

# Medicine by the Numbers

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## ► Stents for Stable Coronary Artery Disease

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### Details for This Review

**Study Population:** Adults, typically 55 to 65 years of age, mostly men, with stable nonacute coronary artery disease (not actively having ischemia or a myocardial infarction) diagnosed by abnormal exercise stress testing, nuclear or echocardiographic stress imaging, or fractional flow reserve (FFR)

**Efficacy End Points:** Death, nonfatal myocardial infarction, angina symptoms

**Harm End Points:** Death, stroke, myocardial infarction, arrhythmia, hemorrhage, contrast media reaction

**Narrative:** Percutaneous coronary intervention (PCI), generally with stenting, is commonly used to open occluded coronary arteries. This review summarizes the evidence on the benefits of this procedure in patients diagnosed with stable nonacute coronary artery disease (without acute ischemia or myocardial infarction). This diagnosis is usually made after an abnormal exercise stress test, or nuclear or echocardiographic stress imaging.

The benefits of PCI in patients with acute ischemia (myocardial infarction) will be discussed in a future *Medicine by the Numbers* review.

The meta-analysis discussed here analyzed data on 5,286 patients from five trials. Patients with stable obstructive coronary artery disease were randomized to receive PCI and medical treatment or medical treatment alone. All patients had a previous positive stress test or abnormal FFR, which is a test commonly used in the cardiac catheterization laboratory to assess the significance of a coronary stenosis by passing a thin wire through the occlusion and measuring any drop in pressure. FFR allows for making treatment decisions based on impairment of blood flow, not just visualizing the stenosis. Not all patients included in the meta-analysis had FFR measured.

### NO BENEFIT IN PATIENTS WITH STABLE NONACUTE CORONARY ARTERY DISEASE

#### Benefits

No benefit in patients with stable nonacute coronary artery disease in the five-year follow-up period

#### Harms

1 in 50 experienced a serious complication such as death, stroke, myocardial infarction, arrhythmia, hemorrhage

After an average of five years of follow-up, coronary stenting for stable nonacute coronary artery disease did not lead to statistically significant changes in the risk of death (7.3% in medical treatment group vs. 6.5% in PCI group; odds ratio [OR] = 0.90; 95% confidence interval [CI], 0.71 to 1.16;  $P = .42$ ); nonfatal myocardial infarction (7.6% in medical treatment group vs. 9.3% in PCI group; OR = 1.24; 95% CI, 0.99 to 1.56;  $P = .06$ ); unplanned revascularization (28.5% in medical treatment group vs. 18.3% in PCI group; OR = 0.64; 95% CI, 0.35 to 1.17;  $P = .14$ ); or angina (23.3% in medical treatment group vs. 20.3% in PCI group; OR = 0.91; 95% CI, 0.57 to 1.44;  $P = .67$ ).<sup>1</sup>

Cardiac angiography is an invasive procedure with potentially serious complications including death (0.11%), myocardial infarction (0.05%), stroke (0.2%), arrhythmia (0.4%), vascular complications (0.4%), contrast media reaction (0.4%), hemodynamic complications (0.3%), and other (0.3%).<sup>2-4</sup> Subjecting patients to a 2% risk of a major complication may not be justified in the absence of clear benefits. None of the trials included in the meta-analysis reported the complications associated with PCI. Therefore, we calculated the number needed to harm based on the data reported in the American Heart Association/American

College of Cardiology (AHA/ACC) guidelines, which used the Society for Cardiac Angiography and Interventions registry database as well as the ACC's National Cardiovascular Data Registry (CathPCI Registry) as their sources.<sup>2,3</sup> Future randomized controlled trials reporting complications of PCI procedures may provide a more accurate estimate of risk.

### The NNT Group Rating System

Green	Benefits greater than harms
Yellow	Unclear benefits
Red	No benefits
Black	Harms greater than benefits

**Caveats:** Most published trials fail to show a benefit from coronary stenting in patients with stable obstructive coronary artery disease. However, stent technology has evolved significantly in recent years, and it is possible that newer-generation drug-eluting stents may offer different results.

It has been suggested that the following patient subgroups might derive net benefit from PCI:

- Higher-risk patients with moderate to severe objective myocardial ischemia (without myocardial infarction). A more recent meta-analysis<sup>5</sup> reported fewer cardiac deaths with PCI compared with medical treatment (hazard ratio = 0.52; 95% CI, 0.30 to 0.92;  $P = .02$ ) in the context of objective ischemia, contradicting the previous data.<sup>1</sup> Of the three trials included, the bulk of patients (888 out of 1,557) came from the FAME 2 trial (Fractional Flow Reserve versus Angiography for Multivessel Evaluation 2), which did not demonstrate a reduction in mortality or myocardial infarction with PCI. The mortality benefit reported was likely driven by the SWISSI 2 trial (Swiss Interventional Study on Silent Ischemia Type II), which reviewed treatment of silent ischemia after ST segment elevation myocardial infarction. Patients included in SWISSI 2 were different from the patients under consideration here, who were higher risk (not stable) having demonstrated a tendency for plaque rupture and myocardial infarction.

- Patients with angina symptoms despite optimal medical therapy. In patients on maximal antianginal drug therapy with continuing life-limiting angina, PCI of the stenosis might be beneficial for alleviating these symptoms as a last resort. However, unlike the objective end points discussed above, anginal severity is subjective and, as such, any improvement might be because of the placebo effect from the procedure itself. The recently published ORBITA study (Optimal Randomized Blinded Investigation with Optimal Medical Therapy of Angioplasty in Stable Angina), although small, reported that PCI did not significantly change anginal severity or frequency in medically optimized patients when compared with a sham procedure.<sup>6</sup> The importance of an optimal drug regimen cannot be overstated. Benefits of PCI appear to be minimal in patients who are receiving optimal current medical management.<sup>7</sup>

The ISCHEMIA trial (International Study of Comparative Health Effectiveness with Medical and Invasive Approaches),<sup>8</sup> which is currently recruiting, will further

inform the debate. This trial compares an initial strategy of medical treatment, with catheterization reserved for patients whose symptoms do not improve with this intervention, to an initial invasive strategy. The results of this open-label trial are expected in December 2018.

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**This series** is coordinated by Dean A. Seehusen, MD, MPH, *AFP* Contributing Editor, and Daniel Runde, MD, from the NNT Group.

**A collection** of Medicine by the Numbers published in *AFP* is available at <http://www.aafp.org/afp/mbtn>.

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