VACCIREVIEW

Influenza Vaccination and Cardiac ICU Outcomes: Seroprotection, STEMI, and Pulmonary Embolism

Bibliography

Galar A, Sanz-Muñoz I, Eiros JM, et al. Serological protection against influenza and cardiovascular events in cardiac ICU patients during seasonal epidemics. Int J Infect Dis. 2026. doi:10.1016/j.ijid.2026.108406

Conclusion

Influenza vaccination in high-risk cardiac ICU patients not only improves "serological protection" but is also associated with fewer STEMIs, pulmonary emboli, and severe clinical courses. Influenza vaccination should become a routine cardioprotective intervention in patients with significant cardiovascular disease.

Summary

This multicenter prospective observational study evaluated influenza vaccination status, serological protection, laboratory-confirmed influenza, and cardiovascular outcomes among patients admitted to cardiac intensive care units (C-ICUs) in five Spanish tertiary hospitals over three influenza seasons (2017–2020). A total of 397 patients (median age 67 years, 67.3% male) were enrolled; 61.7% reported prior influenza vaccination, and 48.9% had pre-existing cardiovascular disease. Systematic testing with Xpert Xpress Flu/RSV identified laboratory-confirmed influenza in 23 patients (5.8%), all influenza A, while all patients underwent serologic testing for antibodies against vaccine strains of A(H1N1) pdm09, A(H3N2), B/Victoria, and B/Yamagata using hemagglutination inhibition assays

"Seroprotection", defined as antibody titers ≥1:40, was markedly higher for influenza A than B (84.6% vs 37.5%, p<0.001), and higher in vaccinated than unvaccinated patients across all strains. The strongest "seroprotection" rate and geometric mean titers (GMTs) were observed for A(H3N2), followed by A(H1N1) pdm09, B/Victoria, and B/Yamagata. Despite similar proportions of laboratory-confirmed influenza among vaccinated and unvaccinated patients (6.1% vs 5.3%, p=0.827), vaccinated individuals showed significantly higher GMTs overall, with a particularly high A(H3N2) GMT in those who developed influenza, consistent with an anamnestic response.

Clinically, vaccinated patients were older, had more comorbidities, and a higher age-adjusted Charlson index, but experienced fewer severe cardiovascular events. Compared with unvaccinated patients, vaccination was associated with lower rates of ST-segment elevation myocardial infarction (STEMI) (28.2% vs 40.8%, p=0.009),

pulmonary embolism (0.8% vs 4.6%, p=0.014), and myocarditis (0% vs 3.3%, p=0.004) at admission, and fewer severe clinical presentations during C-ICU stay (53.1% vs 67.1%, p=0.006). In multivariate analyses, non-vaccination independently predicted STEMI (OR 1.808, 95% CI 1.158–2.822), pulmonary embolism (OR 7.850, 95% CI 1.580–39.003), and severe clinical presentation (OR for vaccination 0.605, 95% CI 0.389–0.942).

Lower antibody titers were associated with worse cardiovascular outcomes: reduced GMTs against A(H3N2) and B/Victoria were linked to higher STEMI incidence, while lower A(H1N1) GMTs correlated with cardiogenic shock, cardiorespiratory arrest, and pulmonary embolism, and low H3N2 titers also related to pulmonary embolism. Overall influenza-attributable mortality was low, and ICU/hospital length of stay did not differ significantly by vaccination status, but influenza-positive patients had more severe complications and longer hospitalization than influenza-negative patients. The authors conclude that in high-risk cardiac ICU populations, influenza vaccination enhances "seroprotection"—especially against A(H3N2)—and is associated with reduced STEMI, pulmonary embolism, and severe clinical courses, supporting systematic vaccination of cardiac patients as part of inpatient management during influenza seasons.

Comment

We had covered before that after years of evidence had been generated, influenza vaccination is now more and more acknowledged as a significant mean to prevent cardiac events (ViVa 46, 2025). This study now usefully links detailed serology with hard cardiovascular endpoints in a high-risk C-ICU population, using a prospective multicenter design, systematic virologic testing, and standardized EMA-aligned assays. The associations between vaccination, higher strain-specific antibody titers, and lower rates of STEMI, pulmonary embolism, and severe presentations are biologically plausible and consistent with existing data on influenza as a cardiovascular trigger, reinforcing the cardioprotective potential of influenza vaccination.

Nonetheless, the non-randomized design, differential baseline characteristics (including younger age in the unvaccinated group), lack of pre-vaccination and follow-up sera, and small number of influenza cases (in subgroups) limit causal inference and strain-specific conclusions. Even so, the work highlights a clear gap in vaccine uptake among eligible cardiac patients and adds weight to positioning influenza vaccination as a standard component of secondary prevention in cardiology care pathways.

*Brought to you by Chief Editor **Joe Schmitt** – Supported by AI*