Clinical relevance of IL-10 gene polymorphism in patients with major trauma

Vasilije Jeremić1,2, Tamara Alempijević1,3, Srdan Mijatović2, Vladimir Arsenijević2, Nebojša Ladjević4, Slobodan Krstić1,2

1School of Medicine, University of Belgrade, 2Clinic for Emergency Surgery, 3Clinic for Gastroenterology and Hepatology, 4Center for Anesthesiology and Reanimation; Clinical Center of Serbia; Belgrade, Serbia

ABSTRACT

Aim To assess IL-10 serum concentration according to outcome of severe trauma treatment and influence of short nuclear polymorphism (SNP) 1082G/A within IL-10 gene on treatment outcome of patients with severe trauma.

Methods Forty-seven patients with major trauma were prospectively recruited, and they were divided into two groups according to outcome (survivors and non-survivors). The IL-10 gene polymorphisms were genotyped using restriction fragment length polymorphism analysis. Serum IL-10 levels were determined with enzyme-linked immunosorbent assay. Association between IL-10 serum concentration, IL-10 SNP type and IL-10 serum concentration in groups of patients with different SNPs with outcome after severe trauma was evaluated.

Results Mean age of patients was 35.53±14.53 years. The major mechanism of injury was traffic, and the mean injury severity score was 35.47±11.23. Despite higher values of IL-10 serum concentrations in patients with lethal outcome, the difference was not statistically significant. In 40 (85%) patients no gene polymorphism for IL-10 was recorded. No statistical significance in frequency of IL-10-1082 gene polymorphism was observed between the patients with different outcomes of polytrauma. No statistically significant difference in IL-10 values was evidenced between the subjects with and without polymorphisms in any of the observed times of measurement, although a trend toward the higher values may be observed in patients with polymorphism in heterozygous form.

Conclusion The patients with IL-10 SNP gene polymorphism despite no proven statistical significance appeared to have higher values of IL-10 and consequently worse outcome.

Key words: interleukin 10, genetic association, IL-10 SNP -1082G/A, outcome
INTRODUCTION

Trauma causes a complex metabolic, hormonal, and cytokine response. “Whole-body inflammatory syndrome” is guided by a complicated system of cellular interactions and mediators aimed at induction of recovery and control of foreign organisms. In certain cases of severe trauma, the process of inflammation becomes uncontrolled, leading to injuries of the initially intact vital tissue (1). Due to involvement of numerous complex mediators and cell systems, interpretation of these multiple interactions and their changes that occur over time is highly complicated (2,3).

Cytokines are peptide hormones released by leukocytes and macrophages and they are highly important mediators due to their occasionally toxic systemic effects. Precisely regulated homeostasis of the pro- and anti-inflammatory cytokines controls body response to a trauma. Each imbalance causes either hyperinflammatory state, which is frequently observed in the early post-traumatic period, or severe immunosuppression, which is described in a later period after trauma or sepsis (4). Significance of the inflammatory mediators has been documented in numerous retrospective and prospective studies, although the published studies were mostly focused on sepsis, while the presented results recording patients with polytrauma remained controversial (5,6). Namely, clear difference was evidenced in response between the patients with tissue injuries accompanied by significant blood loss and those without bleeding (7). Major pro-inflammatory cytokines, such as IL-1, IL-6, IL-8 and TNF-α have been investigated in numerous studies, while the role and significance of antiinflammatory cytokines, such as IL-4, IL-10, IL-13 or TGF-β, which suppress production of pro-inflammatory cytokines are still subject of interest of numerous researchers (8).

As for the third group of cytokines, endogenous receptor antagonists (IL-1ra) or soluble cytokine receptors, such as sTNFr, it was evidenced that they underwent up-regulation after trauma and influenced regulation of the pro-inflammatory cytokines as well (9-11).

Genes coding inflammatory mediators contain a large number of gene variants, that is, polymorphisms that may have either minor or major functional consequences on expression and/or function of the proteins (12,13). According to their type, some of the variants include single nucleotide polymorphism (SNP), short tandem repeats (STR), and variable non-tandem repeats (VNTR).

Despite improvement in treatment of patients with severe trauma, the mortality rate is still high. The aim of this study was to assess IL-10 serum concentration according to outcome of severe trauma treatment and influence of SNP (polymorphism) -1082G/A within IL-10 gene on treatment outcome of patients with severe trauma. We intended to analyze the value of genetic screening in changing the process of clinical practice.

PATIENTS AND METHODS

Forty-seven severely injured patients were included in this prospective study conducted in the Clinic for Emergency Surgery, Clinical Center of Serbia. The data were collected in the period between January and August 2012. Only patients without pre-existing chronic diseases, not receiving medications, and without penetrating injuries were included. All the patients were admitted to the Intensive Care Unit due to severity of the trauma. The patients were assigned an Injury Severity Score (ISS) (14) by independent evaluators. Exclusion criteria were age of <18 years or >65 years, admission >8h after trauma or secondary admission, penetrating injuries, and any chronic illnesses. Injuries of various body regions (head and neck, face, thorax, abdomen, extremities, and skin) were classified by using the Abbreviated Injury Scale (AIS) (14). The clinical course was monitored prospectively in all patients. Patients requiring surgical intervention received standard surgical care and postoperative intensive care.

Blood samples were drawn within 24 h after admission (designated day 1) and on subsequent days (24, 48, 72 hours and 7 days) of hospitalization. Blood (9 mL) was collected in plastic tubes (NH4-heparin tube; Sarsted, Nümbrecht, Germany) along with the routine baseline laboratory work-up and was immediately used for stimulation ex vivo.

In order to obtain cytokine levels from blood samples, plasma was separated by centrifugation, and the sample was frozen instantaneously and stored at -70°C. Sample processing took approximately 30 min. The cytokine levels were determined through ELISA technique by using...
Quantikine commercially available kits (R&D Systems Inc, Minneapolis, USA; QIAampDNA Mini Kit, Qiagen GmbH, Hilden, Germany) were used for genetic analysis. For the described polymorphism analyses -1082 G/A primer was used. Normal genetic variant was GG. Presence of GA was marked as heterozygous polymorphism, and AA as homozygous polymorphism. The genetic analyses were performed by Polymerase Chain Reaction-Restriction Fragment Length Polymorphism (PCR-RFLP). This method involves PCR amplification of DNA segments that have such polymorphisms, digestion of the resulting PCR products by means of restriction enzymes and analysis of the obtained digestion products by polyacrylamide gel electrophoresis, which is presented in figure 1 (15).

This study received an approval from the Ethical Committee of the School of Medicine, University of Belgrade. All patients included in this study gave their written informed consents. In case of unconsciousness of the patient, informed consent was obtained from patients relatives, who were instructed about the purpose of the study.

Descriptive data for all groups and variables were expressed as mean ± standard deviation (SD), mediana, minimum and maximum for continuous measures, or percent of a group for discrete measures. Categorical data were analyzed using the Pearson chi-square test. A normal distribution was tested using the Kolmogorov-Smirnov test. If the data were normally distributed, the t-test was used. Non-parametric data were analyzed using the Mann Whitney U test, and Fridman test. Differences were considered significant when the p value was less than 0.05 (p<0.05).

RESULTS

Demographic features and clinical characteristics of patients are presented in Table 1. The patients are stratified according to outcome. The main mechanism of injury was by vehicle, 25 (53.2%). The mean ISS for all included patients was 35.47, and the score was statistically significantly higher in patients with lethal outcome (40.10 and 31.73, respectively).

Values of IL-10 with statistical significance dropped during the measurement time in patients with lethal outcome (p=0.000), as well as in the group of patients who survived the inflicted injuries (p=0.000).

Table 1. Demographic features and clinical characteristics of patients with severe trauma

<table>
<thead>
<tr>
<th></th>
<th>All</th>
<th>Survivors</th>
<th>Non-survivors</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td>35.5±14.5 (32; 18-65)</td>
<td>34.65±13.41 (31; 18-61)</td>
<td>36.62±16.08 (33; 18-65)</td>
<td>0.659</td>
</tr>
<tr>
<td><strong>Sex (M/F)</strong></td>
<td>32/15</td>
<td>17/9</td>
<td>15/6</td>
<td>0.659</td>
</tr>
<tr>
<td><strong>Mechanism of injury n (%)</strong></td>
<td>25 (53.2%)</td>
<td>14 (53.8%)</td>
<td>11 (52.4%)</td>
<td>0.609</td>
</tr>
<tr>
<td>Vehicle</td>
<td>5 (10.6%)</td>
<td>2 (7.7%)</td>
<td>3 (14.3%)</td>
<td></td>
</tr>
<tr>
<td>Pedestrian</td>
<td>7 (14.9%)</td>
<td>3 (11.5%)</td>
<td>4 (19.0%)</td>
<td>0.609</td>
</tr>
<tr>
<td>Motorcycle</td>
<td>8 (17.0%)</td>
<td>5 (19.2%)</td>
<td>3 (14.3%)</td>
<td></td>
</tr>
<tr>
<td><strong>ISS (X+SD) (Med; min-max)</strong></td>
<td>35.47±11.23 (34; 21-57)</td>
<td>31.73±10.88 (29; 21-50)</td>
<td>40.10±11.27 (38; 22-57)</td>
<td>0.012</td>
</tr>
<tr>
<td>Head and neck</td>
<td>2.94±1.21 (1-5)</td>
<td>2.33±1.05 (2; 1-4)</td>
<td>3.50±1.09 (4; 1-5)</td>
<td>0.004</td>
</tr>
<tr>
<td>Face</td>
<td>2.30±1.16 (1-4)</td>
<td>2.50±1.20 (2; 1-4)</td>
<td>2.17±1.17 (2; 1-4)</td>
<td>0.660</td>
</tr>
<tr>
<td>Chest</td>
<td>3.31±0.92 (3; 1-5)</td>
<td>3.17±0.94 (3; 1-5)</td>
<td>3.47±0.91 (3; 2-5)</td>
<td>0.340</td>
</tr>
<tr>
<td>Abdomen</td>
<td>3.86±1.17 (4; 2-5)</td>
<td>3.70±1.13 (3; 2-5)</td>
<td>4.07±1.22 (5; 2-5)</td>
<td>0.391</td>
</tr>
<tr>
<td>Extremities</td>
<td>2.76±0.70 (3; 2-4)</td>
<td>2.64±0.73 (2.5; 2-4)</td>
<td>2.89±0.66 (3; 2-4)</td>
<td>0.199</td>
</tr>
</tbody>
</table>

M/F, male/female; ISS, injury severity score; AIS, Abbreviated Injury Scale;
Intergroup analysis revealed no statistically significant difference in IL-10 value between the subjects with different outcomes at any observed time of measurement (Table 2). IL-10 values in all times of measurements were higher in patients with lethal outcome.

The incidence of subjects with IL-10 SNP -1082G/A was not statistically significantly different between the groups with different outcomes (Table 3). No gene polymorphism was recognized in 22 (84.6%) survivors, and in 18 (85.7%) patients with lethal outcome. Gene coding IL-10 and IL-10 SNP -1082G/A gene polymorphism were expressed only in heterozygous form, in 4 (15.4%) and 3 (14.3%), respectively.

No statistically significant difference in IL-10 serum concentration was observed between subjects with and without gene polymorphism during the studied 7-day follow-up period (Table 4). In the group of patients with heterozygous polymorphism a more pronounced decline of the values was observed. For detection of G/A changes in promoter region at position -1082 allele specific PCR was performed and showed that in patients without IL10-1082 polymorphism fragment of 242 bp was obtained, while in patients with the polymorphisms, fragments of 242 bp and 122 bp were obtained.

**DISCUSSION**

The results of our study assessed the role of IL-10 serum concentration in patients with severe trauma treatment and influence of SNP (polymorphism) -1082G/A within IL-10 gene on outcome of the treatment. Patients were stratified according to outcome to survivors and non-survivors, with demographic features and clinical characteristics. The mean Injury Severity Score (ISS) for all included patients was 35.47, and was statistically significantly higher in patients with lethal outcome.

In our studied series, no statistically significant difference in IL-10-1082 gene polymorphism was observed between the patients with different outcomes of polytrauma. Polymorphism of the gene was found only in the heterozygous form. Results of the studies with IL-10-1082 GA polymorphism are controversial (16). In studies with critically ill patients, 1082-GG genotype appears less frequently in patients with organ failure when compared to healthy population (17). Moreover, it was also found that 1082GG genotype is associated with significantly less prominent organ dysfunction and mortality in critically ill patients (16).

In our study there was no statistically significant difference in IL-10 values between the subjects with and without polymorphisms in any of the observed times of measurement: on admission, 24h, 48h, 72h and 7 days after admission, although a trend toward the higher values may be observed in patients with polymorphism in heterozygous form. IL-10 is a major anti-inflammatory cytokine modulating pro-inflammatory cytokines, such as TNF-α, as well as synthesis of nitrous oxides, inflammatory cells apoptosis and suppression of macrophage activation (3). IL-10 ameliorates pro-inflammatory response in presence of sepsis and reduces mortality, which was evidenced in some animal studies. In humans, increased IL-10 value is associated with septic shock, major injuries and more frequent lethal outcomes (4). It was

<table>
<thead>
<tr>
<th>Follow up period</th>
<th>IL-10 (X±SD; Med; min-max)</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>0h</td>
<td>263.9±173.1 (336.0±173.0)</td>
<td>p=0.242</td>
</tr>
<tr>
<td>24h</td>
<td>123.4±100.8 (194.2±174.0)</td>
<td>p=0.191</td>
</tr>
<tr>
<td>48h</td>
<td>95.6±78.95 (133.2±121.2)</td>
<td>p=0.261</td>
</tr>
<tr>
<td>72h</td>
<td>71.96±101.9 (98.3±118.2)</td>
<td>p=0.063</td>
</tr>
<tr>
<td>Day 7</td>
<td>48.87±45.08 (63.42±47.1)</td>
<td>p=0.091</td>
</tr>
</tbody>
</table>

Table 2. IL-10 levels measurements according to outcome

<table>
<thead>
<tr>
<th>IL-10 SNP -1082G/A</th>
<th>Outcome</th>
<th>Survivors</th>
<th>Non-survivors</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>No polymorphism-GG</td>
<td>22 (84.6%)</td>
<td>18 (85.7%)</td>
<td></td>
<td>0.916</td>
</tr>
<tr>
<td>Heterozygous polymorphism-GA</td>
<td>4 (15.4%)</td>
<td>3 (14.3%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3. Gene polymorphism incidence according to outcome

<table>
<thead>
<tr>
<th>Follow up period</th>
<th>IL-10 SNP -1082G/A (IL-10 X±SD; Med; min-max)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>0h</td>
<td>286.95±169.98 (351.32±208.14)</td>
<td>0.455</td>
</tr>
<tr>
<td>24h</td>
<td>164.7±144.42 (65.15±20.99)</td>
<td>0.183</td>
</tr>
<tr>
<td>48h</td>
<td>116.08±103.98 (71.96±12.15)</td>
<td>0.989</td>
</tr>
<tr>
<td>72h</td>
<td>85.60±113.81 (58.15±28.79)</td>
<td>0.998</td>
</tr>
<tr>
<td>Day 7</td>
<td>53.70±42.44 (61.10±75.97)</td>
<td>0.450</td>
</tr>
</tbody>
</table>

Table 4. Cytokine IL-10 levels according to gene polymorphism
evidenced that 50-75% of variation in IL-10 production is genetically controlled. In IL-10 genes, single nucleotide promoter polymorphism (G/A) in position 1082 is essential for IL-10 regulation (15-17). G-allele homozygotes (-1082GG) have higher values of circulating IL-10, higher expression of IL-10 mRNA and higher production of IL-10 after *in vitro* stimulation (15).

IL-10 is essential antiinflammatory cytokine that modulates pro-inflammatory cytokines, such as TNF-α, as well as synthesis of nitrous oxide, apoptosis of the inflammatory cells and suppression of macrophage activity (17). It also down-regulates major histocompatibility complex II and expression of costimulatory protein B7 on the cell membrane, which reduces bacterial clearance (18,19). IL-10 decreases pro-inflammatory response in presence of sepsis and reduces mortality in some animal models (20,21), however, the former was not evidenced on other experimental models (22). In humans, increased values of circulating IL-10 are associated with septic shock (23), severity of injury (24,25) and mortality (26,27). Several common polymorphisms were evidenced on IL-10 gene promoters, including -1082 G>A and -592 C>A, which produce three haplotypes in Caucasoid population (GCC, ACC and ATA). Earlier studies evidenced that *in vivo* production of IL-10 was increased in homozygous GCC haplotypes (28). On the other hand, lower incidence of GCC haplotype was found in modern Spanish population in comparison to Northern and Central Europeans (29). The level of mRNA expression was significantly increased in individuals carrying GCC/GCC genotype in comparison to ATA/ATA. It was reported that 50-75% of variation in IL-10 production is gene-controlled (30). Individual analysis of -1082 genotype, independently from -819/-592 genotype, has proven it to be functionally essential SNP (31). High values of serum concentrations of IL-10 were found in 21.6% of the population (>2pg/mL), although majority of them had low or immeasurable concentrations. There was a trend toward higher IL-10 values in individuals homozygous for -1082 genotype (31). Individuals homozygous for G allele (-1082GG) have higher values of circulating IL-10, higher expression of IL-10 mRNA and higher production of IL-10 after *in vitro* stimulation (32-34). It was evidenced in the published studies that IL-10 high producing 1082GG genotype had protective significance for reduction of mortality and organ failure in ARDS patients, which is consistent with the role of IL-10 in escalation of the process of inflammation and reparation of the damaged lung tissue (35). Other studies reported significant or nonsignificant associations between IL-10 -1082G allele and reduction of organ failure, severity of the disease of mortality in critically ill patients (34, 36-38). In non-critically ill patients with pneumonia, -1082 genotype is associated with tendency toward development of sepsis and increase in mortality (39,40). Diversity of studied populations of patients may explain the discrepancy. Other studies evidenced protective effect of -1082G allele in critically ill patients or in cases with meningococcemia associated with marked proinflammatory response (37,41). Association between the combined Fcγ receptor genotype and IL-10 SNP-1082 was also documented in severe meningococcal sepsis (16). Increased incidence of pneumococcal infections was not observed in a cohort group analyzed by Shaaf et al. (40), i.e., patients genetically predisposed for higher production of IL-10 have *linear growth* on the *risk* of more severe form of pneumococcal diseases and the highest risk of onset of septic shock. Having in mind the fact that high incidence of -1082G allele was found in the population, reasonable explanation would be that IL-10 high producing 1082GG genotype is not universally harmful (35). Namely, in Japanese population, no difference was evidenced in mortality rates between GG and AA genotypes in septic patients, although ethic differences in incidence of gene polymorphisms were evidenced as well (42). Namely, incidence of -1082G allele is significantly lower in Japanese (5.3%) population in comparison to white population, where it varies between 46 and 51% (32,33).

**FUNDING**

This work has been funded by the Serbian Ministry for Education and Science (project No. III-41004 and 43007).

**TRANSPARENCY DECLARATION**

Competing interests: none declared.
REFERENCES

1. Jiang JX. Posttraumatic stress and immune disso- 
2. Lausevic Z, Ausevic ML, Trbojevic-Stankovic J, 
Krstic S, Stojimirovic B. Predicting multiple organ 
failure in patients with severe trauma. Can J Surg 
3. Lenz A, Franklin GA, Cheadle WG. Assessment of the clinical 
course with inflammatory parameters. Injury 2007; 
38:1358-64.
4. Partrick DA, Moore EE, Moore FA, Biffl WL, Bar-
nett CC Jr. Release of anti-inflammatory mediators 
after major torso trauma correlates with the de- 
velopment of post injury multiple organ failure. Am J 
5. Redd H, Schlag G, Knei din ger K, Din ges H, Da-
vies J. Activation/adherence phenomena of leuko-
cytes and endothelial cells in trauma and sepsis. In: 
Schlag G, Redd H (Eds). Pathophysiology of shock, 
6. Schumann RR, Leong SR, Flaggs GW, Lichtinghagen R, 
Krettek C. Major secondary surgery in blunt trauma 
patients and perioperative cytokine liberation: de-
termination of the clinical relevance of biochemical 
7. Van der Poll T, Keogh CV, Buurman WA, Lowry 
SF. Passive immunization against tumor necrosis 
factor-alpha impairs host defense during pneumoco-
tal pneumonia in mice. Am J Respir Cell Mol Biol 
8. Verweij CL, Sturk A. Genetic influence on cytokine 
production and fatal meningococcal disease. Lancet 
9. Jeremić et al. IL-10 and outcome in trauma

10. Jiang JX. Posttraumatic stress and immune disso-
11. Schumann RR, Leong SR, Flaggs GW, Lichtinghagen R, 
Krettek C. Major secondary surgery in blunt trauma 
patients and perioperative cytokine liberation: de-
termination of the clinical relevance of biochemical 
12. Partrick DA, Moore EE, Moore FA, Biffl WL, Bar-
nett CC Jr. Release of anti-inflammatory mediators 
after major torso trauma correlates with the de- 
velopment of post injury multiple organ failure. Am J 
13. Schumann RR, Leong SR, Flaggs GW, Gray PW, 
Wright SD, Mathison JC, Tobias PS, Ulevitch RJ. 
Structure and function of lipopolysaccharide binding 
14. Baum AE. MOF, MODS, and SIRS: what is in a 
name or an acronym? Shock-2006; 24:438-49.
after major torso trauma correlates with the de- 
velopment of post injury multiple organ failure. Am J 
16. Van der Poll T, Keogh CV, Buurman WA, Lowry 
SF. Passive immunization against tumor necrosis 
factor-alpha impairs host defense during pneumoco-
tal pneumonia in mice. Am J Respir Crit Care Med 
17. Jeremić et al. IL-10 and outcome in trauma

19. Moore KW, de Waal Malefyt R, Coffman RL, 
O’Garra A. Interleukin-10 and the interleukin-10 
20. Latifi SQ, O’Riordan MA, Levine AD. Interleu-
kin-10 controls the onset of irreversible septic shock. 
21. Walley KR, Lukaes NW, Standiford TJ, Strieter RM, 
Kunkel SL. Balance of inflammatory cytokines rela-
ted to severity and mortality of murine sepsis. Infect 
22. Steinhauser ML, Hogaboam CM, Kunkel SL, Luka-
ces NW, Strieter RM, Standiford TJ. IL-10 is a major 
mediator of sepsis-induced impairment in lung anti-
JL, Goldman M. Interleukin-10 production during 
24. Neidhardt R, Keel M, Steckholzer U, Safret A, Un-
getheum U, Trenz H, Ertel W. Relationship of in-
terleukin-10 plasma levels to severity of injury and 
clinical outcome in injured patients. J Trauma 1997; 
42:863-70.
25. Simmons EM, Himmelfarb J, Sezer MT, Chertow 
GM, Mehta RL, Paganini EP, Soroko S, Freedman 
S, Becker K, Spratt D, Shyr Y, Ikizler TA, PICARD 
Study Group. Plasma cytokine levels predict morta-
lity in patients with acute renal failure. Kidney Int 
26. Van der Poll T, Keogh CV, Buurman WA, Lowry 
SF. Passive immunization against tumor necrosis 
factor-alpha impairs host defense during pneumoco-
tal pneumonia in mice. Am J Respir Crit Care Med 
27. Westendorp RG, Langermans JA, Huizinga TW, 
Verweij CL, Sturk A. Genetic influence on cytokine 
production and fatal meningococcal disease. Lancet 
C, Hohler T. Differential regulation of interleukin-10 
production by genetic and environmental factors-a 
29. Remick DG, Garg SJ, Newcomb DE, Wollenberg 
G, Huie TK, Bolgos GL. Exogenous interleukin-10 fa-
ils to decrease the mortality or morbidity of sepsis. 
30. Turner DM, Williams DM, Sankaran D, Lazarus M, 
Sinnott PJ, Hutchinson IV. An investigation of poly-
morphism in the interleukin-10 gene promoter. Eur J 
C. Interindividual variations in constitutive interleu-
klin-10 messenger RNA and protein levels and their 
association with genetic polymorphisms. Transplanta-
41. Parsons PE, Moss M, Vannice JL, Moore EE, Moore FA, Repine JE. Circulating IL-1a and IL-10 levels are increased but do not predict the development of acute respiratory distress syndrome in at-risk patients. Am J Respir Crit Care Med 1997; 155:1469-73.

Klinički značaj IL-10 genskog polimorfizma kod pacijenata s teškom traumom

Vasilije Jeremić1,2, Tamara Alempijević1,3, Srdan Mijatović3, Vladimir Arsenijević3, Nebojša Ladjević4, Slobodan Krstić1,2
1Medicinski fakultet Univerziteta u Beogradu, 2Klinika za urgentnu hirurgiju, 3Klinika za gastroenterologiju i hepatologiju, 4Centar za anesteziju i reanimaciju; Klinički centar Srbije; Beograd, Srbija

SAŽETAK

Cilj Procena vrednosti serumske koncentracije IL-10 u zavisnosti od ishoda lečenja teške povrede i uticaj kratkih nuklearnih polimorfizama (short nuclear polymorphism, SNP) 1082G/A na genu koji kodira IL-10 na ishod lečenja pacijenata s teškom traumom.

Metode U ovo istraživanje bilo je uključeno 47 teško povređenih pacijenata koji su, prema ishodu lečenja, podeljeni u grupu preživelih i grupu s letalnim ishodom. Analizirana je razlika u vrednostima serumske koncentracije IL-10, učestalosti prisustva SNP-a, kao i serumske koncentracije IL-10 u grupama sa prisutnim različitim SNP-ovima i njihov uticaj na tok i ishod lečenja pacijenata s teškom traumom.

Rezultati Prosečna starost uključenih pacijenata iznosila je 35.53±14.53 godina. Glavni mehanizam povređivanja bio je saobraćaj, a srednja vrednost skora za procenu težine povrede iznosila je 35.47±11.23. Iako je uočena veća serumska koncentracija kod pacijenata s letalnim ishodom, ova razlika nije bila statistički značajna. Kod 40 (80%) pacijenata nije uočeno postojanje genskog polimorfizma. Takođe nije uočena statistički značajna razlika vrednosti u učestalosti pojavljanja genskog polimorfizma u zavisnosti od ishoda lečenja bolesnika s teškom traumom. Nije uočena razlika u serumskim koncentracijama IL-10 u grupama sa ili bez prisutnog polimorfizma, mada su uočene nešto više vrednosti kod pacijenata s prisutnim polimorfizmom u heterozigotnoj formi za gen koji kodira IL-10.

Zaključak Pacijenti s prisutnim SNP-om za gen koji kodira IL-10, iako bez statistički značajne potvrde, imali su više vrednosti serumskih koncentracija IL-10 što je povezano s letalnim ishodom kod pacijenata s teškom povredom.

Ključne reči: interleukin 10, teška povreda, genski polimorfizmi, genske udruženosti