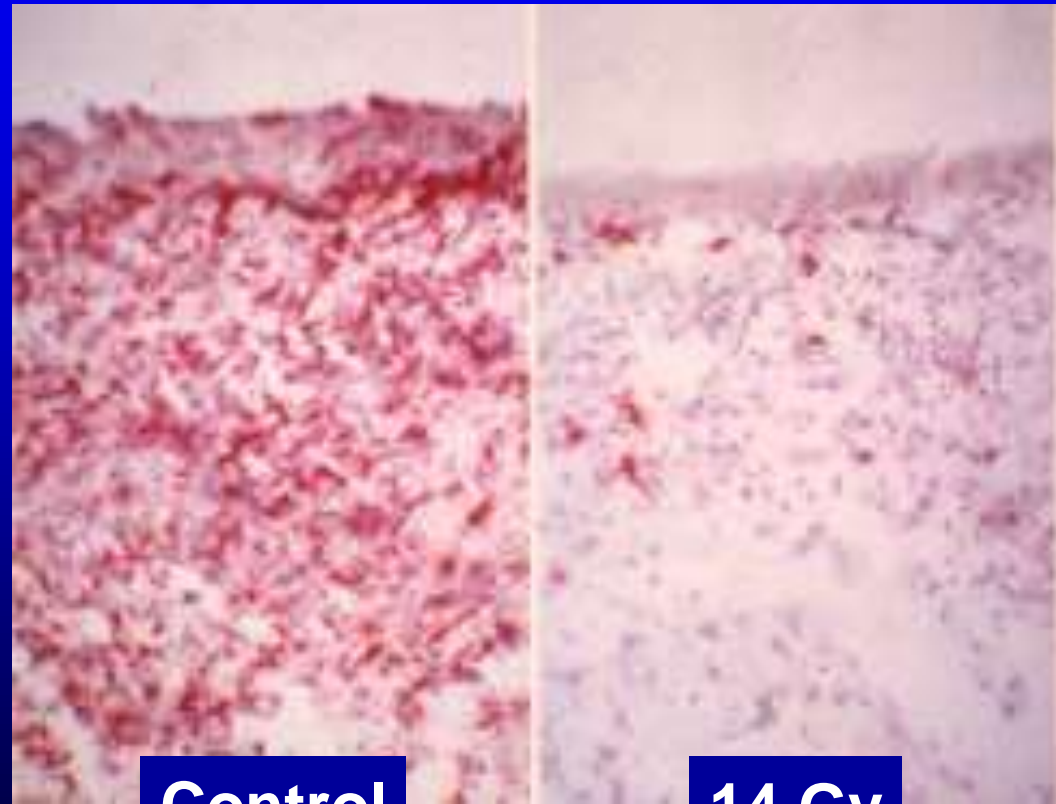
- A photo with the patient, after the placement of the first coronary stent

The Problem of Restenosis



How Does Radiation Work?

- Red staining represents BUDR labeling
- BUDR is incorporated into the DNA of cells that are actively turning over
- In these sections the irradiated vessel has many fewer proliferating cells than does the control vessel

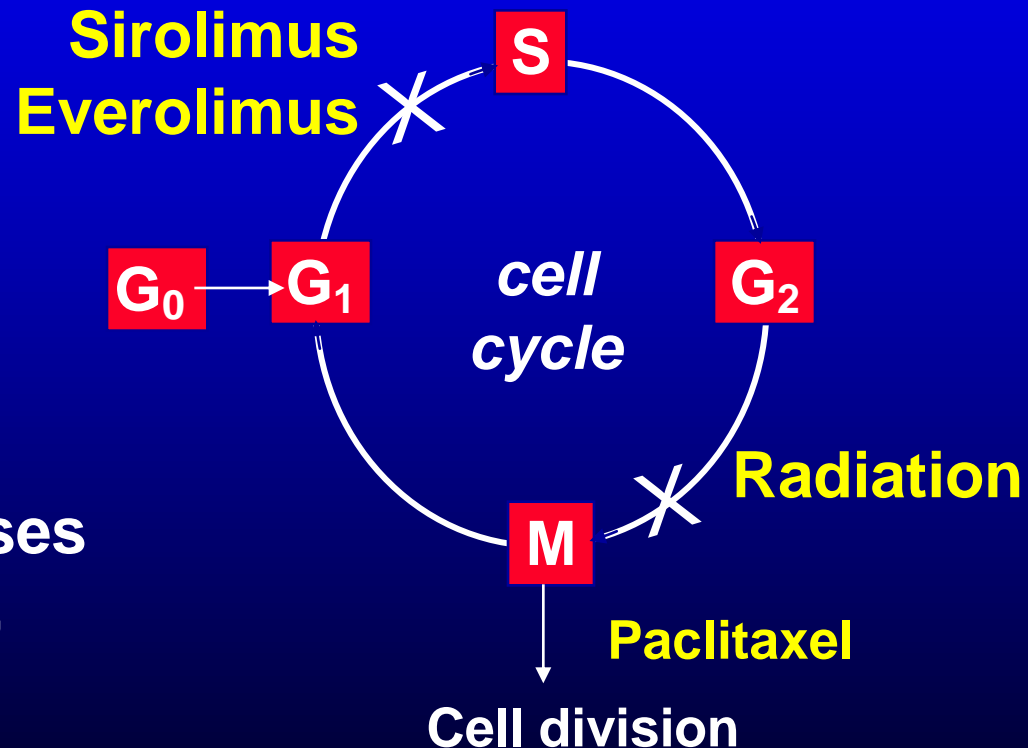


Control

14 Gy

DES and Brachytherapy: Mechanisms of Action

- Drugs used in DES
 - Induce cell-cycle arrest in late G₁ phase
 - Decrease TGF β
 - Elevate p53 levels
 - Inhibit microtubular assembly
 - Inhibit CDK/cyclin complexes
- Brachytherapy suppresses induction of telomerase, which modulates DNA replication





Where are we going with Technology?

•Drug

- Novel Antiproliferative Drugs

•Polymer

- Bioresorbable polymer
- Polymer composition
- No polymer

•Selective Drug Delivery

- Abluminal Coating

•Alloy

- Metallic, Durable
- Metallic, Bioresorbable
- Polymeric, Bioresorbable

•Alloy Design

- Longitudinal Integrity
- Strut Cross Linkage

•Strut Design and Thickness

- Open/Closed cells
- Hybrid cells
- Thinner struts
- Mesh covered struts

•Dedicated Stents

- Bifurcation stenting



Although Bioresorbable Technologies are appealing, there is still a lot of space for improvement...

Will bioresorbable scaffolds be as good as metal for scaffolding complex and calcified lesions ?

Will they be suitable for bifurcation lesions ?

Will thick struts present problems ?

Will preemptive stenting of "vulnerable" but non obstructive plaques occur ?

Will improvements in medical therapy trump invasive prevention in trials ?

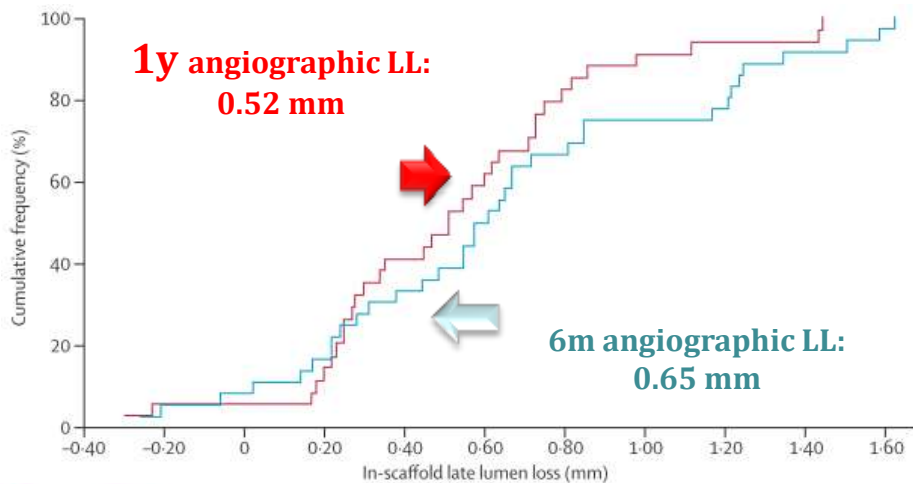
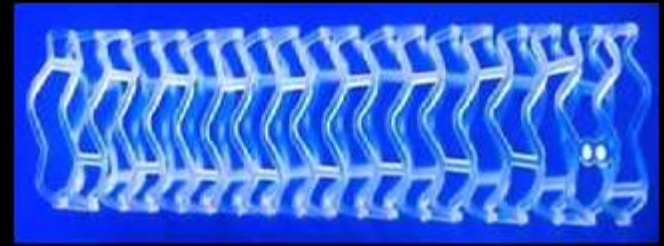
Can bioresorbable technology become cost competitive with low cost DES ?

Bioresorbable Metallic & Bioresorbable Polymeric Scaffolds



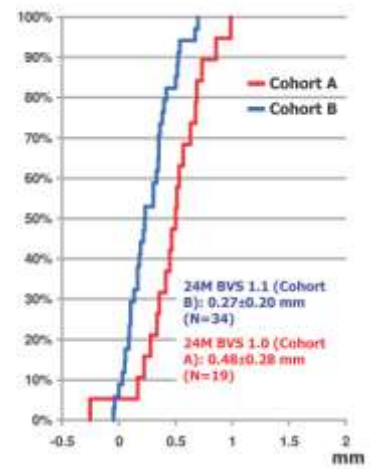
Safety and performance of the drug-eluting absorbable metal scaffold (DREAMS) in patients with de-novo coronary lesions: 12 month results of the prospective, multicentre, first-in-man BIOSOLVE-I trial
 Haude M. et al. Lancet. 2013, Jan 14

First Serial Assessment at 6 Months and 2 Years of the Second Generation of Absorb Everolimus-Eluting Bioresorbable Vascular Scaffold
 A Multi-Imaging Modality Study
 Ormiston J. et al. Circ Cardiovasc Interv. 2012; 5: 620-632



2y angiographic LL: 0.27 mm

(with the 2nd generation BVS, BVS 1.1)



Interpretation Our results show feasibility, a good safety profile, and promising clinical and angiographic performance results up to 12 months for DREAMS. Our promising clinical results show that absorbable metal scaffolds might be an alternative to polymeric absorbable scaffolds.

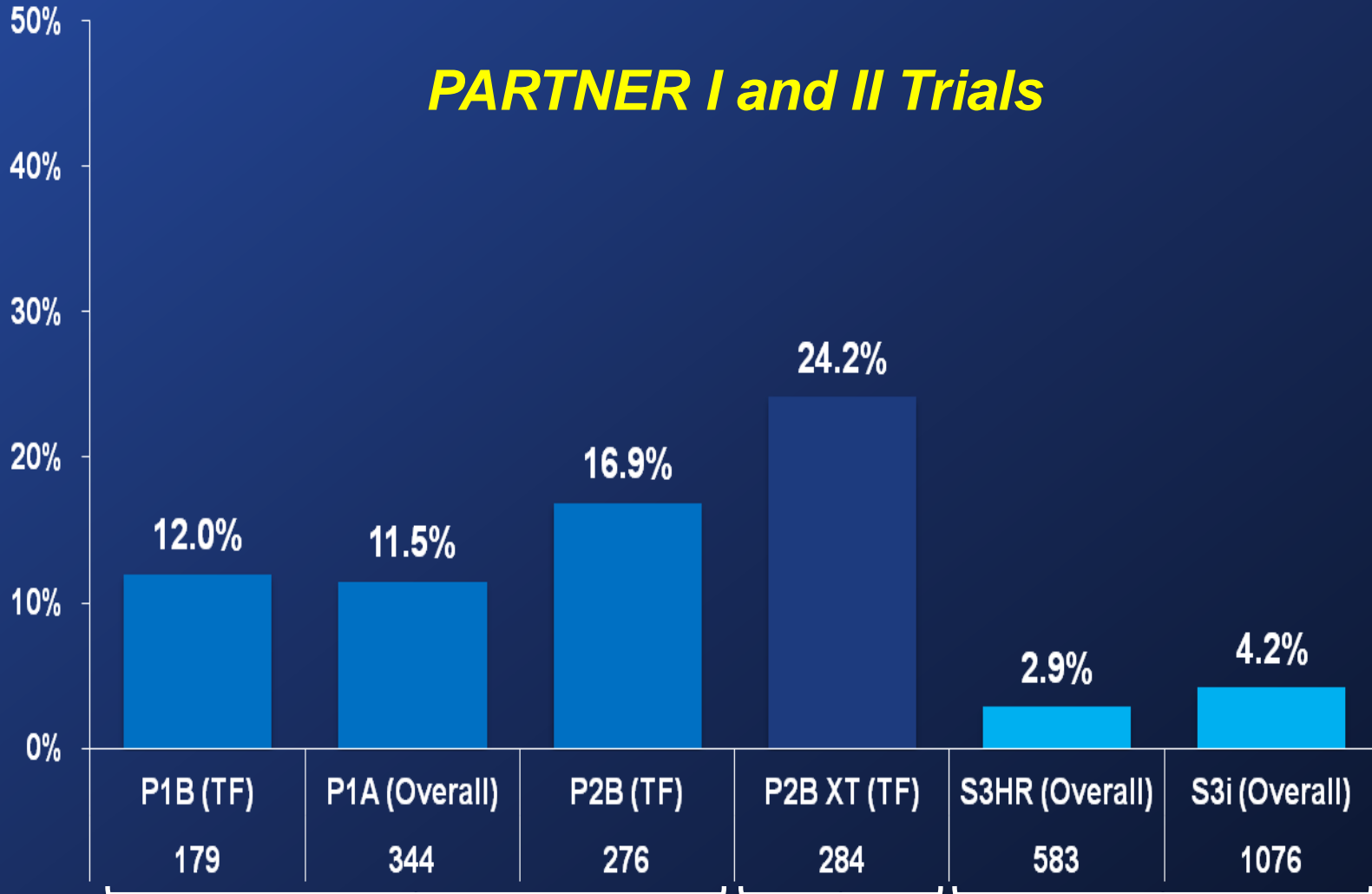


Moderate/Severe PVL at 30 Days

Edwards SAPIEN Valves



PARTNER I and II Trials



SAPIEN

**SAPIEN
XT**

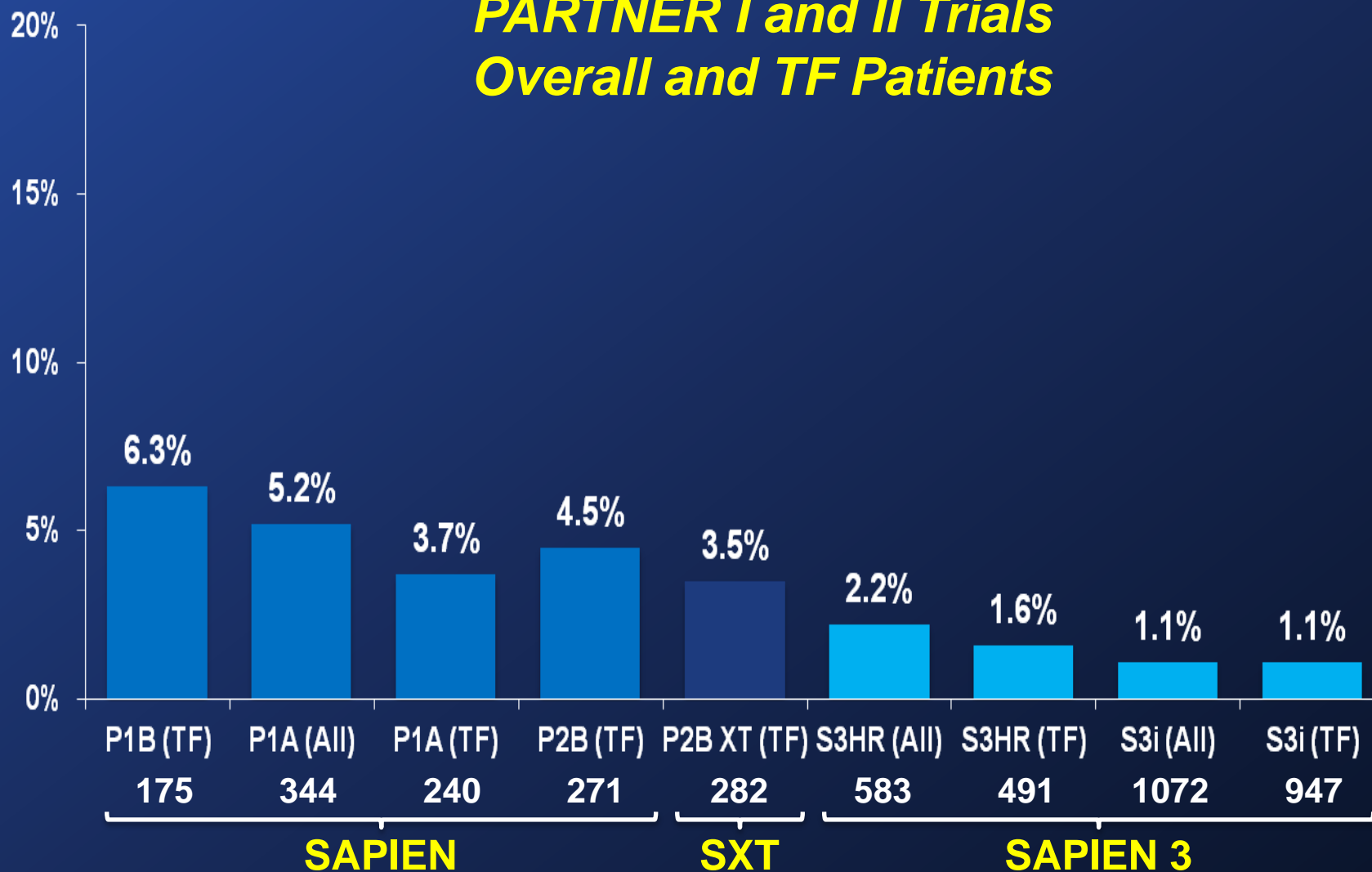
SAPIEN 3

All-Cause Mortality at 30 Days

Edwards SAPIEN Valves (As Treated Patients)



***PARTNER I and II Trials
Overall and TF Patients***





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- EDITORIAL Paradoxical Embolism and Recurrent Stroke
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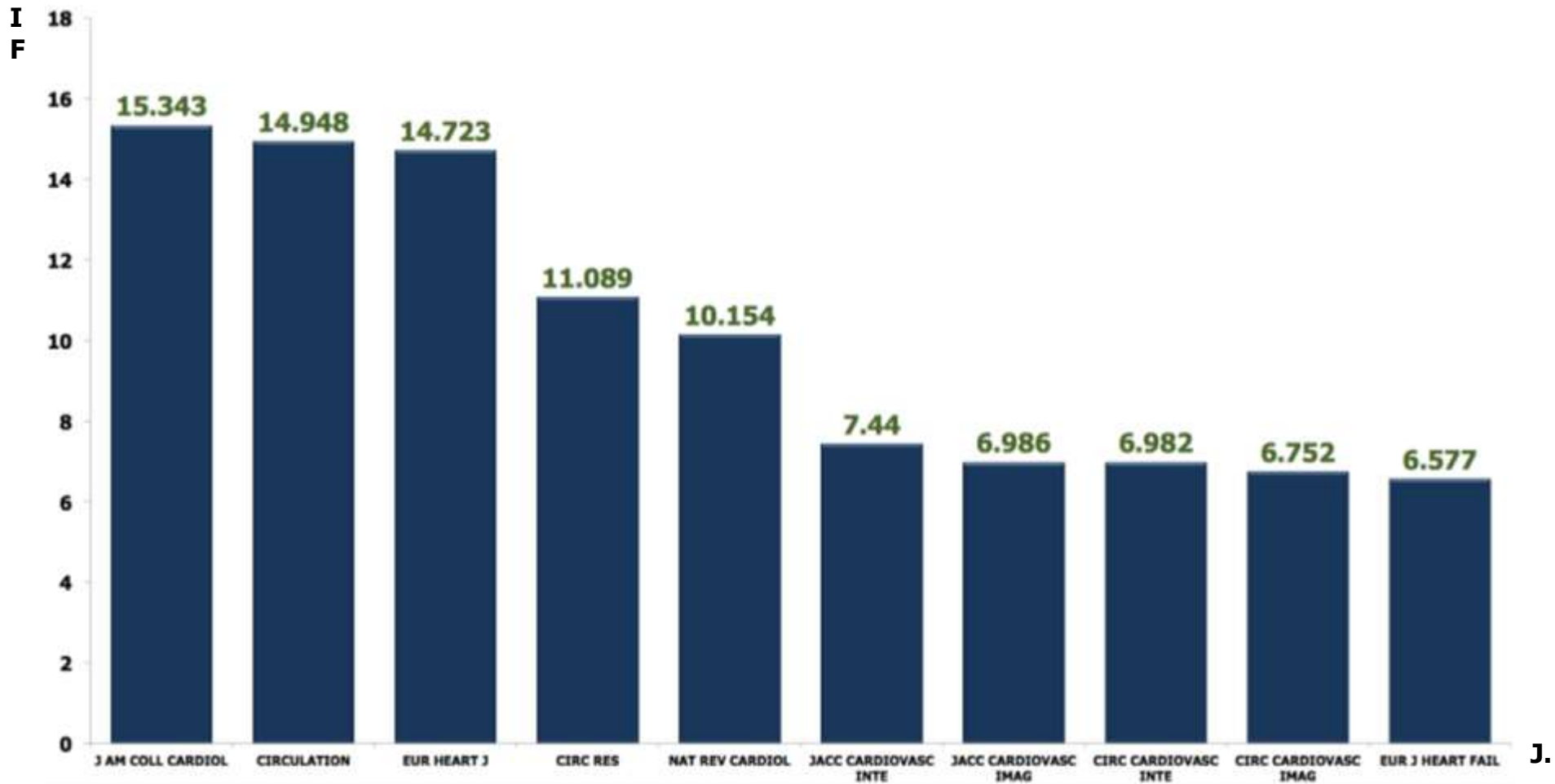
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- EDITORIAL Leave No Trace vs. More Definitive
Data Needed

IMAGES IN INTERVENTION

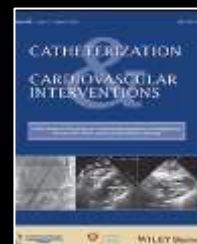
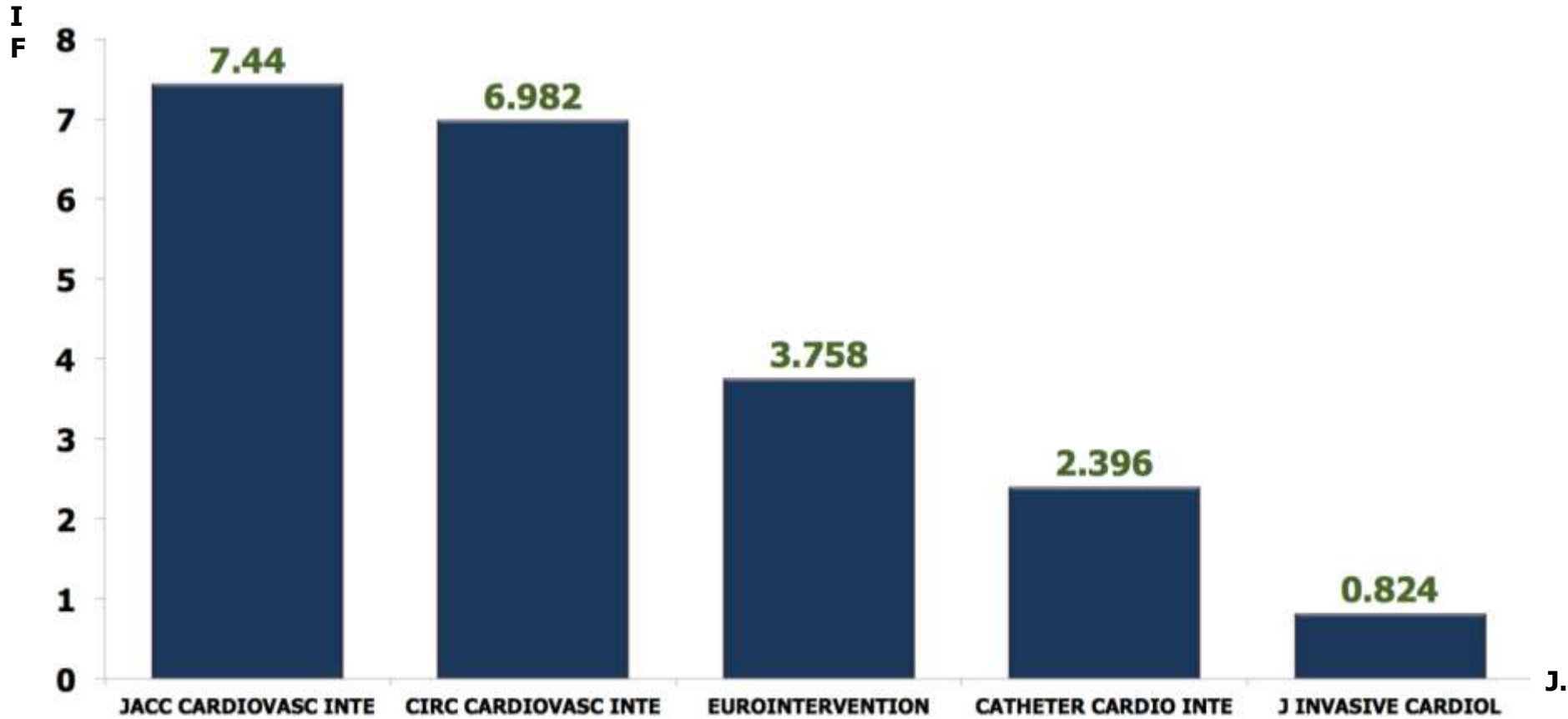
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S.B. King III

Leading Cardiology Journals

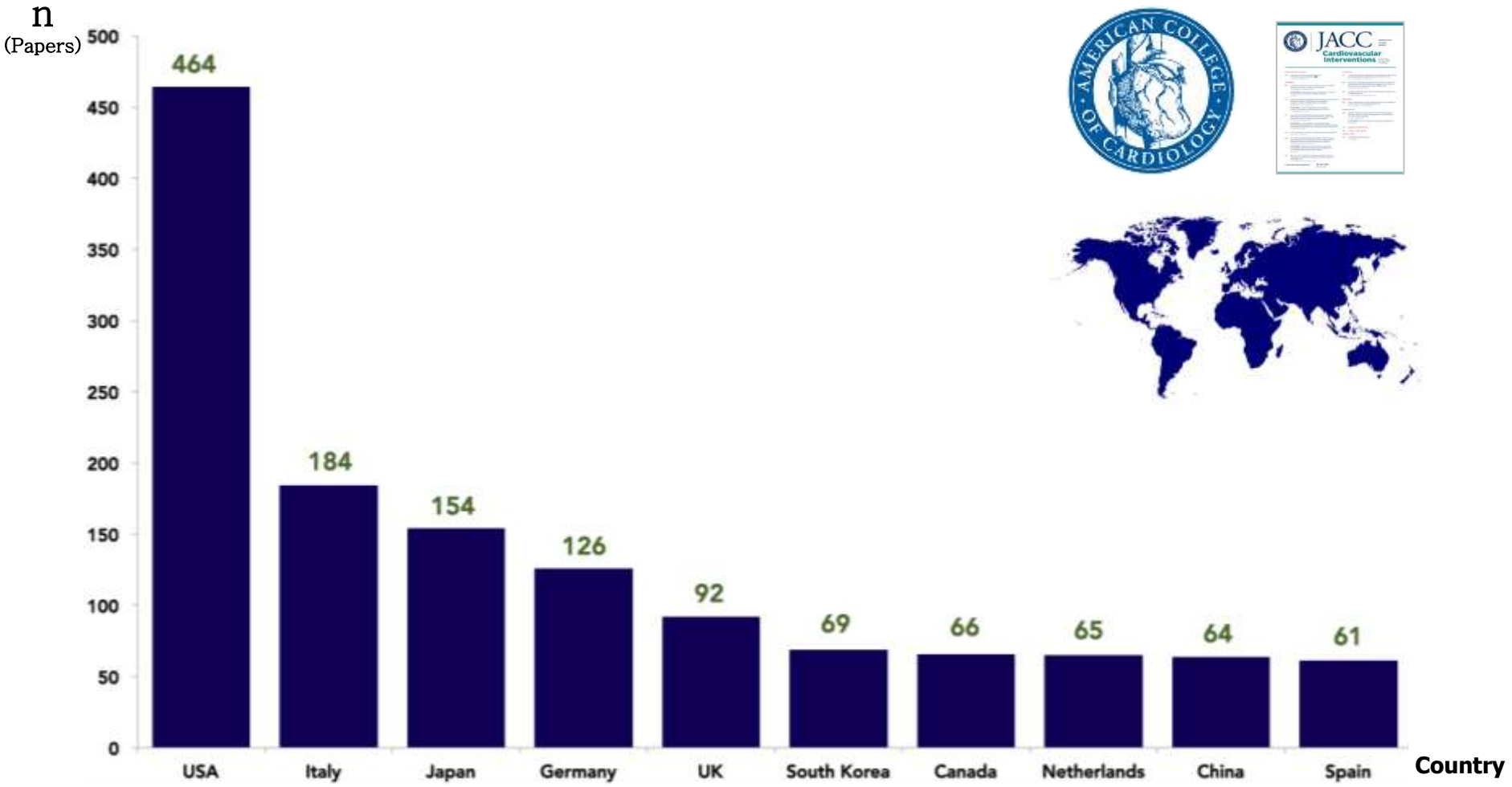
among 124 journals worldwide



Leading Interventional Cardiology Journals



Submissions from each of the 10 top countries



What is the future of coronary interventions?

It depends on three things.

- Technologic advances
- The potential to control cardiovascular disease medically
- The expansion of the availability and affordability of medical care