

P3.071: Changes in the Adsorptive and Transport Functions of Blood Cells in Lung Cancer

R. Kadyrbayeva^{1,2,4}, T. Goncharova¹, D. Kaidarova², K. Smagulova^{1,2,4}, V. Makarov³, I. Turkpenova^{1,2,4}
¹Kazakh Institute of Oncology and Radiology, ²Asfendiyarov University, ³National Scientific Oncology Center, ⁴Kazakhstan school of medical oncologists
Correspondence: rabigakadyrbayeva@gmail.com

INTRODUCTION

Blood-based biomarker testing in lung cancer typically overlooks blood cells' role in adsorbing and transporting immunoglobulins, tumor markers, and proteins. We assessed this distribution between plasma and blood-cell fractions before and after treatment.

METHODS

We compared 58 lung cancer patients to 60 controls, then followed 50 patients before/after surgery (age 35–70, mean 48). Blood was fractionated into plasma and a blood-cell-derived supernatant (NaCl wash, re-centrifugation). IgA, IgG, IgM, IgE, CEA, and CYFRA 21-1 were measured by ELISA; protein/albumin by standard assays. Groups were compared by t-test or Mann-Whitney U ($p < 0.05$).

RESULTS

Compared with controls, lung cancer patients showed markedly elevated IgA, IgG, and IgM (3.0–3.5-fold), CEA (2.4-fold), and CYFRA 21-1 (1.6-fold), whereas albumin and total protein were reduced by 33.6% and 9.9%, respectively. IgE showed the largest change, increasing 74.2-fold in the blood-cell fraction.

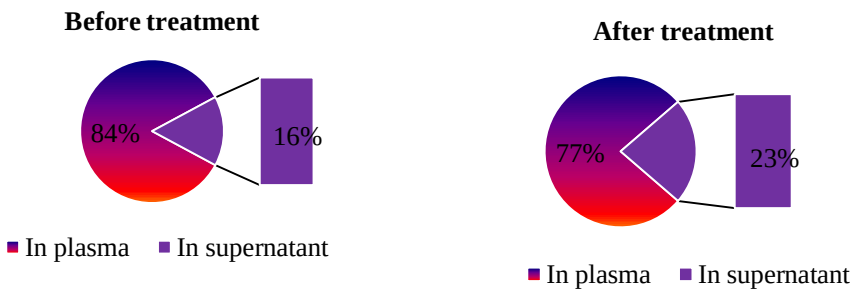
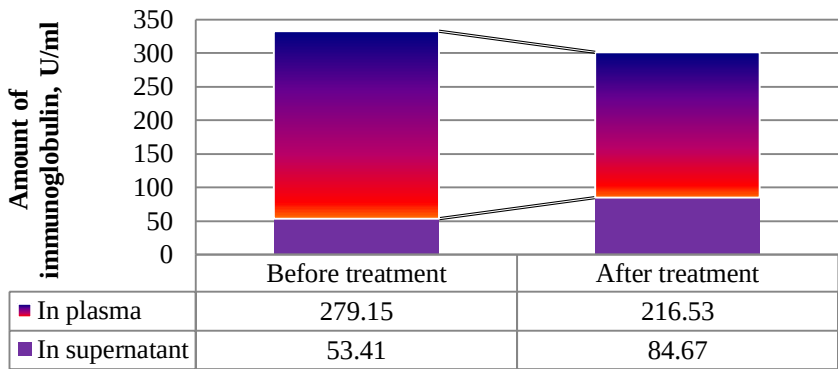


Figure 1. Immunoglobulin IgA levels in lung cancer patients before and after treatment

RESULTS

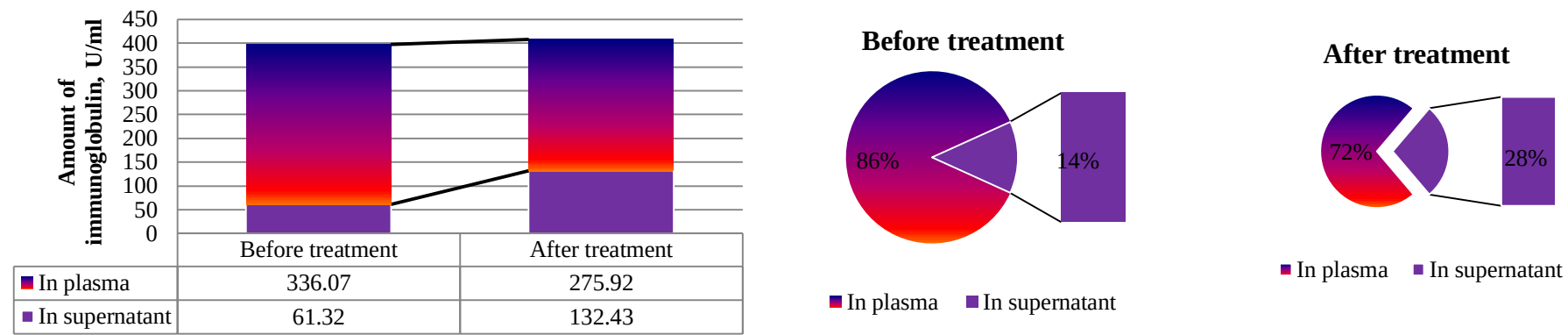


Figure 2. Immunoglobulin IgG levels in lung cancer patients before and after treatment

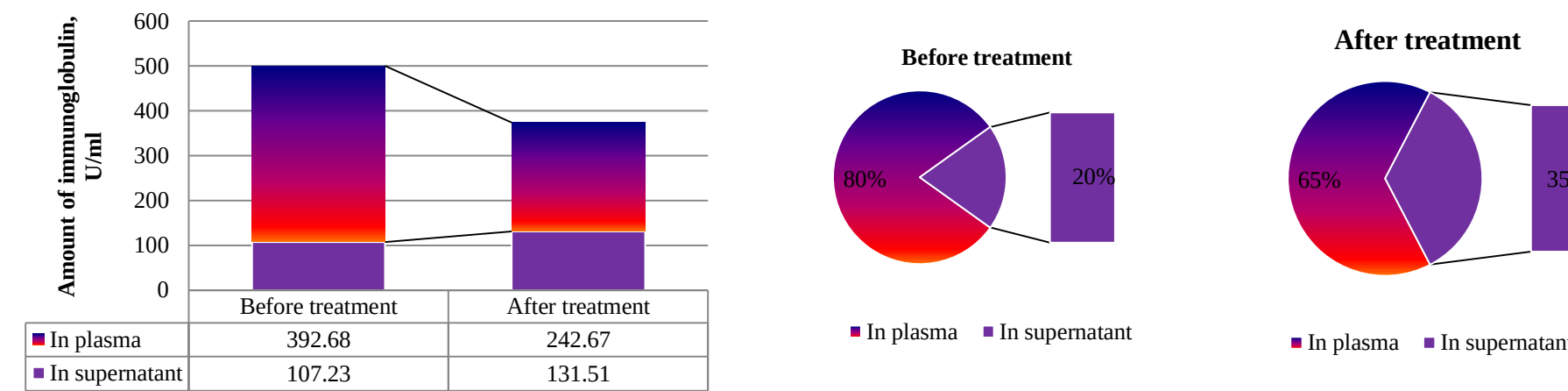


Figure 3. Immunoglobulin IgM levels in lung cancer patients before and after treatment

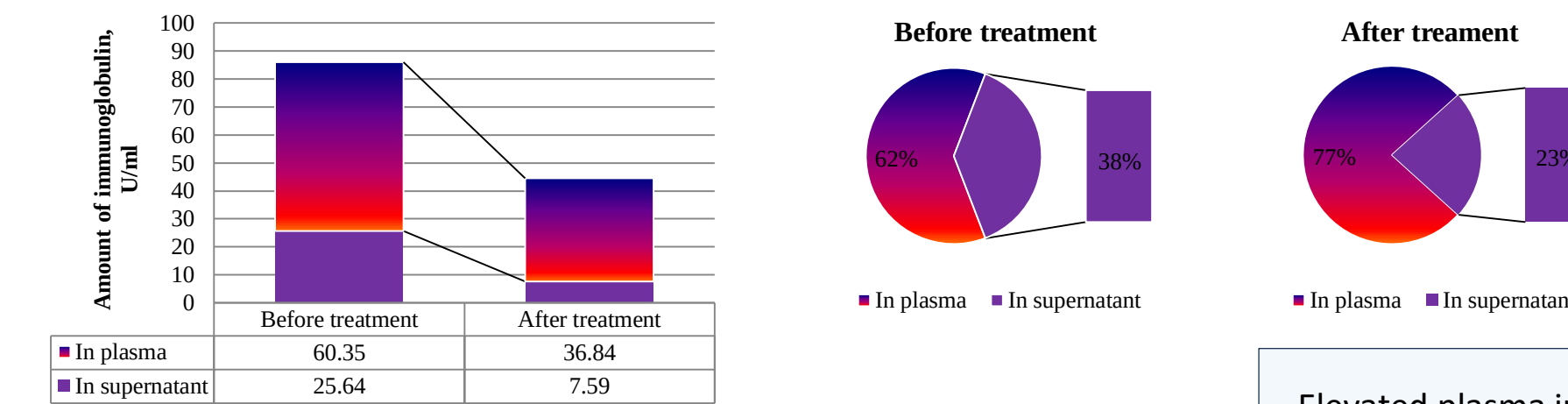


Figure 4. Immunoglobulin IgE levels in lung cancer patients before and after treatment

Marker	Before	After	p-value
Albumin	10.6%	20.2%	$p < 0.001$
Total protein	22.4%	25.8%	$p < 0.001$

Both fractions combined increase overall after treatment ($p < 0.05$).

Table 1. Protein synthesis recovery after treatment (% in supernatant fraction)

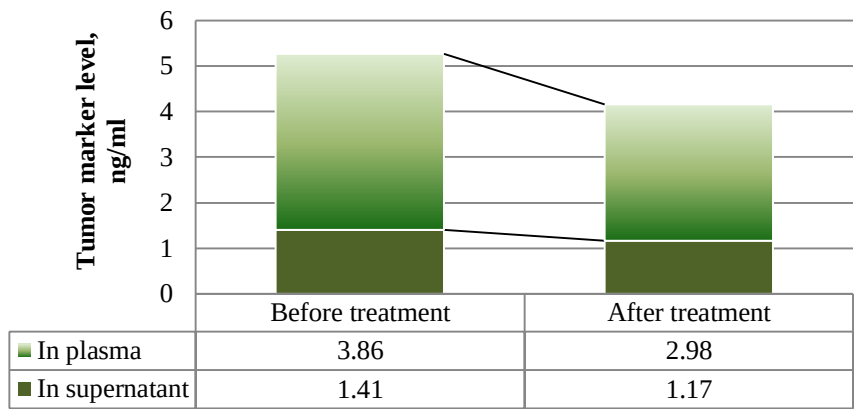


Figure 5. CEA tumour marker levels in lung cancer patients before and after treatment

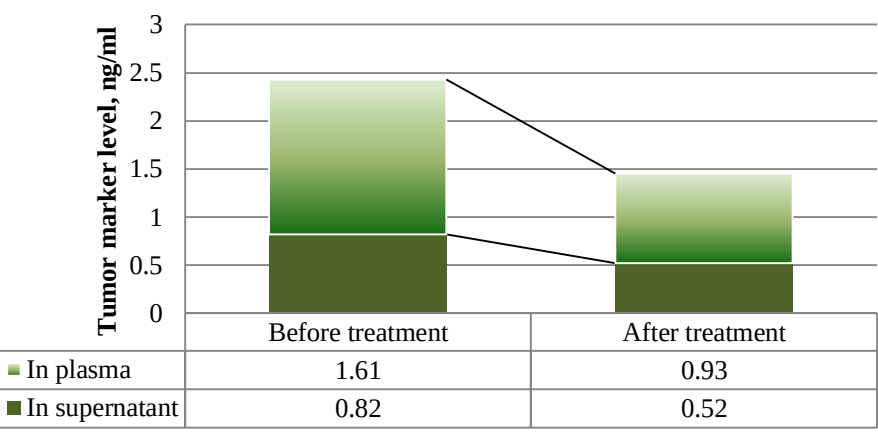


Figure 6. CYFRA 21.1 tumour marker levels in lung cancer patients before and after treatment

After treatment, CEA (5.76→4.62 ng/mL) and CYFRA 21-1 (2.43→1.45 ng/mL) decreased significantly ($p < 0.001$). IgA, IgG, and IgM redistributed toward the blood-cell fraction, while albumin and total protein increased ($p < 0.05$) — consistent with partial restoration of adsorption–transport function.

DISCUSSION

Elevated plasma immunoglobulins with reduced cellular proportion indicate disrupted blood-cell adsorption–transport function, likely driven by membrane alterations associated with the tumor process. Unlike plasma-only analysis, assessing the cellular fraction additionally captures these changes. Their partial shift toward the supernatant after treatment, alongside rising albumin and total protein, indicates recovery of this function, while parallel declines in CEA and CYFRA 21-1 independently confirm treatment effectiveness.

CONCLUSION

Immunoglobulins, tumor markers and proteins redistribute between plasma and blood cells in lung cancer, reflecting disrupted adsorption–transport function that partially recovers with treatment. Parallel marker declines confirm efficacy, supporting dual-compartment assessment for more sensitive treatment monitoring.