

# Immune Checkpoint Inhibitor–Associated Myocarditis in Cancer Patients: A Systematic Review of Clinical Presentation, Management, and Outcomes

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## INTRODUCTION & AIM

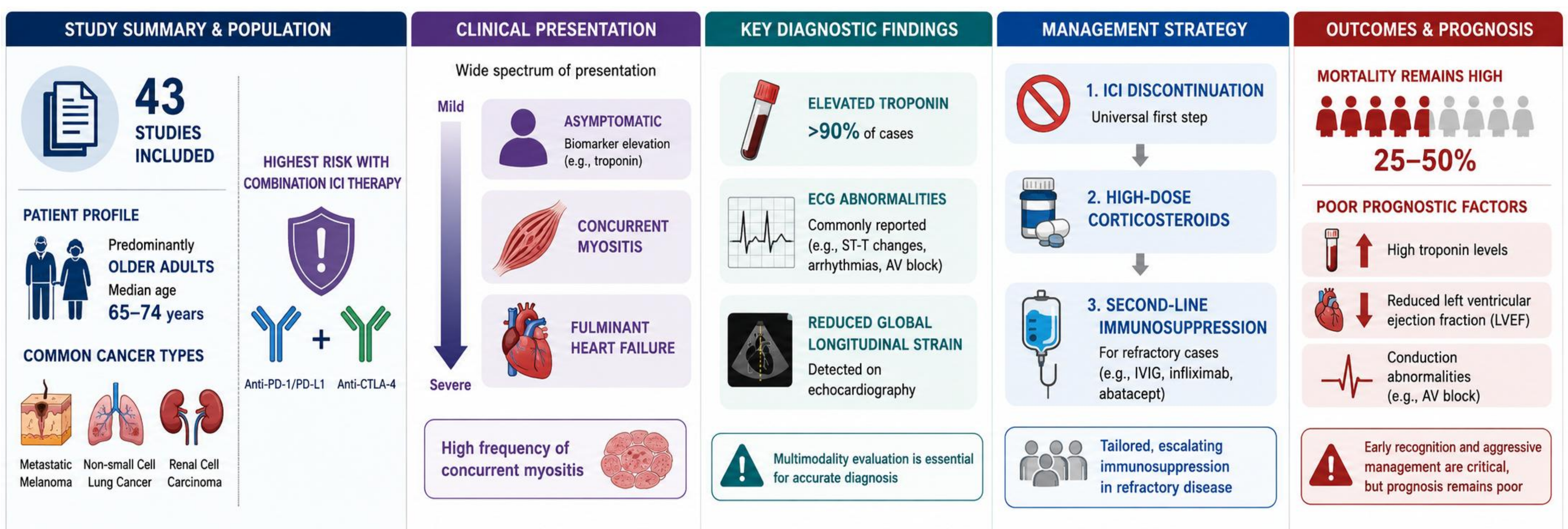
Immune checkpoint inhibitor-associated myocarditis (ICI-M) is a rare but life-threatening toxicity. This systematic review synthesizes the current evidence on the epidemiology, clinical presentation, diagnostic approaches, management strategies, and outcomes of ICI-M to guide clinical practice.

## METHOD

We systematically searched PubMed from inception to January, 2026 for studies reporting on ICI-M in cancer patients. Data on patient demographics, clinical features, diagnostic findings, treatment, and outcomes were extracted. The risk of bias was assessed using appropriate tools.

## RESULTS & DISCUSSION

43 studies were included. ICI-M predominantly affected older adults (median age 65-74 years) with metastatic melanoma, non-small cell lung cancer, or renal cell carcinoma. The highest risk was associated with combination ICI therapy (anti-PD-1/PD-L1 + anti-CTLA-4). Clinical presentation ranged from asymptomatic biomarker elevation to fulminant heart failure, with a high frequency of concurrent myositis. Key diagnostic findings included elevated troponin (>90% of cases), ECG abnormalities, and reduced global longitudinal strain on echocardiography. Management universally involved ICI discontinuation and high-dose corticosteroids. Second-line immunosuppression (e.g., IVIG, infliximab, abatacept) was used in refractory cases. Despite treatment, mortality remained high (25-50%). Poor prognostic factors included high troponin levels, reduced left ventricular ejection fraction, and conduction abnormalities.



## CONCLUSIONS

ICI-M is a severe complication with high mortality. Early recognition via proactive monitoring, prompt diagnosis using a multi-modal approach, and immediate, aggressive immunosuppression are critical. Future research should focus on predictive biomarkers and randomized trials to optimize management.

## FUTURE WORK

Future studies should focus on early detection strategies, standardized diagnostic criteria, risk stratification of high-risk patients, and prospective evaluation of immunosuppressive therapies to improve outcomes and reduce mortality in immune checkpoint inhibitor–associated myocarditis.