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## Advances in Interventional Cardiology I: Case Studies

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## Advances in Interventional Cardiology I: Case Studies

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### I. INTRODUCTION

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Coronary atherosclerotic heart disease (CASHD) is currently the single largest cause of mortality in the United States, resulting in approximately 500,000 deaths each year. Estimates for the United States indicate that more than 12 million people may have a history of heart attack, angina, or both and that roughly 1 million people will have a new or recurrent heart attack this year alone. As of 1997 (the most recent data available), this enormous disease burden led to more than 1 million diagnostic heart catheterizations and an almost equal number of revascularization procedures each year. Nearly 50% of these revascularizations are performed by means of percutaneous transluminal coronary angioplasty (PTCA), and this percentage has continued to increase.<sup>1</sup>

PTCA was developed more than 20 years ago from the pioneering efforts of Andreas Gruentzig. Building on the work of Dotter,<sup>2</sup> Zeitler,<sup>3</sup> and Porstmann,<sup>4</sup> Gruentzig envisioned that atherosclerotic arterial lesions could be treated endovascularly with expandable balloon-tipped catheters; he subsequently designed, constructed, tested, and first used this therapy clinically.<sup>5-8</sup> Since that time, increases in our understanding of the biology of atherosclerotic disease and its responses to treatment, vast improvements in the equipment available, and use of adjunctive therapies have led physicians to perform PTCA for an expanding spectrum of disease, with steadily improving results.

This is the first part of a 2-part review on interventional cardiology. The first part emphasizes diagnosis and treatment of multivessel coronary artery disease (CAD) as well as coronary thrombosis. Two case patients are 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 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 an active 52-year-old man who presents to a cardiologist with a 1-year history of exertional chest discomfort. He describes the discomfort as a pressure sensation across his left chest, accompanied by shortness of breath that is relieved with rest. The discomfort had initially occurred only with strenuous exercise but has progressively been occurring with less activity. He was seen 3 months earlier by his primary care physician for these symptoms and was started on a mononitrate. This therapy improved his symptoms somewhat, but they have continued to progress. His medical history is significant for hypertension and hypercholesterolemia, for which he is receiving treatment. He has a strong family history of early atherosclerotic disease, and he quit smoking 8 months ago after a 60 pack-year history of cigarette use. On physical examination, his heart rate is 72 bpm and his blood pressure is 132/76 mm Hg. The remainder of the physical examination is within normal limits. The electrocardiogram also shows normal findings.

Patient 1's physician obtains an exercise stress test, which is positive for ischemia by stage III of a Bruce protocol. Patient 1 subsequently undergoes a cardiac catheterization, revealing normal left ventricular function and pressures with an ejection fraction of 55%. Selective angiography shows significant lesions in the mid-left anterior descending artery (LAD) and the proximal right coronary artery (RCA) (**Figures 1 and 2**).

- What is the most appropriate treatment for patient 1's multivessel coronary artery disease?