

Impact of Alcohol on Peritoneal Cytokine Expression Following Damage Control Laparotomy in Trauma Patients

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Introduction

- Trauma patients requiring damage control laparotomy are at high risk for systemic inflammatory dysregulation.¹
- The peritoneal cavity plays a key role in this process, as cytokine-rich ascitic fluid can influence both local and systemic immune signaling.²
- Acute alcohol intoxication is present in a large proportion of trauma patients.³
- Alcohol use is known to alter immune function, but its effect on peritoneal cytokine responses after traumatic injury remains poorly understood.
- Objective: To evaluate the impact of alcohol intoxication on peritoneal cytokine profiles in trauma patients.
- Hypothesis: Alcohol-positive patients would exhibit altered peritoneal cytokine expression compared to alcohol-negative patients.

Methods

Adult trauma patients undergoing exploratory laparotomy at Level 1 Trauma Center

Sample Collection

Peritoneal fluid samples collected intraoperatively

Cytokine Analysis

Cytokine concentrations measured using Milliplex assays

Grouping by Alcohol Status

Alcohol-positive: EtOH $\geq$ 15 mg/dL
Alcohol-negative: EtOH $\leq$ 15 mg/dL

Statistical Analysis

Numerical variables: Wilcoxon rank-sum test
Categorical variables: Chi-square/Fisher's exact test

Secondary Analysis

Propensity-score matching on
Age, BMI, ISS, Sex, Race, MOI, Smoking, Shock

Results

	No Alcohol (n=25)	Alcohol (n=10)	P-value
Demographics			
Age (years), median	33	32.5	0.88
Male Sex (%)	84	80	0.78
ISS, median	29	21.5	0.39
BMI, median	25.1	30.24	0.11

Table 1: Demographic and Clinical Characteristics of the Unmatched Cohort

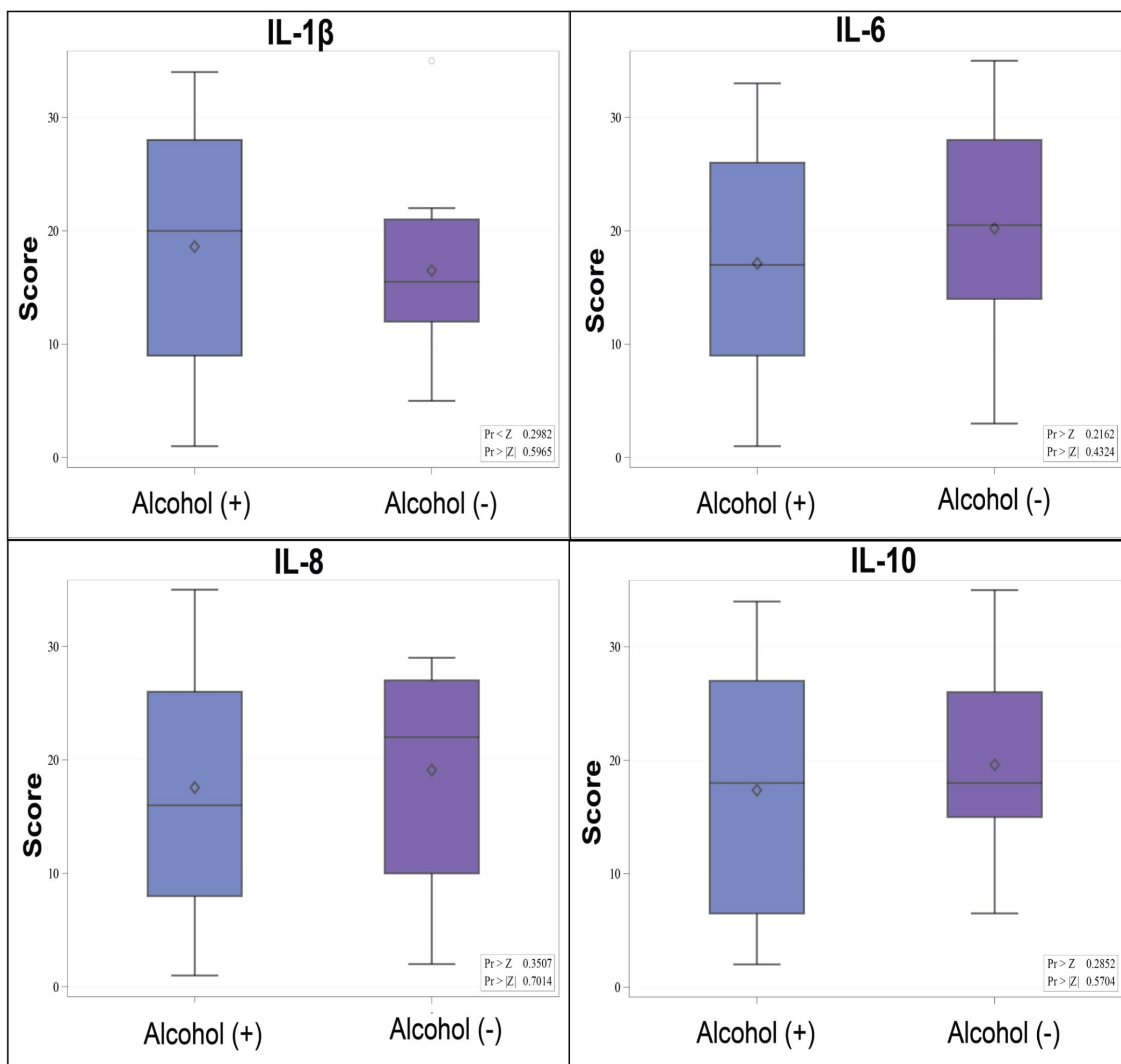


Figure 1: Rank Distributions of Peritoneal Cytokine Levels by Alcohol Status (Unmatched Cohort)

	No Alcohol (n=8)	Alcohol (n=8)	P-value
Demographics			
Age (years), median	37.5	33.0	0.44
Male Sex (%)	87.5	87.5	1.00
ISS, median	25.0	25.5	0.90
BMI, median	27.2	27.5	0.75

Table 2: Demographic and Clinical Characteristics after Propensity Score Matching

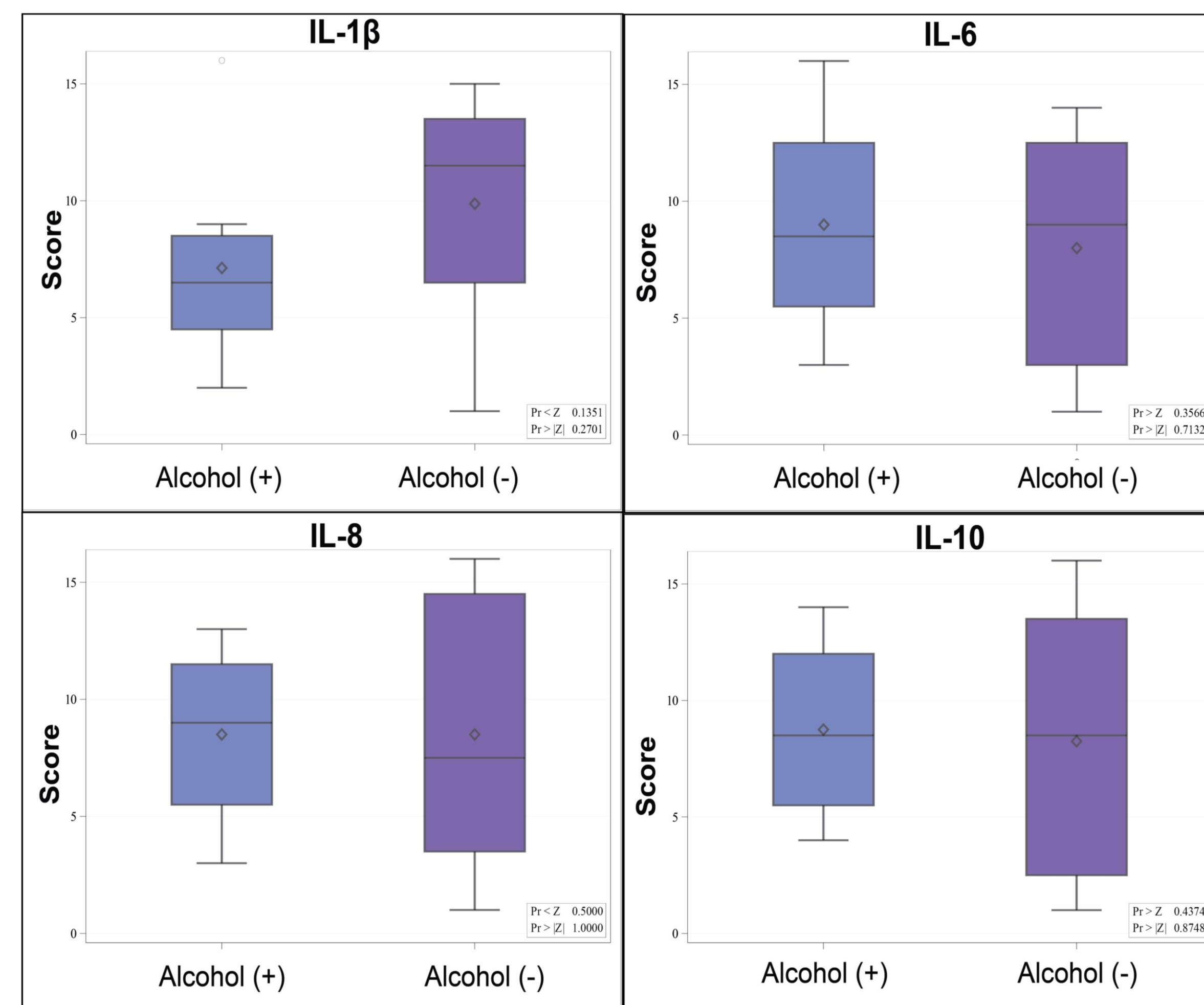


Figure 2: Rank Distribution of Peritoneal Cytokine Levels by Alcohol Status (Matched Cohort)

Discussion

- Prior studies show alcohol may increase injury severity but does not independently worsen trauma outcomes.^{6,7,8}
- In this cohort, no significant cytokine differences were found between alcohol-positive and alcohol-negative patients.
- The strong inflammatory response from trauma and surgery may override alcohol's immune effects.
- This may explain why acute intoxication has not been linked to worse clinical outcomes in prior studies.
- High variability in cytokine levels underscores complex immune dynamics and the need for larger studies.

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Conclusion

- Detectable blood alcohol levels was not associated with significant differences in peritoneal cytokine profiles for IFN- γ , IL-1 β , IL-4, IL-6, IL-8, IL-10, IL-17A, VEGF, MCP-1, and FGF-2.
- Findings consistent across both unadjusted and propensity-matched analyses.
- Overall, alcohol intoxication did not appear to alter the local peritoneal immune response in this trauma cohort.