Alcohol Use and Risk of Renal, Infectious, and Hematologic Complications in Multiple Myeloma: A Real-World Cohort Study

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Introduction

- **Multiple myeloma (MM)**: Associated with high rates of renal, infectious, and hematologic complications.
- **Alcohol-related disorders (ARD)**: Known to impair immunity, nutrition, and metabolic stability; may amplify MM complication risk.
- **Evidence gap**: No large-scale, matched analysis has quantified the impact of ARD on MM complications.
- **Importance**: Alcohol use is a modifiable risk factor. Understanding its impact could guide screening, counseling, and treatment strategies.
- **Objective**: Evaluate the association between ARD and major complications in MM patients using a large, multicenter electronic health record (EHR) network.

Methods

- **Design/Data Source**: Retrospective cohort using TriNetX Research Network (2015–2024).
- **Population**: Adults ≥18 years with MM (ICD-10 C90.x).
- **Exposure**: Alcohol-related disorders (ICD-10 F10.x); comparator = MM without ARD.
- **Matching**: 1:1 propensity score match on age, sex, race/ethnicity, hypertension, diabetes, obesity, cardiovascular disease, and baseline renal function (SMD <0.1).
- **Outcomes**: Acute kidney injury (AKI), chronic kidney disease (CKD), infections, hematologic toxicities, diabetic ketoacidosis (DKA), hyperosmolar hyperglycemic state (HHS).
- **Analysis**: Odds ratios (OR), 95% confidence intervals (CI), p-values, absolute risk increase (ARI), number needed to harm (NNH).

Results

After matching (n=6,381 per group), ARD was associated with:

Renal complications –

- AKI: +13.0% ARI (35.7% vs 22.7%), NNH=8, OR 1.88 (95% CI 1.74–2.04)
- CKD: +7.7% ARI (34.0% vs 26.3%), NNH=13, OR 1.45 (95% CI 1.34–1.56)

Infectious complications –

- Infections: +10.0% ARI (32.3% vs 22.3%), NNH=10, OR 1.66 (95% CI 1.53–1.79)

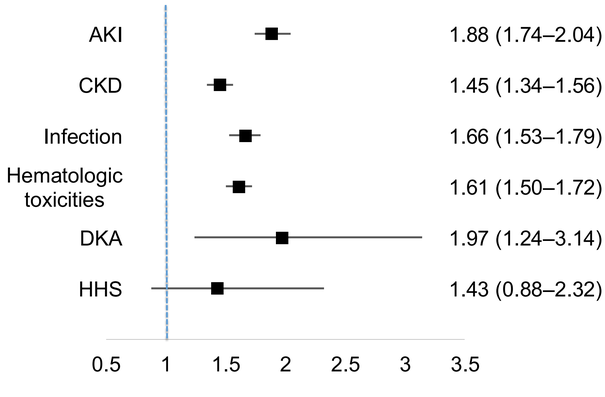
Hematologic toxicities –

- Toxicities: +11.8% ARI (57.2% vs 45.4%), NNH=9, OR 1.61 (95% CI 1.50–1.72)

Metabolic complications –

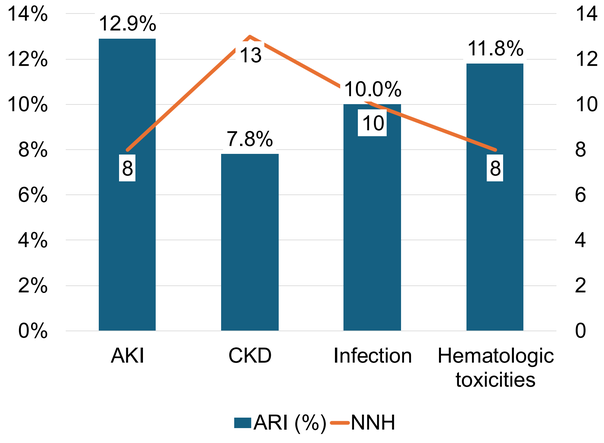
- DKA: +0.4% ARI (0.8% vs 0.4%), NNH=250, OR 1.97 (95% CI 1.24–3.14), p=0.004
- HHS: Not significant (p=0.145)

Figure 1: Odds Ratios (Alcohol vs No Alcohol) with 95% CI



Results Cont'd

Figure 2: Attributed Risk Index and Number Needed to Harm for Major Outcomes



Discussion

- **Key findings**: ARD in MM patients significantly increased the risk of renal, infectious, and hematologic complications, with low NNH values for most outcomes.
- **Clinical implications**: Alcohol use is a modifiable factor; integrating screening and counseling into MM care pathways could meaningfully reduce preventable morbidity.
- **Strengths**: Large multicenter dataset, robust matching, clinically meaningful effect size measures (OR, ARI, NNH).
- **Limitations**: ARD defined by ICD-10 codes; no data on alcohol quantity or duration; no stratification by treatment regimens; residual confounding possible.
- **Next steps**: Prospective trials to assess whether alcohol reduction interventions improve complication rates, treatment tolerance, and survival.

Conclusion

- Alcohol use significantly increases morbidity in MM, with higher risks of renal, infectious, and hematologic complications.
- Absolute risks are clinically meaningful: as few as 8 MM patients with ARD result in one additional AKI or hematologic toxicity event.
- DKA risk nearly doubled, while HHS showed no significant difference, suggesting alcohol's impact is selective and biologically plausible.
- ARD should be recognized as a modifiable, under-addressed risk factor in MM care.
- **Clinical implication**: Incorporating routine alcohol screening, counseling, and supportive interventions into MM management may reduce preventable complications and improve patient outcomes.
- **Future directions**: Studies are needed to evaluate the effect of alcohol cessation on MM outcomes, interactions with specific treatment regimens, and survival trajectories.

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