

Serum Alkaline Phosphatase Levels Predict AKI in Paediatric Sepsis: A Multicentre Retrospective Study

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BACKGROUND AND AIMS

Alkaline phosphatase (ALP) is a membrane-bound glycoprotein, expressed in different tissues and playing several physiologic roles, including bacterial endotoxin detoxification through lipopolysaccharide dephosphorylation.¹ In adult patients with sepsis, a potential association between changes in ALP levels and acute kidney injury (AKI) was found, and treatment with exogenous ALP has been shown to improve renal function in patients with severe sepsis and septic shock complicated by AKI.²⁻⁵ No similar data exist in paediatric patients. The authors aimed to investigate the association between serum ALP levels and disease severity, including AKI occurrence in paediatric patients with sepsis.⁶

MATERIALS AND METHODS

This retrospective study of Kineret, a computerised database of four Israeli Government hospitals (Barzilai, Poria, Hilel Yafe, Bnei Zion), included paediatric patients (age: 0–18 years) hospitalised between 1st January 2000–1st June 2024 with ICD-9 sepsis-related diagnoses. Demographic, clinical, and laboratory data were retrieved. Serum ALP levels were adjusted to sex and age-normal values and described, for unification between age groups and sexes, as standard deviation scores (SDS).

RESULTS

A total of 809,952 hospitalisations of paediatric patients were screened; 710 records comprised the study group. The median (interquartile range [IQR]) age was 17 (10–38) months, and 53% were males. Median (IQR) hospital stay length was 4 (3–6) days. Mean minimal ALP level was 177 ± 76 U/L, minimal median (IQR) ALP SDS was -1.69 (-2.32 – -0.98). A total of 164 patients (23%) developed AKI. Compared to non-AKI patients, patients with AKI were older (median age [IQR]: 19 [9–56] versus 16 [10–33] months; $p < 0.001$), and had more hypoalbuminaemia and leukopenia (55% versus 10% [$p < 0.001$], and 14.6% versus 3% [$p < 0.001$], respectively). Minimal ALP levels were lower in the AKI group, both in absolute values (mean $\pm$ SD: 156 ± 83 U/L versus 183 ± 73 U/L; $p < 0.001$), and ALP SDS (median [IQR]: -2.02 [-2.60 – -1.27] versus -1.59 [-2.22 – -0.90]; $p = 0.017$). Hospital stay was longer in the AKI compared to the non-AKI group (median [IQR]: 7 [4–12] versus 4 [3–5] days; $p < 0.001$).

CONCLUSION

ALP was below average in paediatric patients with sepsis. Moreover, it was significantly

lower in the AKI versus non-AKI group. ALP can serve as an additional marker of sepsis severity. Further prospective studies are needed to confirm these findings.

References

1. Koyama I et al. Alkaline phosphatases reduce toxicity of lipopolysaccharides in vivo and in vitro through dephosphorylation. *Clin Biochem.* 2002;35(6):455-61.
2. Pickkers P et al. Alkaline phosphatase for treatment of sepsis-induced acute kidney injury: a prospective randomized double-blind placebo-controlled trial. *Crit Care.* 2012;16(1):R14.
3. Liu S et al. Association between alkaline phosphatase to albumin ratio and mortality among patients with sepsis. *Sci Rep.* 2024;14(1):3170.
4. Hümmeke-Oppers F et al. Innovative drugs to target renal inflammation in sepsis: alkaline phosphatase. *Front Pharmacol.* 2019;10:919.
5. Pickkers P et al. Effect of human recombinant alkaline phosphatase on 7-day creatinine clearance in patients with sepsis-associated acute kidney injury: a randomized clinical trial. *JAMA.* 2018;320(19):1998-2009.
6. Gurevich E et al. Serum alkaline phosphatase levels predict AKI in pediatric sepsis: a multicentre retrospective study. ERA26-RES-418. ERA Congress, 3-6 June, 2026.