A multidisciplinary approach for recurrent ventricular fibrillation and severe tricuspid regurgitation after mantle radiation for non-Hodgkin lymphoma

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**BACKGROUND**

- High-dose radiation therapy to the chest can cause a variety of cardiovascular (CV) complications, including coronary artery disease (CAD), cardiomyopathy, and arrhythmias.

- The optimal management strategy for radiation-induced heart disease is not known, particularly when different CV complications co-exist.

**CASE – A 50-YEAR-OLD WOMAN**

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<th>Diagnosis</th>
<th>Non-Hodgkin lymphoma of the chest diagnosed in 1988 with recurrence in left lung in 1990</th>
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| Cancer Treatment | • Mantle radiation to the chest  
• Anthracycline-containing chemotherapy  
• Splenectomy  
• Left lung surgery |
| CV Complications & Interventions | 2009  
• Syncope concerning for cardiac arrhythmia  
• Extensive CAD requiring coronary artery bypass grafting (CABG)  
• Severe bilateral carotid artery disease requiring bilateral endarterectomy  
• Placement of an automatic implantable-cardioverter defibrillator (AICD) for secondary prevention  
2014  
• Multiple AICD shocks for ventricular fibrillation (VF)  
• Intolerant to amiodarone and sotalol  
• Coronary artery bypass grafts were patent.  
2016, 2018, and 2019  
• Recurrent VF with AICD shocks  
2014 – Present  
• Worsening tricuspid valve regurgitation due to septal leaflet impingement by AICD lead  
• Symptomatic right heart failure in 2019 |

**TRICUSPID VALVE MALCOAPTATION**

**CLINICAL DECISION MAKING**

**RECURRENT VF:**

- Recurrent VF was presumed to be due to radiation-induced myocardial fibrosis after a cardiac PET scan revealed no evidence of inflammation (e.g., sarcoidosis).

- Thoracoscopic cardiac sympathectomy and radiofrequency ablation were both felt to have a low likelihood of arrhythmia elimination.

- Patient agreed to be re-challenged with amiodarone, which she has tolerated well to date.

**SEVERE TV REGURGITATION:**

- Given the evidence of mild RV dilation, mild systolic dysfunction, and symptomatic right heart failure, the patient was evaluated by our heart valve team.

- Medical and surgical challenges included the following:
  - History of radiation to the chest and prior sternotomy (CABG and left lung surgery)
  - Not a candidate for endovascular or laser AICD lead extraction
  - High suspicion for requiring TV repair or replacement
  - Not a candidate for subcutaneous AICD placement due to risk for advanced conduction disease and need for pacemaker in the future

**MULTIDISCIPLINARY TEAM DECISION:** Surgical approach via right thoracotomy and TV replacement with 29-mm Hancock bioprosthetic valve. SVC was scarred down with both pacing wires.

- AICD lead was positioned inferiorly and pinned between the sewing cuff of the TV and the tricuspid annulus.

**CONCLUSION**

- Radiation-induced CV complications are varied (severe carotid and coronary artery disease, cardiac arrhythmias, valvular heart disease, and cardiomyopathy) and may present many decades after initial cancer treatment.

- A multidisciplinary approach is essential for the management of these complex patients.

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