6th Risk, Diagnosis and Treatment of Cardiovascular Disease in Women

Advanced Interventional Therapy for Radiation-Induced Cardiovascular Disease

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This report describes the case of a 61-year-old woman who presented with dyspnea, aortic stenosis, and coronary artery disease—typical side effects of radiation therapy for Hodgkin lymphoma. A poor candidate for surgery, she underwent successful high-risk percutaneous coronary intervention and subsequent transcatheter aortic valve replacement. This report highlights some of the cardiovascular-specific sequelae of radiation therapy for cancer treatment; in addition, possible directions for future investigations are discussed. ***(Tex Heart Inst J 2016;43(4):315-7)***

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The incidence of radiation-induced cardiovascular disease (CVD) is increasing in tandem with numbers of cancer survivors. In survivors of Hodgkin lymphoma, CVD is the chief cause of death.[1] The risk of radiation-induced CVD in this population is thought to be directly proportional to the dose of radiation received, as well as to the length of time of radiation exposure.[2] As the field of cardio-oncology develops, interventional cardiologists will become increasingly involved, as in the case of the patient described here.

Case Report

A 61-year-old woman, diagnosed with Hodgkin lymphoma at the age of 25 years and consequently treated with radiation therapy, presented with dyspnea on minimal exertion. Her extensive radiation therapy had been complicated by a related chest wound that needed a muscle flap. Years later, she had developed interstitial lung disease, another known side effect of radiation therapy. Evaluation of the patient's dyspnea revealed severe aortic stenosis (AS) (Fig. 1). A cardiovascular surgeon determined her risk to be too high for surgical aortic valve replacement because of severe damage from radiation therapy, as well as the potential for complications related to the wound flap after a sternotomy. The patient consulted with a structural interventional cardiologist and was determined to be a candidate for transcatheter aortic valve replacement (TAVR).

The patient underwent coronary angiography to define her coronary anatomy and to ensure that significant coronary artery disease would not cause additional risk. Not unexpectedly, 2 lesions were discovered: a 70% stenosis in the left main ostium and a 90% stenosis in the proximal left circumflex coronary artery (Fig. 2). At this point, the patient's 2 options were either surgical revascularization and aortic valve replacement, or high-risk percutaneous coronary intervention (PCI) followed by TAVR several weeks later. After consulting the cardiovascular surgeon again, the patient chose to undergo the PCI and subsequent TAVR.

The patient underwent percutaneous stenting of the lesions with assistance from an Impella™ CP device (Abiomed, Inc.; Danvers, Mass) and was discharged from the hospital the next day. She was placed on standard dual-antiplatelet therapy. Five weeks later, TAVR was performed uneventfully, and the patient was discharged from the hospital 2 days thereafter. As of June 2016, she continued to take dual-antiplatelet medication and was doing well.

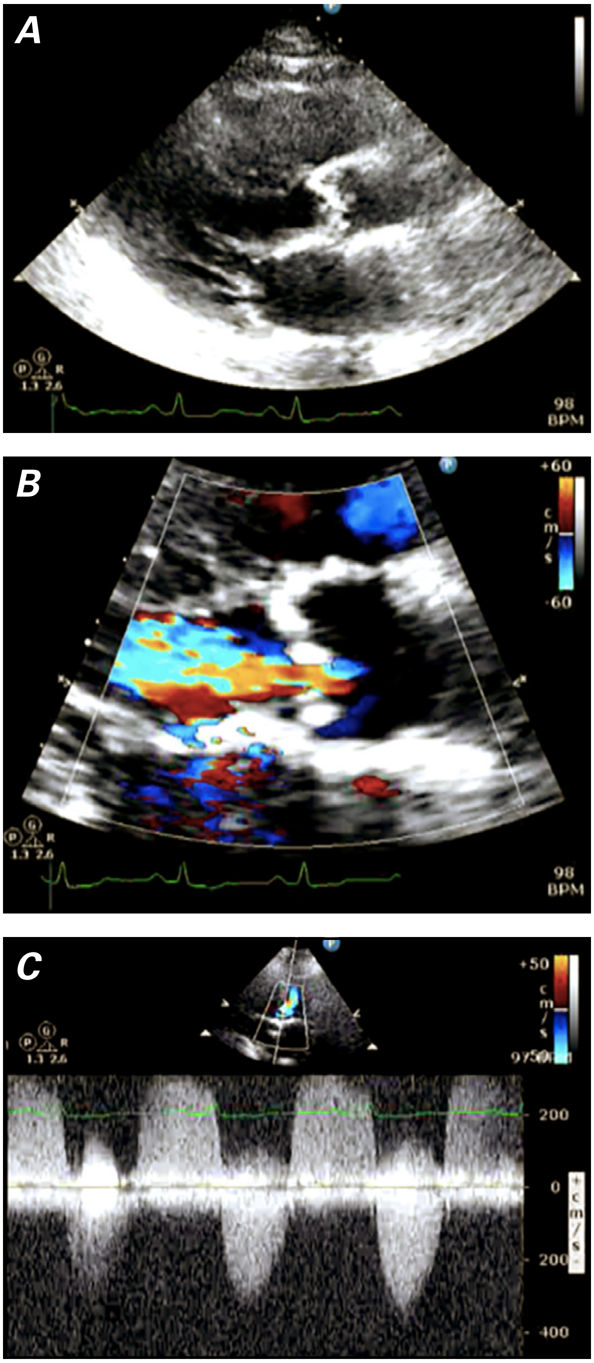

Fig. 1 *Two-dimensional transthoracic echocardiograms.* ***A****) The parasternal long-axis view shows the calcification of the aortic root, aortic valve, and anterior mitral leaflet classically seen in patients who have radiation-induced valvular disease.* ***B****) Color-flow Doppler mode reveals turbulent flow through the aortic valve, consistent with aortic stenosis.* ***C****) Continuous-wave Doppler mode reveals aortic regurgitation and an increased gradient across the aortic valve, with peak velocity nearing 4 m/s.*

Discussion

This case highlights the importance of recognizing late sequelae of radiation therapy. Although the natural history of calcific AS is well described and understood, it is probably a different mechanism from that of AS associated with radiation therapy. Yet the treatment is the same—and, presumably, conservative treatment of radiation-associated AS has the same outcome as that of calcific AS, although the respective time frames might differ. This presumption warrants investigation.

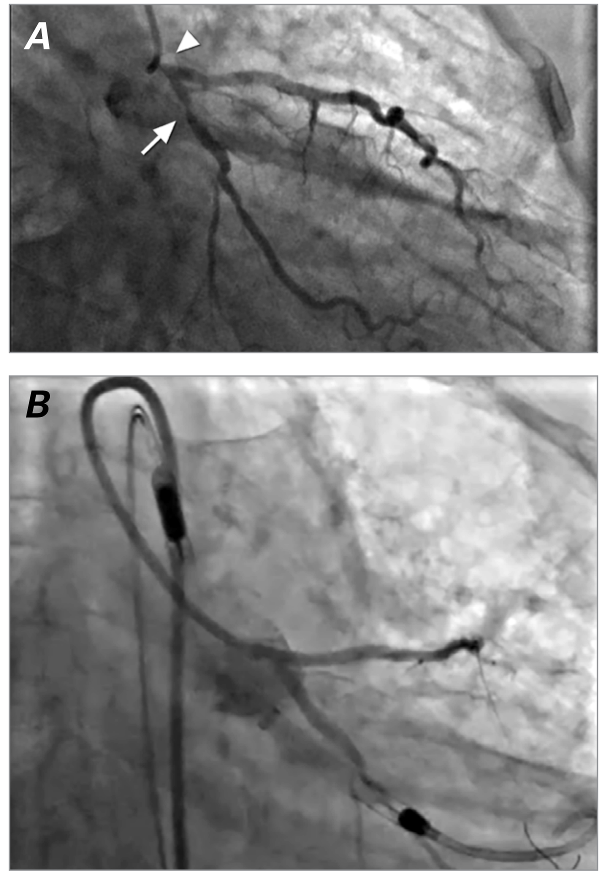

Fig. 2 ***A****) Diagnostic angiogram (anteroposterior caudal view) shows stenoses in the left main (arrow) and left circumflex (arrowhead) coronary arteries.* ***B****) Angiogram shows the Impella device in the left ventricle after percutaneous intervention. The ostial left main and proximal left circumflex coronary arteries are widely patent after the placement of drug-eluting stents.*

Whereas cancer survivors treated with radiation therapy are increasing in number, patients who have radiation-induced AS remain a small portion of the population relative to the number of patients who have calcific AS. Accordingly, TAVR has not been well studied as a treatment option for radiation-induced AS.

High-risk PCI with assistance from the Impella device or the TandemHeart® (CardiacAssist, Inc.; Pittsburgh, Pa) has been described in several observational studies and registries. However, the use of mechanical circulatory support-assisted PCI in patients who have AS is not well studied, perhaps because these patients typically undergo combined surgical revascularization and aortic valve replacement. Similarly, the subpopulation of patients who have radiation-induced coronary artery disease and AS has not been studied in these terms.

This patient's case illustrates the intersection of radiation-induced CVD with the increasing experience and expertise in PCI techniques. The futures of cardio-oncology and interventional cardiology are intertwined to the benefit of patients in need.

References

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