Cardio-Oncology

CORRESPONDENCE

Open Access

TAVR in cancer patients: outcomes in survivors with radiation and active cancer

Umesh C. Sharma[1*] and Saraswati Pokharel[2]

Heart failure (HF) due to radiation-induced aortic stenosis (AS) is one of the most frequent late complications in cancer survivors with prior chest radiation therapy (C-XRT). Despite advancements in cardiac-sparing radiation techniques, the long-term cardiotoxic effects, particularly valvular heart disease, remain challenging [1]. Aortic stenosis in this population has a poor prognosis, with untreated symptomatic cases leading to very high mortality within two years [2]. While surgical aortic valve replacement (SAVR) is the standard intervention for severe AS, it is often not feasible for patients with prior C-XRT due to radiation-induced mediastinal fibrosis and calcification. Transcatheter aortic valve replacement (TAVR) offers a less invasive alternative, but its outcomes in this high-risk group remain unclear [3]. Key considerations for the management of these patients are outlined in Table 1.

Previous meta-analyses by Zafar et al. (2020) suggested that TAVR in cancer survivors with prior C-XRT had comparable short-term (30-day) mortality and safety outcomes to non-C-XRT patients [4]. However, the study revealed a higher 1-year mortality rate and a significant increase in congestive heart failure (CHF) exacerbation in the C-XRT group. Building on these findings, two new meta-analyses by Felix et al [5]. and Yasmin et al. [6], in this issue, offer fresh perspectives on TAVR outcomes in C-XRT patients. Yasmin et al.'s analysis of 6,191 patients demonstrated no significant differences in all-cause mortality at 30 days and 1 year between C-XRT and non-C-XRT patients, but a substantially higher risk of worsening CHF post-procedure (RR 1.98, $p=0.0004$). Felix et al. studied outcomes after TAVR in patients with or without active cancers and found higher short- and long-term mortality rates driven by non-cardiovascular causes in patients with active cancer. There was also a higher incidence of post-TAVR major bleeding in patients with active cancer, not driven by major vascular complications, highlighting the need for a personalized approach and early intervention due to the progressive nature of radiation-induced valvular disease.

When considered together, these studies emphasize the need for clinical evaluation and multidisciplinary decision-making when selecting candidates for TAVR among cancer patients. For those with active cancer, as discussed by Felix et al., careful assessment of cancer stage, bleeding risk, and overall prognosis is important. For cancer survivors with prior C-XRT, as shown by Yasmin et al., the focus is on managing potential radiation-related cardiotoxicity and its impact on post-procedural outcomes. These studies provide valuable data to guide patient selection and optimize procedural outcomes in cancer patients undergoing TAVR.

The collective findings underscore that while TAVR is a viable option for cancer survivors with prior C-XRT, the increased risk of heart failure exacerbation necessitates careful management. Both Felix et al. and Yasmin et al. emphasize the importance of tailored strategies, particularly individualized approaches, early intervention, and close monitoring, to address the higher risk of CHF. A multidisciplinary approach, involving oncologists

*Correspondence:
Umesh C. Sharma
sharmau@buffalo.edu
[1] Department of Medicine, Jacob's School of Medicine and Biomedical Sciences, University at Buffalo, Buffalo, NY, USA
[2] Department of Pathology and Laboratory Medicine, Roswell Park Comprehensive Cancer Centre, Buffalo, NY, USA

Table 1 TAVR in cancer survivors with prior chest radiation - key considerations

Cancer survivor with prior C-XRT
• Radiation causes fibrosis and valve calcification, leading to aortic stenosis.
Severe aortic stenosis
• Very high mortality within 2 years if untreated.
• SAVR is often risky due to radiation-induced fibrosis.
TAVR as an alternative
• A less invasive treatment, ideal for high-risk patients.
Expected outcomes
• Short-term survival at 30 days is comparable to non-C-XRT patients.
• Long-term risks include a higher likelihood of heart failure and increased 1-year mortality.
Management plan
• Early intervention, close monitoring, and collaborative care with oncologists are essential.

in treatment decisions, is essential for optimizing patient outcomes in this unique population.

Despite their valuable contributions, both studies face limitations that must be acknowledged. Yasmin et al. point out the difficulty of analyzing a heterogeneous patient population, with varying types of thoracic malignancies, therapies, and comorbidities. They also note significant gaps in data, including the inability to evaluate radiation dosage, tumor location, and the interval between radiation therapy and TAVR. Similarly, Felix et al. encountered challenges in analyzing data related to cancer type, surgical risk, and device use, which limits the generalizability of their findings. Both studies underscore the need for large-scale, randomized controlled trials (RCTs) to provide conclusive evidence on the efficacy and safety of TAVR in this underrepresented population.

In conclusion, while TAVR offers considerable potential for cancer survivors with severe AS and prior C-XRT, managing the increased risk of heart failure exacerbation requires an individualized approach. Close post-procedural monitoring, risk assessment models that consider cancer-specific factors, and collaboration across specialties are essential for improving patient outcomes. Future RCTs are critical to refining risk stratification and establishing clear guidelines for managing these high-risk patients.

Acknowledgements
NA.

Authors' contributions
U.S. and S.P. both reviewed the related manuscripts/literature and prepared the manuscript.

Funding
No specific funding was received for this editorial.

Data availability
No datasets were generated or analysed during the current study.

Declarations

Ethics approval and consent to participate
Not applicable. This editorial does not involve human or animal studies.

Competing interests
The authors declare no competing interests.

Received: 8 September 2024 Accepted: 3 January 2025
Published online: 15 February 2025

References

1. Patil S, Pingle SR, Shalaby K, Kim AS. Mediastinal irradiation and valvular heart disease. Cardiooncology. 2022;8:7. https://doi.org/10.1186/s40959-022-00133-2.
2. Jaworski C, Mariani JA, Wheeler G, Kaye DM. Cardiac complications of thoracic irradiation. J Am Coll Cardiol. 2013;61:2319–28. https://doi.org/10.1016/j.jacc.2013.01.090.
3. Yazdchi F, Hirji SA, Nohria A, Percy E, Harloff M, Malarczyk A, Newell P, Kerolos MB, McGurk S, Shekar P, et al. Transcatheter compared with surgical aortic valve replacement in patients with previous chest-directed radiation therapy. JACC CardioOncol. 2021;3:397–407. https://doi.org/10.1016/j.jaccao.2021.07.005.
4. Zafar MR, Mustafa SF, Miller TW, Alkhawlani T, Sharma UC. Outcomes after transcatheter aortic valve replacement in cancer survivors with prior chest radiation therapy: a systematic review and meta-analysis. Cardiooncology. 2020;6:8. https://doi.org/10.1186/s40959-020-00062-y.
5. Felix N, Nogueira A, Carvalho PEP, et al. Outcomes of patients with active cancer after transcatheter aortic valve replacement: an updated meta-analysis. Cardio-Oncology. 2024;10:55. https://doi.org/10.1186/s40959-024-00256-8.
6. Yasmin F, Moeed A, Alam MT, et al. Outcomes after transcatheter aortic valve replacement in cancer survivors with prior chest radiation therapy: an updated systematic review and meta-analysis. Cardio-Oncology. 2024;10:61. https://doi.org/10.1186/s40959-024-00265-7.

Publisher's Note