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Prikaz slučaja | Case report

"Post-Intensive Care" Syndrome in Patients After Abdominal Surgery – Pilot Study

Sindrom nakon boravka u jedinici intenzivne njege kod kirurških pacijenata – pilot studija

Marina Boboš[1], Suzana Bojić[1,2], Nemanja Dimić[1,2], Irina Nenadić[1,2], Marko Đurić[1,2], Vesna Stevanović[2,3], Predrag Stevanović[1,2]

[1] Kliničko-bolnički centar "Dr Dragiša Mišović – Dedinje", Beograd, Srbija
[2] Medicinski fakultet, Univerzitet u Beogradu, Srbija
[3] Institut za zdravstvenu zaštitu majke i deteta Srbije "Dr Vukan Čupić", Beograd, Srbija

Descriptors
CRITICAL ILLNESS; REHABILITATION; ANESTHESIA, GENERAL; COMPLICATIONS

SUMMARY. *Aim.* The retrospective observational study aimed to determine whether there is a defined syndrome after intensive care after less than 14 days of stay in the intensive care unit. *Material and methods.* Patients who stayed in the intensive care unit of the Clinical Hospital Center "Dr. Dragiša Mišović – Dedinje" in Belgrade during the May 2022 were examined. Data from the health information system and therapeutic lists were used, and the questionnaire on quality of life was filled out during telephone conversations with patients. In the end, the data were statistically processed. *Results.* Of 16 patients, the average stay in the intensive care unit was 4.7 days (from 2 to 10). In eight of them, a certain level of change in the general state of health was shown in the last year (which includes the period of hospitalization), and in two of them this change was significant. The general health was significantly impaired in four of them, primarily related to male sex, age and ASA status. In these four patients, the length of stay in the intensive care unit was eight days at maximum. *Conclusion.* The results of this pilot study indicate the occurrence of the syndrome after intensive treatment in our sample of patients. As the sample is small, more extensive studies are needed to confirm or refute the claim that even a stay shorter than 14 days in intensive care units can lead to a significant change in health status and the emergence of post-intensive care syndrome in critically ill patients.

Deskriptori
KRITIČNA BOLEST; REHABILITACIJA; OPĆA ANESTEZIJA; KOMPLIKACIJE

SAŽETAK. *Cilj.* Retrospektivna opservaciona studija imala je za cilj utvrditi postojanje definiranog sindroma nakon intenzivne njege kod pacijenata sa boravkom kraćim od 14 dana u jedinici intenzivne njege *Materijal i metode.* Ispitani su pacijenti koji su boravili u jedinici intenzivne njege Kliničkog bolničkog centra "Dr. Dragiša Mišović – Dedinje" u Beogradu tijekom svibnja 2022. godine. Korišteni su podaci iz zdravstvenog informacijskog sustava i terapijskih lista, te je upitnik o kvaliteti života popunjen tijekom telefonskih razgovora sa pacijentima. Na kraju su podaci bili statistički obrađeni. *Rezultati.* Od 16 pacijenata, prosječan boravak u jedinici intenzivne njege iznosio je 4,7 dana (od 2 do 10). Kod osam pacijenata zabilježena je određena promjena općeg zdravstvenog stanja tijekom posljednje godine (uključujući period hospitalizacije), a kod dvoje je ta promjena bila značajna. Opće zdravlje značajno je bilo narušeno kod četvero pacijenata, uglavnom u vezi sa muškim spolom, dobi i ASA status. U ovih četvero pacijenata, najduže trajanje boravka u jedinici intenzivne njege bilo je osam dana. *Zaključak.* Rezultati ove pilot studije ukazuju na pojavu sindroma nakon intenzivnog liječenja na našem uzorku pacijenata. S obzirom na malen uzorak, potrebno je provesti opsežnije studije kako bi se potvrdila ili opovrgla tvrdnja da čak i boravak kraći od 14 dana u jedinicama intenzivne njege može dovesti do značajne promjene zdravstvenog stanja i pojave sindroma nakon intenzivne njege kod kritično bolesnih pacijenata.

The improvement of technical capabilities, as well as new diagnostic and therapeutic procedures, has made it possible to increase the survival of patients in intensive care units (ICU). However, with the increase in the survival rate, the morbidity rate of patients has also increased because survivors after a critical illness often develop a chronic, persistent critical illness, as well as the so-called post-intensive care syndrome (PICS).

Chronic critical illness (CCI) is a subacute condition that requires a high level of healthcare over an extended period. It most often develops after 14 days of stay in the ICU. Its characteristics are prolonged hospital stays, great patient suffering, high mortality and high consumption of resources. CCI can also be defined as a syndrome, which implies the need for prolonged mechanical ventilation with prolonged weakness of the patient caused by myopathy and neuropathy, then the loss of the patient's dry body mass and an increase in the percentage of fat, significant neuroendocrine changes, neurological conditions such as delirium and coma, malnutrition, oedema, incontinence, as well as immunosuppression. (1) These patients also often complain of pain, thirst, depression, and anxiety. (1) Persistent critical illness (PCI) has also been de-

✉ **Adresa za dopisivanje:**
Marina Boboš, MD, Masarikova 2a, Pančevo, Srbija,
e-mail: marinamorisan@gmail.com

scribed as a subgroup of CCI when the fundamental health problem for which the patient was admitted to the ICU has been resolved. However, there is still a need for intensive treatment. (2) PICS represents all residual health problems that patients have after discharge from the hospital and who stayed in the ICU during hospitalization and is most often linked to CCI. (3) All three groups of patients have joint chronic inflammation, immunosuppression and catabolism, which leads to organic dysfunction and general weakness of the organism. (3)

Numerous publications have shown that functional deterioration of patients is associated with immobility, pharmacological treatment and mechanical ventilation during ICU stay. (4–6) One of the ways to examine the quality of life after a critical illness and stay in the ICU is by using adequate epidemiological questionnaires.

In our observational pilot study, we wanted to examine whether a shorter stay in the ICU (less than 14 days) affects the patient's quality of life after discharge from the hospital.

Materials and method

We looked at surviving patients who stayed in the surgical ICU of our institution during May 2022. The data was collected using the health information system (HIS) and the patient's medical history. The Short Form Quality of Life 36 epidemiological questionnaire (SF-36 QoL) was filled out during a telephone conversation with each patient. Apart from the basic data about the patient (gender, age, comorbidities), the database includes the type of operation, need for surgical re-intervention, transfusion, hemodynamic support, need for mechanical ventilation, administration of sedatives or neuroleptics, proven in-hospital infection, acute kidney injury, CPR,... The database also included patient responses as part of the SF-36 QoL questionnaire. The collected data were statistically processed.

Results

During May 2022, a total of 31 patients stayed in the ICU of our institution. When writing this paper, treating one complex patient is still ongoing. Three of them died during their stay in the hospital. Five patients were excluded from further analysis since they spent less than 48 hours in the ICU. Six of the remaining 22 patients did not fill out the SF-36 QoL questionnaire, so statistical data refer to 16 patients for whom complete information was obtained.

Basic patient characteristics, type of surgery, and complications are presented in Table 1.

The average hospitalization of these patients was 15.3 days (from 7 to 41 days). The patient's stay in the ICU lasted an average of 4.7 days (from 2 to 10 days). After treatment in the ICU, four patients continued their treatment in the semi-intensive care unit (SICU), lasting 2 to 14 days. When asked what bothered them the most during their stay in the ICU, former patients gave the most common answers: inability to communicate with loved ones, inability to eat and drink, and prolonged immobility. Only one person complained about the urinary catheter.

Table 1. General characteristics of patients, type of surgery and complications
Tablica 1. Opće karakteristike pacijenata, vrsta operacije i koplikacije

Gender, male / Spol, muški	**8 (50%)**
Age yrs. / Starost u godinama	63.4 (41 to 80)
Chronic diseases / Kronične bolesti	15 (93.7%)
Number of chronic diseases / Broj prisutnih kroničnih bolesti	
0	1 (6.3%)
1	6 (37.5%)
2+	9 (56.2%)
Hypertension / Visok krvni tlak	15 (93.7%)
Obesity / Pretilost	1 (6.3%)
Asthma/chronic opstructive pulmonal disease / Astma/kronična opstruktivna bolest pluća)	2 (12.5%)
Diabetes Mellitus / Dijabetes	2 (12.5%)
Coronary disease / Koronarna bolest	1 (6.3%)
Hypothireosis / Hipotireoza	2 (12.5%)
Other / Drugo	6 (37.5%)
Surgery / Operacija	
Colorectal / Kolorektalna	6 (37.5%)
Upper gastrointestinal tract / Gornji probavni sustav	2 (12.5%)
Liver / Jetra	3 (18.7%)
Other / Drugo	5 (31.3%)
Complications / Komplikacije	
Reintervention / Reintervencija	0 (0%)
Infection / Infekcija	3 (18,7%)
Need for vasopressors / Potreba za vazopresorima	2 (12.5%)
Need for sedatives / Potreba za sedativima	6 (37.5%)
Cardiopulmonary resuscitation / Kardiopulmonalna reanimacija	1 (6.3%)

When it comes to the answers to the questions from the SF-36 QoL questionnaire for the assessment of the quality of life, according to the scoring rules, the numerical value of each answer is determined on a scale from 0 to 100, where 0 represents the lowest and 100 the highest possible level of functionality of the patient. The response values were then combined into eight domains of the patient's overall health status, and finally, an average value was determined for each domain. The change in general health was calculated by a special algorithm that includes the results of each of the eight domains. Obtained values of 50 and lower were considered significant. The results of the questionnaire are shown in Table 2.

General health was significantly impaired in a total of 4 (25%) patients and was associated with male gender (3

Table 2. The results of the Short Form Quality of Life Questionnaire 36 for each patient
Tablica 2. Rezultati Upitnika o kvaliteti života kratkog oblika 36, za svakog pacijenta

Patient	Physical functioning / Fizičko funkcioniranje	Role limitations due to physical health / Ograničenja uslijed fizičkog zdravlja	Role limitations due to emotional problems / Ograničenja uslijed emotivnih problema	Energy/ fatigue / Energija, umor)	Emotional well-being / Emotivno zdravlje)	Social functioning / Društveno funkcioniranje)	Pain / Bol	General health / Opće zdravlje)	Health change / Promjena zdravstvenog stanja
1	80	**50**	100	85	84	87.5	100	90	100
2	75	**50**	**0**	55	**48**	**50**	90	60	75
3	65	**50**	100	85	84	75	57.5	55	75
4	95	100	100	85	92	100	100	75	100
5	65	**50**	100	75	96	100	90	85	100
6	**50**	**0**	100	**45**	76	100	67.5	**45**	75
7	100	100	100	80	92	100	100	85	100
8	60	**25**	100	**50**	72	75	77.5	**50**	75
9	70	**25**	100	70	88	100	100	60	75
10	75	75	100	75	84	100	100	60	75
11	95	100	100	85	96	100	100	75	100
12	90	100	100	60	72	87.5	77.5	75	75
13	**40**	**25**	100	**35**	68	**50**	**45**	**10**	**50**
14	75	100	100	70	72	75	77.5	70	75
15	65	100	100	**50**	84	87.5	80	60	100
16	70	75	**33.3**	**50**	68	87.5	67.5	**40**	**50**

vs. 1), age (three of them were over 70 years old), ASA III status (all of them), prolonged duration of the entire hospitalization (12, 15, 16 and 23 days), as well as the extent of the operation (subtotal gastrectomy, suture of the urinary bladder, proctosigmoidectomy, and abdominal perineal resection). Interestingly, the length of stay in the ICU in these four patients was 2, 3, 7 and 8 days, respectively, which means that two patients spent less time in the ICU than the average length of stay in the ICU for the examined group of patients.

Finally, some degree of change in the general condition was observed in 8 patients (50%) in the past year (which includes hospitalization). A significant change was observed only in two (12.5%) of them. One of them was a 71-year-old male, ASA III status, who stayed in the ICU for seven days after the suture of the urinary bladder. He did not stay in the SICU, and his total hospitalization lasted 15 days. The second patient was a 59-year-old male, ASA III status, who stayed in the ICU for three days after gastrectomy. He did not stay in the SICU, and the total hospitalization lasted 23 days.

When asked what helped them the most in their recovery, former patients singled out the most important, the support of family and close people (nine of them), as well as adequate care during their stay in the hospital (five of them), daily physical activity appropriate to their current state of health (four of them), as well as a positive attitude towards recovery (three of them).

Discussion

Patients who survive a critical illness or spend a long time in the ICU often have various functional impairments that persist during the first year after hospitalization but sometimes longer.

In one Spanish epidemiological observational study from 2020, which referred to 91 surviving patients after severe COVID-19 infection and ICU stay, 67% of patients had a reduced health-related quality of life in the first six months after hospitalization. (7) 63% of respondents also reported a worsening of their functional status. Advanced age, male sex, need for mechanical ventilation during ICU stay, duration of mechanical ventilation, length of ICU stay and length of hospital stay were associated with a decreased quality of life and decreased functional status at 6 months after ICU admission, or both. (7) This study used the EuroQol Group Association five-domain, three-level questionnaire (EQ-5D-3L), which differs from the questionnaire used in our study. However, what is common in the results presented in this and our study is that male gender, age, and length of hospital stay positively correlate with decreased quality of life after an ICU stay.

In patients who have stayed in the ICU for a long time, muscle weakness persists even after discharge from the hospital due to a decrease in muscle mass, a decrease in muscle contractility, but also alterations in the activity of motor neurons. During the recovery phase, while catabolic processes in the body recede and protein synthesis increases, a certain degree of muscle atrophy remains, which indicates possible anabolic resistance and defects in muscle mass repair in patients after a critical illness. (8)

The most significant percentage (50%) of the limitations of our patients was related to physical limita-

tions, such as the inability to walk longer than a kilometer or climb stairs to the third floor. Many needed the help of another person to perform daily household chores. Handgrip dynamometry measures isometric muscle strength and can be used as a quick diagnostic test of muscle weakness. However, since we conducted phone conversations with our patients, this test was not performed on them.

No pharmacological solutions exist for persistent muscle weakness after critical illness. The emphasis is on adequate nutritional support and physical rehabilitation. (9,10). Our patients received nutritional support in the perioperative period according to the Enhanced Recovery After Surgery (ERAS) protocol guidelines. (11) All our patients received physical therapy daily during their ICU stay, which is very important for the acute course of the disease and the recovery period.

One of the common symptoms in people with PICS is respiratory dysfunction, especially in people who have suffered acute respiratory distress syndrome (ARDS) of any etiology. Inadequate, extensive, prolonged inflammation and remodeling lead to residual lung damage, which can cause long-term respiratory weakness. (3) Radiologically, after one year of ARDS, more than 50% of patients have persistent ground-glass opacities in the lungs, while the infiltrates in the parenchyma generally disappear. (12) Interestingly, spirometry findings in these patients are satisfactory, with mild functional impairment of both obstructive and restrictive type, which is not correlated with radiological findings. (12) Assessment of patients' physical function is performed using the six-minute walk test and usually shows significant physical limitation. (13) Since this does not correlate with radiological findings, physical limitations are attributed to concomitant cardiac dysfunction, muscle weakness, and neuromyopathy. As much as half of the subjects in our study had a significant physical limitation (Table 2, third column), which is assumed to be unrelated to respiratory complications during the ICU stay since the majority did not receive prolonged mechanical ventilatory support.

Patients who stay in the ICU have an increased risk of cognitive impairment, functional disability, and dementia. (14) Our respondents did not show significant changes in emotional health, social functioning, or limitations due to emotional problems. One prospective study showed that as many as 40% of ICU patients, regardless of the reason for admission to the ICU, showed reduced cognitive function three months after hospital discharge. The cognitive deficit was present even after 12 months, significantly reducing the quality of life of these patients. (15) Different tests are used to diagnose dementia, such as the MiniMental State Examination (MMSE) and The Montreal Cognitive Assessment (MoCA). However, the nature of these tests is such that they cannot be performed over the phone. Therefore, our subjects were not tested for the presence of dementia.

Conclusion

The results of this pilot study indicate the occurrence of the syndrome after intensive treatment in our sample of patients. As the sample is small, more extensive studies are needed to confirm or refute the claim that even a stay shorter than 14 days in intensive care units can lead to a significant change in health status and the emergence of post-intensive care syndrome in critically ill patients.

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