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Research Letter

Effect of colchicine on 90-day outcomes in patients with acute myocarditis: a real-world analysis

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Colchicine demonstrated favorable results in preclinical studies on experimental myocarditis [1,2] and showed to prevent recurrences of myopericarditis in a clinical setting [3]. However, whether colchicine can effectively reduce the risk of adverse outcomes in patients with acute myocarditis is unknown.

We aimed to compare the 90-day incidence of the composite outcome of all-cause death, ventricular arrhythmias, and acute heart failure (HF) in patients hospitalized with acute myocarditis across multiple centers in the United States (US), according to treatment with colchicine.

We accessed the TriNetX Research Network, a global federated health research enterprise with real-time data from the electronic medical records of participating healthcare organizations (HCO). (A list of studies using TriNetX is available.) [4,5] This secondary analysis of existing data does not involve identifiable data, intervention, or interaction with identifiable human subjects. It is exempt from informed consent, human subject research regulations, or oversight by an institutional review board.

The TriNetX network was searched on May 14, 2024, using the US collaborative network cohort of 64 HCOs. We included adult patients hospitalized between 2004 and 2024 for acute myocarditis (ICD-10-CM codes I51.4 OR I40). We divided patients into two groups according to the use of colchicine within 14 days of the diagnosis. Statistical analyses were conducted on the TriNetX platform. Continuous and categorical variables were compared using the independent-sample *t*-test and the Chi-Square test, respectively. Patients were then 1:1 propensity score matched (PSM) for age, sex, race, history of gout (ICD-10-CM M10), left ventricular ejection fraction (LVEF), use of glucocorticoids (HS051) or non-steroidal anti-inflammatory drugs (CN104), and troponin I levels at diagnosis. We derived cumulative incidence curves from Kaplan-Meier (KM) survival curves and used the Log-rank (Mantel-Cox) test. We derived Hazard Ratios (HR) with 95 % Confidence Intervals (CIs) from Cox regression analysis to compare the outcomes within the two groups. The platform generated propensity scores using logistic regression, and the scores were matched to patients via a greedy nearest-neighbor algorithm.

Each matched cohort included 1137 patients (age 39.7 ± 16.8 years, 63 % males, 19 % Black or African American). Patients treated with colchicine had a lower 90-day incidence of the composite outcome of all-cause death, ventricular arrhythmias, and acute HF (193 [17.0 %] versus 279 [24.5 %], Log-rank $p < 0.001$; HR 0.66, 95%CI [0.55–0.79]) (Fig. 1A). Secondary analysis showed that the incidence of the separate outcome of all-cause death was 3.3 % vs. 6.6 % (Log-rank $p < 0.001$; HR 0.48, 95 % CI [0.33–0.71]) (Fig. 1B), ventricular arrhythmias was 6.1 % vs. 9.1 % (Log-rank $p < 0.01$; HR 0.65, 95 % CI [0.48–0.88]) (Fig. 1C), and acute HF was 10.9 % vs. 14.7 % (Log-rank $p < 0.01$; HR 0.72, 95 % CI [0.57–0.91]) (Fig. 1D) in patients treated with colchicine or not, respectively.

This large real-world analysis shows that patients with acute myocarditis treated with colchicine within 14 days of diagnosis have better outcomes at 90 days. The benefit may stem from the anti-inflammatory properties of colchicine through modulation of NLRP3 inflammasome and possibly reducing scar burden [2,3]. Further research is needed to confirm the results, elucidate the mechanism and to establish a definitive role of colchicine in acute myocarditis management.

Disclosure statement

None of the other authors report any conflicts of interest regarding the content of this article.

CRediT authorship contribution statement

Michele Golino: Writing – review & editing, Writing – original draft, Visualization, Supervision, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Alexa Coe:** Writing – original draft, Investigation, Data curation, Conceptualization. **Anas Aljabi:** Writing – original draft, Investigation, Formal analysis, Conceptualization. **Azita H. Talasaz:** Writing – review & editing, Supervision,

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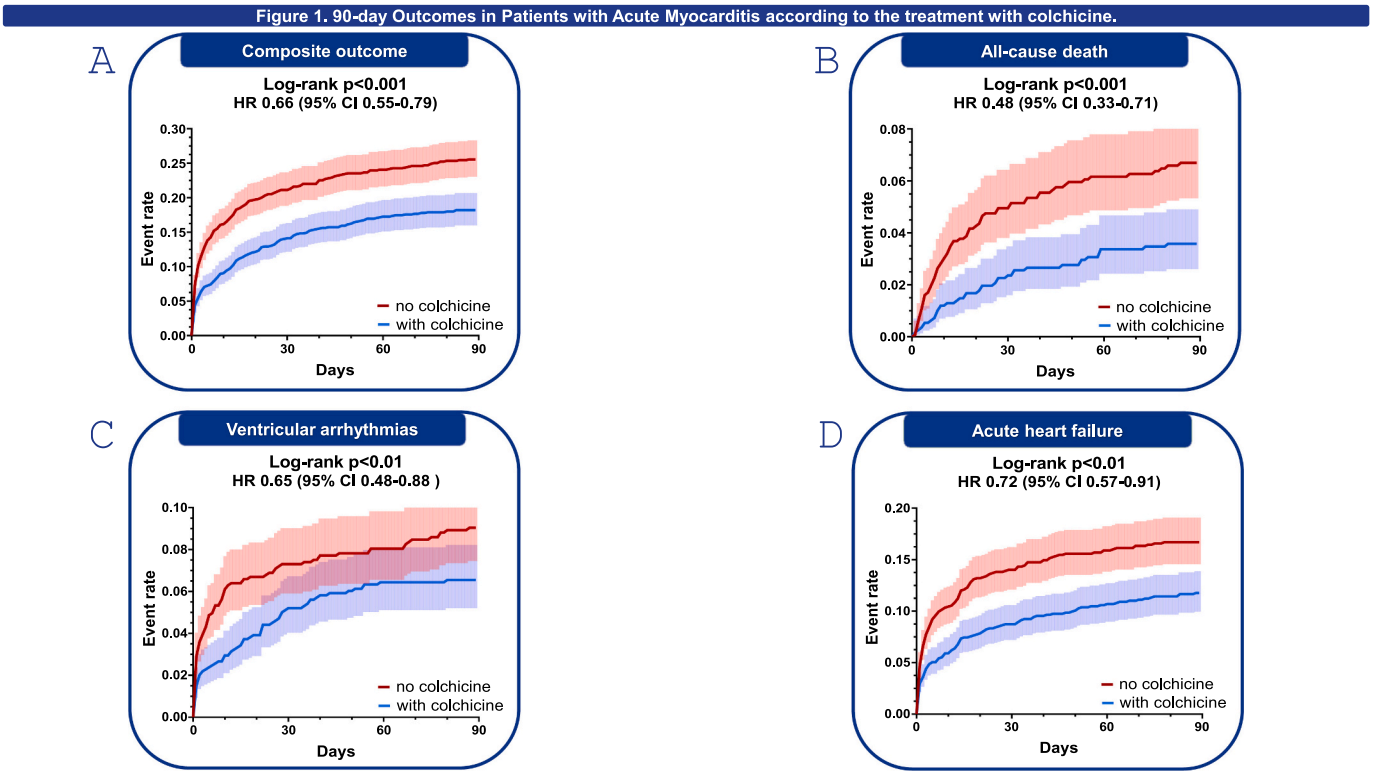

Fig. 1. Cumulative incidence curves of the composite outcome (*Panel A*), as well as the separate outcomes of all-cause death (*Panel B*), ventricular arrhythmias (*Panel C*), and acute heart failure (*Panel D*) according to the treatment with colchicine during hospitalization for acute myocarditis, after propensity score matching. The y-axis represents the event rate, calculated as 1 minus the survival probability from Kaplan-Meier analysis. The curves are compared using the Log-rank test.

Investigation, Conceptualization. **Benjamin Van Tassell:** Writing – review & editing, Visualization, Supervision, Data curation, Conceptualization. **Antonio Abbate:** Writing – review & editing, Supervision, Conceptualization. **Roshanak Markley:** Writing – review & editing, Visualization, Validation, Supervision, Methodology, Investigation, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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