

# HOSPITAL PHYSICIAN®

## CARDIOLOGY BOARD REVIEW MANUAL

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## Advances in Interventional Cardiology II: A Case Study

### Series Editor:

**W. Robert Taylor, MD, PhD**

*Associate Professor of Medicine*

*Director, Cardiovascular Disease Fellowship Training Program*

*Division of Cardiology, Department of Medicine*

*Emory University School of Medicine, Atlanta, GA*

### Contributing Author:

**Mark E. Leimbach, MD**

*Assistant Professor of Medicine*

*Division of Cardiology*

*Department of Medicine*

*Emory University School of Medicine*

*Atlanta, GA*

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#### I. INTRODUCTION

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Since its inception, the success of percutaneous transluminal coronary angioplasty (PTCA) has been limited by the problem of restenosis of the treatment site. Restenosis is now understood to be a multifactorial process. First, there is elastic recoil of the overstretched vessel wall, which occurs nearly immediately after balloon deflation. Second, neointima formation occurs for up to several months, with increased proliferation and migration of multiple cell types as well as increased matrix production. Third, in a process akin to wound healing, vascular remodeling occurs, which decreases the size of the vessel area.<sup>1-7</sup> Each of these effects contributes to a decrease in the size of the lumen.

Multiple pharmacologic approaches to prevent restenosis have been attempted. Although many showed promising results in animal trials, none have proven successful in large-scale clinical trials.<sup>8-13</sup> The use of intracoronary stents has reduced the occurrence of clinically significant restenosis in a limited number of lesion types by preventing elastic recoil and negative vascular remodeling.<sup>14,15</sup> By stimulating inflammation, however, these stents may actually increase neointimal formation, resulting in a new lesion type, in-stent restenosis.<sup>16-18</sup> Most recently, the use of intravascular radiation as a means of preventing restenosis has

gained considerable attention. Researchers realized ionizing radiation's ability to inhibit or kill rapidly dividing cells (hence its effectiveness in treating cancer and benign hypertrophic conditions) might directly alter the major processes of restenosis (eg, neointima formation and negative remodeling).

This is the second part of a 2-part review on interventional cardiology. The first part emphasized diagnosis and treatment of multivessel coronary artery disease as well as coronary thrombosis (*Hospital Physician Cardiology Board Review Manual*, Volume 6, Part 5). Two case patients were presented to highlight features of the management of these conditions. The second part presents one case patient and discusses intravascular radiation for the prevention of restenosis after angioplasty. A complete review of interventional cardiology is well beyond the scope of this article; however, major advances in the field are described as are trials supporting the use of current interventions.

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#### II. CASE PATIENT I

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##### PRESENTATION

Patient 1 is a 67-year-old man who underwent angioplasty to his mid-left anterior descending artery (LAD) (lateral branch of a double-barrel LAD) for treatment