

Prospective analysis of inflammatory response markers, endothelial dysfunction and hemostasis parameters in COVID-19 associated pneumonia patients with and without type 2 diabetes mellitus

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Background: The coronavirus disease 2019 (COVID-19) has spread around the world with high cardiovascular complications and mortality. Patients with heart pathology and diabetes mellitus were at greatest risk. An accurate and timely laboratory diagnosis is a vital step to help manage cardiovascular disease during this pandemic.

Purpose: To conduct a prospective analysis of complete blood count parameters, inflammatory response, endothelial dysfunction of arterial wall and hemostasis in groups of patients undergoing COVID-19 associated pneumonia with and without type 2 diabetes mellitus (DM2); to highlight indicators of long-term adverse cardiovascular events.

Methods: The study was carried out within register on one-year cardiac follow-up of patients after COVID-19-associated pneumonia. Patients (n=380) were identified in the period from April to July 2020 according to the data of medical information system of monoinfectious hospital. At the moment, data of the first 65 patients with cardiovascular pathology are obtained. Group 1 included 53 patients without DM2 (mean age 47.83±15.86 years), group 2 consisted of 12 patients with DM2 (61.71±9.12 years). Baseline parameters of complete blood count, biochemistry and hemostasis were assessed on the day of hospitalization. In-depth analysis of laboratory parameters was carried out in 3 months.

Results: In group 1 significant decrease of coagulogram parameters: INR (p=0.004), fibrinogen, APTT, thrombocrit, large platelets level (p<0.0001), CRP level, liver enzymes (p<0.0001), leukocytes (p=0.015), erythrocytes (p=0.006) and increase in hematocrit (p<0.0001) were registered in 3 months compared to baseline data. In group 2 positive dynamics of CRP (p=0.018), platelets (p=0.046), APTT (p=0.043) and erythrocytes (p=0.028) were revealed, while CRP concentration remained higher than reference values in 3 months. In group 2 in-depth analysis of biomarkers revealed values exceeding normal levels: hs-CRP (4.72±3.33 mg/L), homocysteine (13.17±7.95 µmol/L), myeloperoxidase (47.6±38.51), NT-proBNP (154.56±127.30 mg/ml), P-selectin (141.29±124.71) TgFb1 (6549.86±1987.87 pg/ml). Correlation analysis detected positive association of homocysteine level with platelets level (p=0.002. R=0.998), myeloperoxidase with fibrinogen (p=0.012. R=0.865).

Conclusion: Three months after COVID-19 elevated levels of inflammatory markers (CRP, hs-CRP, homocysteine), endothelial dysfunction and thrombophilia (large platelets, P-selectin, TgFb1) are indicators of prolonged arterial inflammatory syndrome and increased predisposition to coagulopathy with thrombosis determining a very high risk of developing adverse cardiovascular events in patients with DM2.