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Assessing Changes In Integral Hematological Indices Throughout The Disease Course Of Leptospirosis

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Disclosures

O. Zubach: None.

Abstract

Background. Leptospirosis is one of the most common bacterial zoonotic diseases. Its pathogenesis is defined by several factors resulting from endo- and exotoxigenesis caused by *Leptospira interrogans*. To assess the usage of hematological indices as predictors of disease severity, we analyzed integral hematological indices in patients with leptospirosis. **Methods.** We analyzed blood samples from 56 patients with leptospirosis, who were treated at Lviv Regional Infectious Disease Clinical Hospital in 2016-2019. The specific hematological markers assessed were adaptation index (AI), immune reactivity index (IRI) and lymphocyte-granulocyte index (LGI) and were mathematically calculated using standard formulas. These data were compared between the day of admission (day 0) and the seventh day post admission (day 7), and results were presented as median, lower, and upper quartiles (Me [25Q-75Q]).

Results. The levels of AI, IRI, and LGI were statistically significantly lower on day 0 (AI - 0.18 [0.09; 0.36], IRI - 2.04 [1.25; 3.06], LGI - 1.66 [0.80; 3.16]) than on day 7 (AI - 0.33 [0.2; 0.48], IRI - 3.37 [2.33; 5.37], LGI - 3.15 [1.72; 4.44], $p < 0.05$). These levels were also statistically significantly lower than in the control group (30 healthy individuals) - AI - 0.34 [0.3; 0.46], IRI - 3.75 [2.71; 5.0], LGI - 3.15 [2.84; 4.28], $p < 0.05$. We assessed whether these markers could be used as potential indicators of disease severity. Patients were grouped based on disease severity: moderate ($n=16$), and severe ($n=40$). In the moderate severity subgroup, we did not identify a significant difference in AI and LGI between day 0 and day 7. However, IRI values were statistically significantly increased on day 7: 2.82 [2.06; 3.4] vs. 5.0 [3.03; 6.8], $p < 0.05$. In the severe disease subgroup, patients exhibited lower levels of AI, IRI, LGI on day 0 compared to values seven days later: the levels of the AI - 0.13 [0.07; 0.26], IRI -

1.68 [1.18; 2.83], LGI - 1.25 [0.65; 2.14] were significantly lower on day 0 compared to the same values on the day 7: AI - 0.27 [0.15; 0.43], IRI - 3.11 [2.2; 4.55], LGI - 2.4 [1.32; 3.93], $p < 0.05$, as well as compared to the control group, $p < 0.05$. **Conclusions.** Patients with leptospirosis had lower levels of adaptation markers at the start of the disease, which likely corresponds to a "stress reaction". As the disease progressed there was a trend of the values returning to normal ranges, likely corresponding to the "reaction of orientation". These findings suggest a potential use of hematological blood indices as predictors of disease severity for leptospirosis.

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