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**Abstract Title :** Deciphering the dilemma: Intravenous (IV) iron use in iron deficiency anemia during acute infections

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**Authors**

Haris Sohail[1], Lindsay Wilson[2], Jennifer Collins[1], Amir Kamran[1]

[1] Charleston Area Medical Center, Hematology/Oncology, Charleston, WV, United States, [2] West Virginia University School of Medicine, Morgantown, WV, United States



**Abstract Body**

Background

The use of intravenous (IV) iron for treating iron deficiency anemia during acute infections remains controversial. Prior studies have reported conflicting outcomes, leading to hesitancy among healthcare providers to administer IV iron in this setting, even when clinically indicated. This study evaluates the impact of IV iron administration during hospitalization for acute infections on overall mortality, length of stay, and hemoglobin levels.

Methods

This retrospective cohort study was conducted using the TriNetX Research Network to identify adults ≥ 18 years of age between 2000-2024 with a diagnosis of one of the following acute infections: MRSA bacteremia, pneumonia, urinary tract infection (UTI), colitis, cellulitis, or bacterial meningitis. Patients were required to have a concurrent diagnosis of iron deficiency anemia at the time of infection. To ensure infections were being actively treated, patients were included only if they received antibiotic therapy within two days of the infection diagnosis. Patients were then stratified based on whether or not they had IV iron administration at or near the active course of the illness. Propensity matching (1:1) was performed within each infection group to balance age, sex, race, baseline labs, and relevant comorbidities. All analyses were conducted within the TriNetX platform using built-in survival and risk assessment tools.

Results

In a propensity-matched cohort of 15,022 patients with MRSA bacteremia, IV iron administration was associated with significantly lower mortality at both 14 days (RR 0.47, 95% CI 0.42–0.52; HR 0.46, 95% CI 0.41–0.51; $p < 0.0001$) and 90 days (RR 0.72, 95% CI 0.68–0.76; HR 0.68, 95% CI 0.64–0.73; $p < 0.0001$).

Similarly, in 27,062 patients hospitalized with pneumonia, IV iron use significantly reduced mortality at 14 days (RR 0.48, 95% CI 0.45–0.51; HR 0.46, 95% CI 0.43–0.50; $p < 0.0001$) and 90 days (RR 0.72, 95% CI 0.69–0.74; HR 0.67, 95% CI 0.65–0.70; $p < 0.0001$).

In a cohort of 23,114 patients with urinary tract infections (UTIs), IV iron use was similarly associated with lower mortality at 14 days (RR 0.49, 95% CI 0.44–0.54; HR 0.47, 95% CI 0.43–0.52; $p < 0.0001$) and at 90 days (RR 0.73, 95% CI 0.69–0.77; HR 0.70, 95% CI 0.66–0.73; $p < 0.0001$).

Among 7,938 hospitalized patients with colitis, IV iron administration led to significantly reduced mortality at 14 days (RR 0.61, 95% CI 0.52–0.72; HR 0.60, 95% CI 0.51–0.71; $p < 0.0001$) and 90 days (RR 0.80, 95% CI 0.74–0.87; HR 0.77, 95% CI 0.71–0.84; $p < 0.0001$).

In a cohort of 13,005 patients hospitalized with cellulitis, IV iron use was associated with significantly lower mortality at 14 days (RR 0.56, 95% CI 0.47–0.66; HR 0.55, 95% CI 0.46–0.65; $p < 0.0001$) and 90 days (RR 0.73, 95% CI 0.68–0.79; HR 0.71, 95% CI 0.65–0.77; $p < 0.0001$).

In contrast, among 143 patients hospitalized with meningitis, IV iron use showed no statistically significant difference in mortality at either 14 days (RR 0.99, 95% CI 0.42–2.3; HR 0.89, 95% CI 0.34–2.1; $p = 0.74$) or 90 days (RR 0.99, 95% CI 0.57–1.7; HR 0.94, 95% CI 0.52–1.7; $p = 0.83$).

Across all infection subgroups except meningitis, IV iron was associated with significantly greater improvements in hemoglobin levels measured 60–90 days after treatment. Patients receiving IV

iron demonstrated larger increases in hemoglobin from baseline compared to those who did not: MRSA bacteremia (1.6 vs. 1.0 g/dL), pneumonia (1.5 vs. 0.97 g/dL), UTI (1.5 vs. 1.0 g/dL), colitis (1.6 vs. 1.0 g/dL), and cellulitis (1.6 vs. 1.1 g/dL), all $p < 0.0001$. In meningitis patients, no significant difference was observed (1.4 vs. 1.0 g/dL, $p = 0.44$).

Conclusion

This study highlights the positive impact of IV iron on both short- and long-term mortality across various infection subtypes. Mortality benefits were consistently observed, with the greatest effect seen in pneumonia and MRSA bacteremia cohorts. IV iron was also associated with statistically significant improvement in hemoglobin levels after treatment. The lack of significant benefit in the meningitis group is likely attributable to the small sample size. These findings support the potential role of IV iron as a safe adjunctive therapy in hospitalized patients with infection and iron deficiency anemia.

**Keywords:** Supportive Care, Clinical Practice (Health Services And Quality), Treatment Considerations, Clinical Guidelines

**Disclosure :** None declared