

History of Coronary Revascularization with Stents

Matthew B. Earnest, MD, FACC FSCAI

November 5, 2020

I have no conflicts of interest to declare relating to this topic.

The problem

92 million people in the US with CAD





- ❖ Variable symptoms, presentations and paths of progression
- ❖ Access to care

PCI with stents

- ❖ Proven effective at reducing symptoms in stable ischemic HD
- ❖ Proven reduction in MACE in ACS

Timeline of our techniques

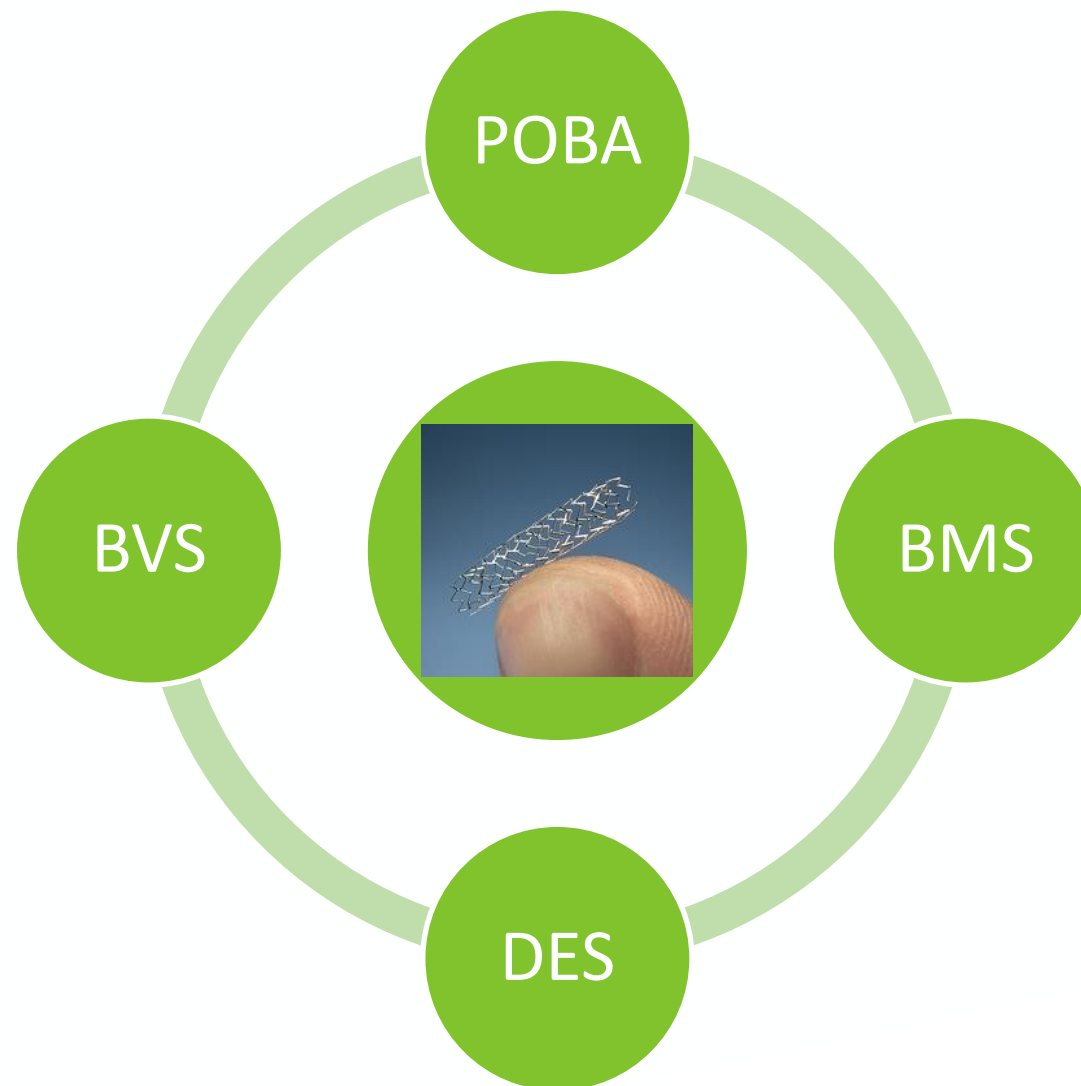
Table 1 Historical milestones in coronary artery stenting

Time	Person(s)	Landmark events
1964	Dotter and Judkins	Conceptual description of coronary angioplasty using an implantable prosthetic device
May 1977	Gruntzig and Myler	First coronary angioplasty during coronary artery bypass graft surgery
 September 1977	Andreas Gruntzig	First coronary angioplasty in an awake patient; a revolution in interventional cardiology
 1979	Geoffrey Hartzler	First balloon angioplasty to treat AMI
 1986	Sigwart and Puel	The first implantation of a stent in human coronary arteries; second revolution in interventional cardiology
1991	Cannon and Roubin	First coronary stenting to treat AMI
1994	Serruys <i>et al.</i> and Fischman <i>et al.</i>	Publication of first two landmark (Benestent and STRESS) trials
1994	FDA	FDA-approved use of stents to treat acute and threatened vessel closure after failed balloon angioplasty
 1999	Eduardo Sousa	The first drug (sirolimus) eluting stent implanted in human coronary artery; third revolution in interventional cardiology
2002–04	EME and FDA	Approvals of Cypher and Taxus stents in Europe and USA
2011	EME	Approval of Absorb BVS (bioresorbable vascular scaffold) in Europe; fourth revolution in interventional cardiology

FDA, Food and Drug Administration USA; EME, European Medicines Agency.

Designed to address a problem

- ❖ POBA
 - ❖ Recoil
 - ❖ Acute vessel closure
 - ❖ Late vessel closure (restenosis)
- ❖ BMS
 - ❖ Early bail-out option
 - ❖ Stand-alone treatment
 - ❖ DAPT
 - ❖ Difficulty in delivery
 - ❖ Restenosis
- ❖ DES
 - ❖ First gen ST
 - ❖ Later gen delivery, reduction in ISR
 - ❖ Duration of DAPT
- ❖ BVS
 - ❖ Promising idea
 - ❖ Inferior long term results



Progression of Stent Design

Materials

Stainless Steel

Cobalt Chromium

Platinum Chromium

Configuration

Self expanding

Balloon expandable

Cell design

Progression of Stent Design

Coatings

Drugs

Polymers

Scaffold material

BVS

Progression of Stent Design – Future?

Return of bio-absorbable?

Ongoing trials and development

Adjunctive therapies

Sensors

Therapies for regeneration

Electrical properties

**Thank you for your attention.
Thank you for the work you do to treat heart disease.**