

A4 Predicting Rapidly Progressive Hyperinflammation in children: Biomarker Profiles

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INTRODUCTION

Post-infectious hyperinflammation ranges from mild to life-threatening. Identifying progressive disease course is crucial, highlighting the need for prognostic markers.

OBJECTIVES

- 1) Describe a longitudinal pediatric hyperinflammation cohort,
- 2) Compare clinical/lab features of monophasic vs. progressive disease,
- 3) Identify biomarkers predicting disease course and trajectories.

METHODS

A single-center study (Jan 2021–Jan 2024) included pediatric post-infectious hyperinflammation (Kawasaki disease/MIS-C) patients, classified as monophasic (IVIG-responsive, no intensive care) or rapidly progressive (IVIG-resistant, requiring intensive care/advanced treatment). Clinical, laboratory, treatment, outcomes, and biomarkers were analyzed.

RESULTS

Clinical Features:

- Among 80 patients: 56 RPH, 24 monophasic.
- Fever universal (median: 10 vs. 9 days).
- Rash, mucosal involvement, conjunctivitis → more in monophasic.
- Acute abdomen, neurological symptoms, pleural effusion → more in RPH.
- Myocarditis (43% vs. 0%, $p < 0.01$) & reduced EF (21% vs. 0%) → only in RPH.
- Coronary aneurysms → more in monophasic (21% vs. 5%).

ICU Admission & Treatment:

- ICU admission (21% vs. 0%, $p < 0.01$) & mechanical ventilation → only in RPH.
- Hospital stay longer in RPH (8.2 vs. 5.6 days, $p = 0.04$).
- All received IVIG.
- Steroids (64% vs. 0%, $p < 0.01$) & anakinra (34% vs. 0%, $p < 0.01$) → only in RPH.
- Aspirin use lower in RPH (55% vs. 83%, $p = 0.034$).

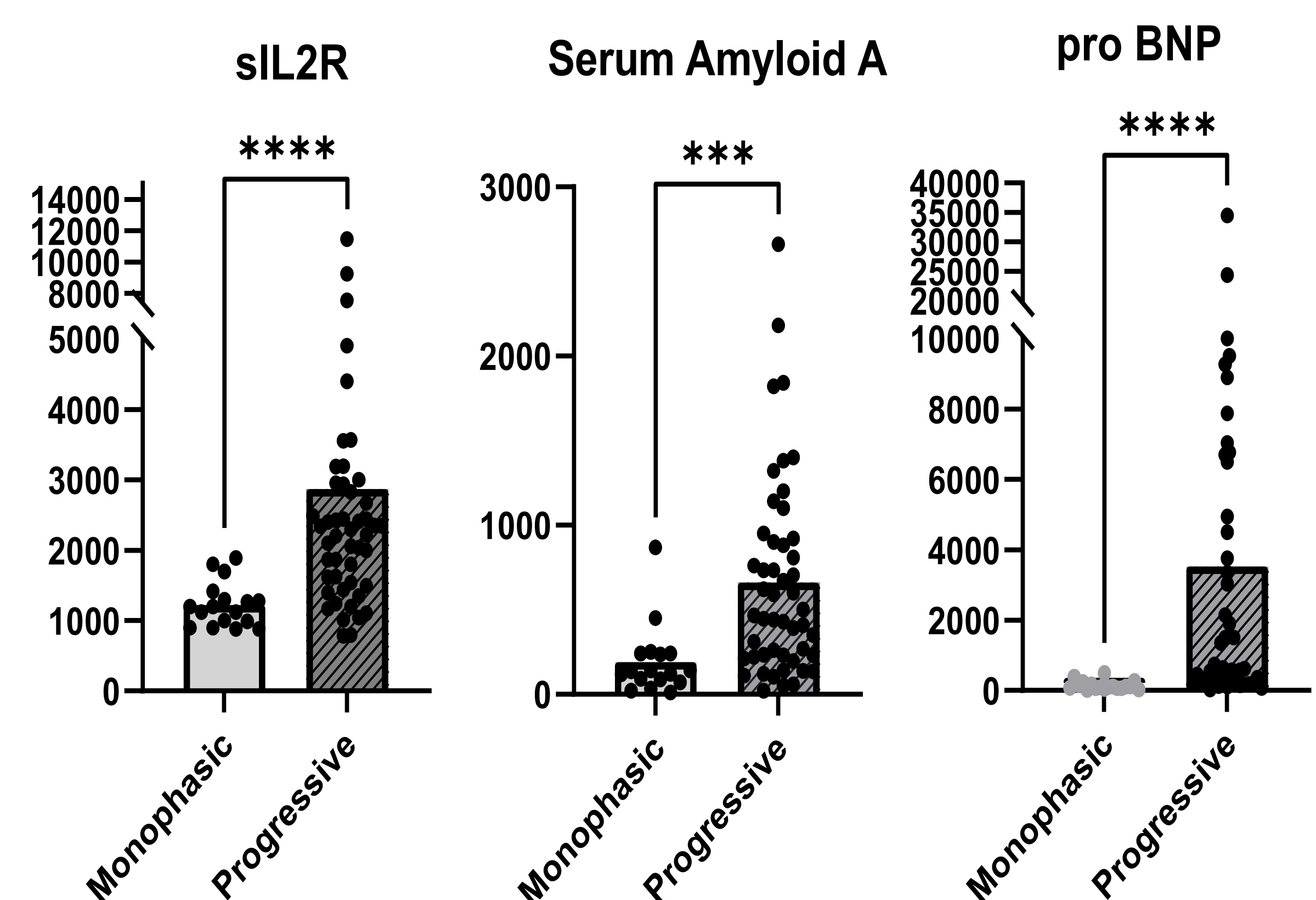
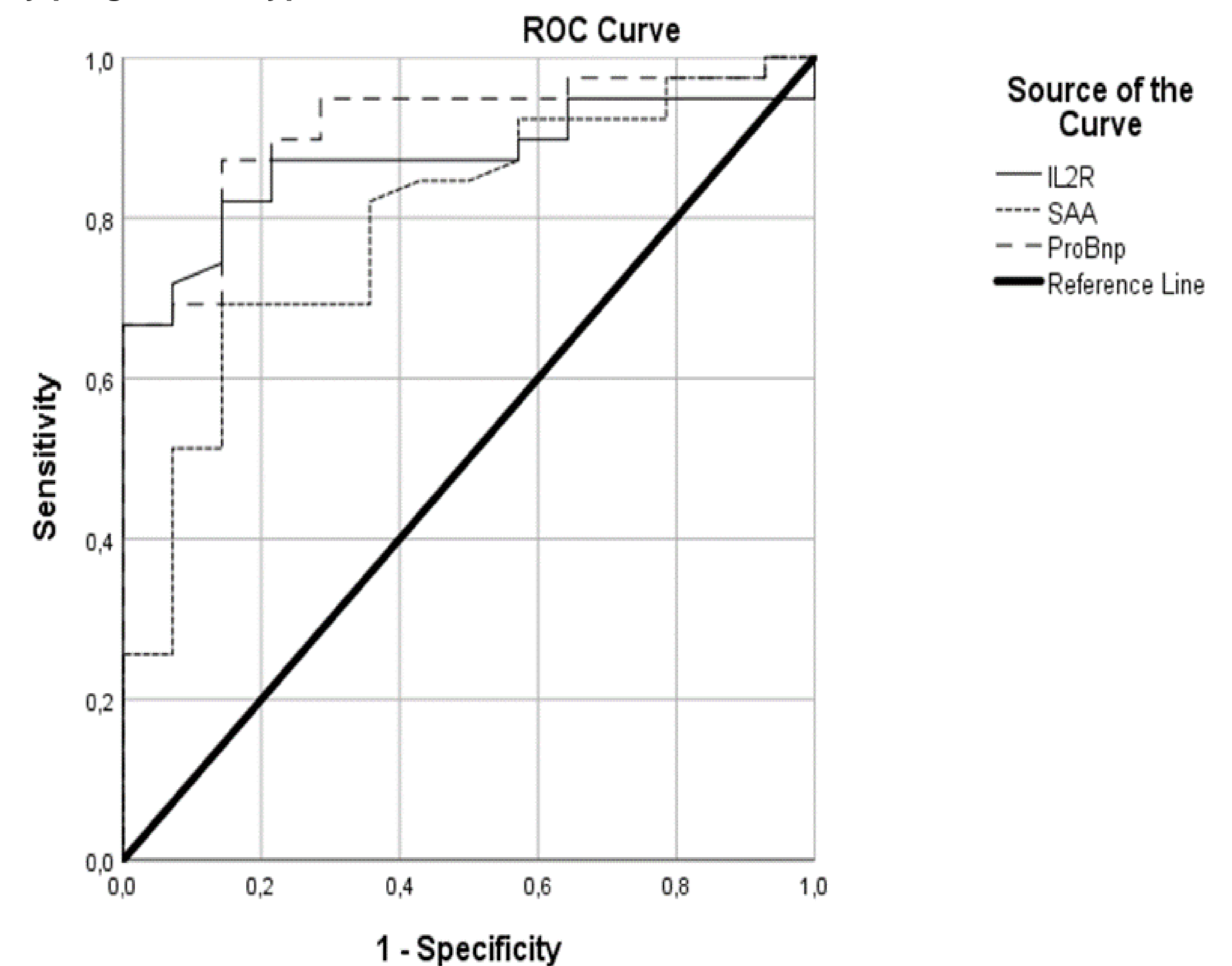
Laboratory Findings & Outcomes:

- RPH: lower lymphocyte/platelet counts, higher NT-proBNP, IL-2R, ferritin ($p < 0.01$).
- More kidney dysfunction in RPH.
- Pyuria more common in monophasic (52% vs. 13%, $p < 0.01$).
- NT-proBNP (AUC: 0.912, $p < 0.001$) & IL-2R (AUC: 0.873, $p < 0.001$) → high diagnostic accuracy.
- SAA, IL-2R, NT-proBNP peaked at therapy escalation, declined before discharge ($p < 0.001$).
- Last visit: survival 100%, aspirin use 9% (RPH) vs. 38% (monophasic), 1 RPH patient on anakinra.

CONCLUSION

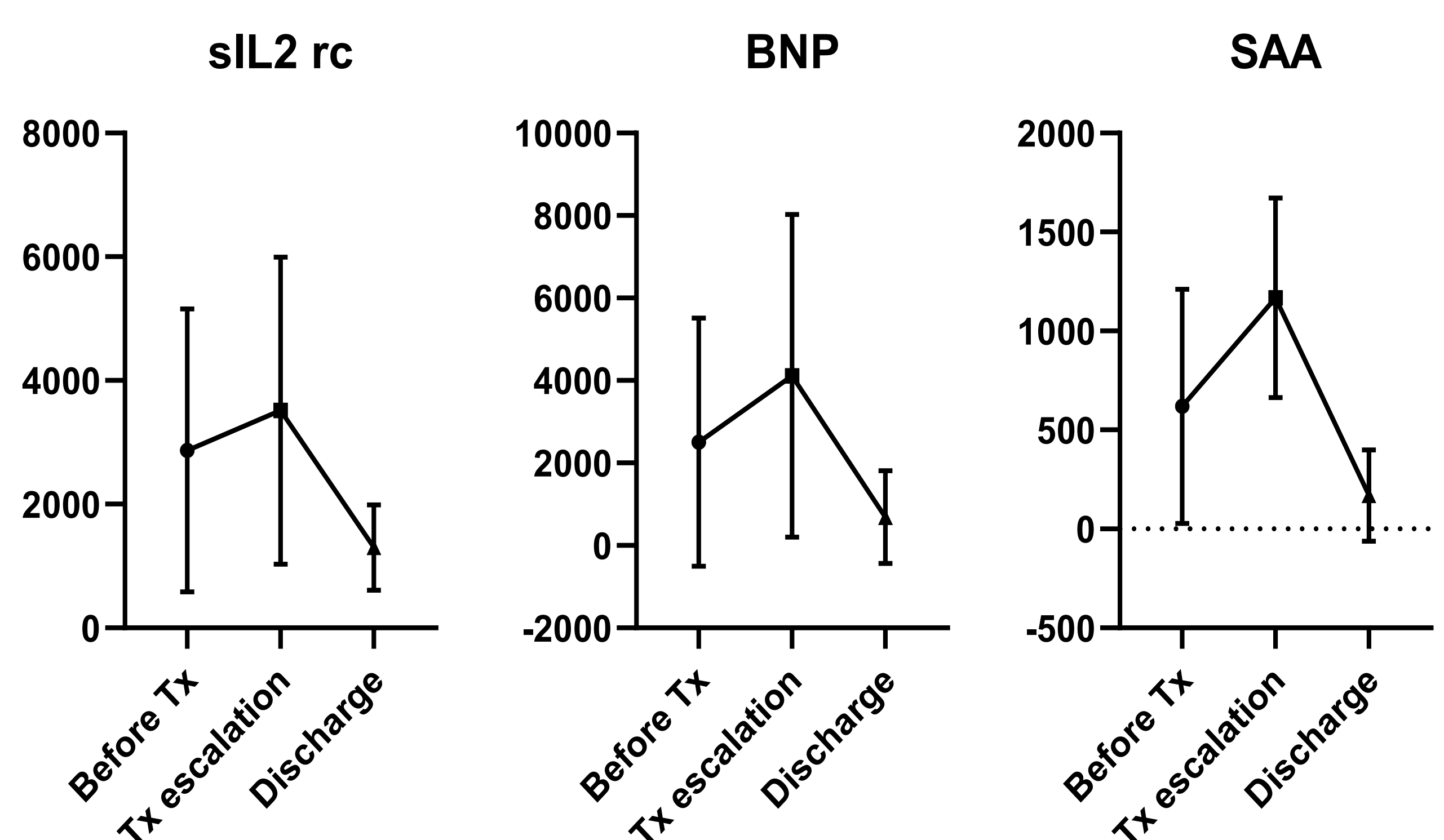
Early identification of high-risk patients is crucial for guiding timely therapeutic escalation. Pro-BNP, IL-2R, and SAA have emerged as promising biomarkers for prognostic differentiation; however, further multicenter prospective studies are needed to validate these findings.

Figure . Performance of novel biomarkers in differentiating a monophasic from rapidly progressive hyperinflammation



Legend: ProBNP demonstrated the highest diagnostic accuracy (AUC: 0.912, 95% CI: 0.832–0.992, $p < 0.001$), followed by IL2R (AUC: 0.873, 95% CI: 0.778–0.967, $p < 0.001$) and SAA (AUC: 0.793, 95% CI: 0.661–0.925, $p = 0.001$).

Figure. Trajectories of Biomarkers



Legend: Trajectories of SAA, IL-2R, and NT-proBNP levels in 41 patients with a rapidly progressive disease course requiring therapy escalation. A significant time effect was observed ($p < 0.001$), with linear and quadratic trends. SAA, IL-2R, and NT-proBNP levels increased at therapy escalation and declined before discharge.