The Impact of Medical Conditions on the Quality of Life of Survivors at Discharge From Intensive Care Unit

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Key words: *intensive care; health-related quality of life; SOFA score; TISS-28 score; critical illness neuromuscular abnormalities.*

Summary. *Background and Objective. Impaired health-related quality of life (HRQOL) is one of the possible outcomes after discharge from an intensive care unit (ICU). Evaluation of patient health status on discharge from the ICU would help identify factors influencing changes in HRQOL after ICU discharge.*

The objective of the study was to identify whether health state on discharge from prolonged stay in the ICU has any influence on survivors' HRQOL 6 months after intensive care.

Material and Methods. A prospective study of patients with the prolonged length of stay (exceeding 7 days) in the ICU was conducted. The study covered the impact of organ system dysfunction (SOFA score), number of therapeutic interventions (TISS-28 score), and critical illness neuromuscular abnormalities (CINMA) on discharge from the ICU on HRQOL 6 months following ICU discharge.

Results. In total, 137 patients were included in the study. The SOFA score on the last day in the ICU was 2.91 (SD, 1.57); the TISS-28 score on the last day in the ICU was 21.79 (SD, 4.53). Decreased physical functioning (PF) and role physical (RP) were identified. Circulatory impairment on discharge from the ICU had an impact on decreased PF (P=0.016), role physical (P=0.066), and role emotional (P=0.001). Patients with dysfunction in more than one organ system on ICU discharge had decreased role emotional (P=0.016). Severe CINMA was diagnosed in 18 patients. They had decreased PF (P=0.007) and RP (P=0.019). Patients with the TISS-28 score above or equal to 20 points showed lower HRQOL in the PF domain (P=0.077) and general health (P=0.038).

Conclusions. HRQOL in patients with prolonged stay in the ICU is particularly impaired in the domains of physical functioning and role physical. It is associated with circulatory impairment, CINMA, and greater number of therapeutic interventions on discharge from the ICU.

Introduction

Death and full recovery are two main and contrary outcomes of intensive care. As survivors often suffer from postintensive care unit (post-ICU) consequences, they cannot be regarded as fully recovered. Post-ICU consequences are caused by an illness itself, organ dysfunction developed before ICU admission or acquired during the stay in the ICU, and/or prolonged intensive care support of failed organ(s). Organ failures in intensive care may have an impact on the life of ICU survivors long after their discharge from the ICU. To evaluate the quality of health and life in such patients as a whole, mere objective clinical or laboratory analyses are not enough. Subjective perception of the physical and mental quality of life by patients themselves becomes more and more important for the evaluation of post-ICU outcomes. Though it has been proved that health-related quality of life (HRQOL) in intensive care patients is poorer before ICU admission as compared with that of the population (1), further reduction in HRQOL scores was also observed after their discharge from the ICU (2). Poorer HRQOL after intensive care is influenced by factors related and unrelated to illness, health status on ICU admission, and ICU-related factors. For example, the female gender has been identified as a potential predictor of poorer mental health after ICU discharge (3), while older age may cause poorer physical status (4). Illness-related factors, such as sepsis, multiple organ dysfunction, and respiratory distress syndromes, undoubtedly have negative implications on the HRQOL in ICU survivors (2, 5, 6). Studies have also confirmed the influence of health status severity and organ system dysfunction on the post-ICU quality of life (3). A long stay in the ICU affects some domains of HRQOL. Physical activity and viability are most commonly impaired domains of

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HRQOL in patients after cardiac surgery (7) and in other postoperative patients (8) staying in the ICU for longer periods than usual (5–7 days). As there are no studies addressing the relation between health state on discharge from the ICU and HRQOL, our study was focused on the analysis whether patient's health status on discharge from the ICU had any impact on HRQOL scores in future. The study included long-term ICU patients.

The objective of our study was to identify whether health state on discharge from prolonged stay in the ICU had any influence on the survivors' health-related quality of life six months after intensive care.

Material and Methods

A prospective study was carried out with a permission of the Lithuanian Bioethics Committee. The study included all patients older than 18 years without mental diseases, staying in the First Intensive Care Unit of Vilnius University Hospital Santariškių Klinikos for 7 days or more from June 1, 2008, till January 31, 2010, who signed an agreement to participate in the study on their discharge from the ICU. In order to select a cohort most of all vulnerable to intensive care factors, patients with prolonged stay in the ICU (more than 7 days) were selected for the study. The length of prolonged stay was indentified based on measured average stay in the First Intensive Care Unit of Vilnius University Hospital Santariškių Klinikos (mean, 4.8; SD, 1.8 days). The stay in the ICU is considered to be prolonged if it exceeds the average stay by 2 days. The Medical Outcomes Study Short Form 36 (SF-36) was used to assess the quality of life (9, 10). It served for assessing eight domains of the quality of life: physical functioning (PF), role physical (RP), bodily pain (BP), general health (GH), vitality (VT), social functioning (SF), role emotional (RE), and mental health (MH). Answers in the SF-36 were scored using a 0- to 100-point scale algorithm; scoring was made according to the instructions of SF-36v2 Health Survey (11). A lower score indicated worse HRQOL. Preadmission HRQOL was assessed by interviewing patients' relatives during the first 7 days of patients' stay in the ICU. Health state on discharge from the ICU was measured according to the SOFA and TISS-28 scores and by paying special attention to any signs of acquired neuromuscular abnormalities. Likewise, the length of stay in the ICU and length of mechanical ventilation (MV) were measured. Severity of illness on ICU admission was assessed according to the APACHE II (Acute Physiology and Chronic Health Evaluation II) score (12) and SAPS-3 (Simplified Acute Physiology Score 3) (13). Organ dysfunction was assessed by the SOFA (Sepsis-related Organ Failure Assessment) score (14). It was assessed on the first and last day of stay in the ICU. Impairment of organ systems on discharge from the ICU was assessed by measuring the impairment in each organ system (circulatory, respiratory, coagulation, hepatic, renal, and central nervous system) separately. The assessments in points by the SOFA score are presented in Table 1.

The SOFA score higher than 1 point is considered to indicate organ dysfunction.

The number of therapeutic interventions on the last day of stay in the ICU was calculated according to the simplified Therapeutic Interventions Scoring System (TISS-28) (15). Patients were divided into 2 cohorts based on the number of therapeutic interventions (16): patients with a TISS of <20 points during the last 24 hours in the ICU and patients with a TISS of ⩾20. The assessment in points by the TISS-28 score is presented in Table 2.

Neuromuscular abnormalities are not reflected in the overall organ failure scores. The existence of neuromuscular abnormalities acquired during intensive care on discharge from the ICU was measured. Post-ICU neuromuscular abnormality was assessed in accordance with clinical examinations and

Table 1. Assessment of Organ Failure (SOFA score)

Organ System/ Impairment Criterion	Number of Points				
	0	1	2	3	4
Respiratory/PaO_2/fiO_2, mm Hg	>400	⩽400	⩽300	⩽200 with MV	⩽100 with MV
Coagulation/Thrombocytes $\times 10^3/mm^3$	>150	⩽150	⩽100	⩽50	⩽20
Hepatic/Bilirubin μmol/L	<20	20–32	33–101	102–204	>204
Circulatory/Hypotension	No hypotension	MAP <70 mm Hg	Dopamine ⩽5 or dobutamine	Dopamine >5 or epinephrine ⩽0.1 μg/(kg•min) or norepinephrine ⩽0.1 μg/(kg•min)	Dopamine>15 or epinephrine >0.1 μg/(kg•min) or norepinephrine >0.1 μg/(kg•min)
Central nervous system/ Glasgow coma scale	15	13–14	10–12	6–9	<6
Renal/Creatinine μmol/L or diuresis	<110	110–170	171–299	300–440 or <500 mL/24 h	>440 or <200 mL/24 h

MV, mechanical ventilation; MAP, mean arterial pressure.

Table 2. Assessment of Patients' Condition Based on the Number of Therapeutic Interventions

Class	Points	Description
I	0–19	Physiologically stable patients requiring prophylactic observation
II	20–34	Patients requiring intensive care and continuous monitoring
III	35–60	Severe and hemodynamically unstable patients
IV	>60	Patients requiring special and continuous treatment

electroneuromyographic (ENMG) investigations. Critical illness neuromuscular abnormalities (CINMA) were diagnosed according to the criteria of distal symmetric polyneuropathy for scientific studies (17). Severe CINMA was diagnosed where denervation changes were identified. The evaluation of neurological condition and ENMG examinations were conducted by one researcher. HRQOL in ICU survivors six months after ICU discharge was examined by interviewing the patients on the phone. Differences of every HRQOL domain (PF, RP, BP, GH, VT, SF, RE, and MH) before treatment in the ICU and six months after treatment in the ICU were calculated (positive results mean worsening of HRQOL, while negative results indicate improvement of HRQOL).

Statistical Analysis. A statistical data analysis was carried out using the statistical analysis software SPSS15. Mean values of parameters were calculated with standard deviations. The Kolmogorov-Smirnov test for normality was used. The Mann-Whitney *U* test was used for comparison of nonnormally distributed independent variables. Normally distributed independent samples were compared using the Student *t* test. The chi-square test was used to compare nominal variables. In our study, results were considered statistically significant when the *P* value was less than significance level of 0.05; when the P value was between 0.05 and 0.10, the results were considered as indicative of a trend. The statistical methods were selected in accordance with the mathematical methods of statistics (18).

Results

A total of 166 patients were enrolled in the study. In fact, 11 patients (6.6%) died in hospital after discharge from the ICU. Another 14 patients (8.4%) died after discharge from hospital. A total of 25 patients (15.1%) with a length of stay in the ICU exceeding 7 days died within six months after ICU discharge. The 6-month survival rate among ICU patients after discharge from hospital was 84.9% (141 patients). Due to the lack of HRQOL data prior to ICU admission, 4 patients were excluded from the study. A total of 137 patients were surveyed. Characteristics of these patients are presented in Table 3.

On discharge from the ICU, almost all patients had at least one organ system dysfunction according to the SOFA sore. It was namely the respiratory system, which was impaired nearly in all our patients; respiratory system dysfunction was not identified only in 2 patients on discharge from the ICU. On the other hand, central nervous system dysfunction was quite rare on ICU discharge, i.e., it was identified only in 2 patients.

The average of TISS on discharge from the ICU was 22 points.

Neurological clinical and electroneuromyographic examinations were carried out in 114 patients. The majority of them (100 patients) survived the first six months after ICU discharge. Among these patients, CINMA was diagnosed in 44 patients (44%) including 18 patients (18%) with severe CINMA. These patients had signs of muscle denervation in addition to ENMG changes. There were no signs of neuromuscular abnormalities in 47 patients (47%). Neuromuscular abnormalities unrelated to critical illness were diagnosed in 9 patients (9%). Characteristics of patients who underwent neurological clinical and ENMG examinations did not differ from those in patients without neurological clinical and ENMG examinations.

Survivors' preadmission HRQOL and HRQOL six months following ICU discharge were compared. The data are presented in Table 4.

Table 3. Characteristics of Patients

Characteristic	Value
Gender, male/female, n (%)	80 (58.4)/57 (41.6)
Age, years	51.15 (16.41) [19–86]
APACHE II, points	16.94 (7.14) [4–50]
SOFA score on the first day in the ICU, points	6.55 (3.40) [1–15]
SAPS 3, points	56.73 (15.10) [19–109]
Length of stay in the ICU, days	16.82 (11.64) [7–64]
Length of mechanical ventilation, hours	206.76 (270.72) [0–1242]
SOFA score on the last day in the ICU, points	2.91 (1.57) [0–11]
TISS-28 score on the last day in the ICU, points	21.79 (4.53) [13–31]

Data are mean (SD) [range] unless otherwise stated.
APACHE II, Acute Physiology and Chronic Health Evaluation II; SOFA, sepsis-related organ failure assessment; SAPS 3, simplified acute physiology score 3; TISS-28, Therapeutic Interventions Scoring System 28; ICU, intensive care unit.

Table 4. Comparison of Preadmission Health-Related Quality of Life and Health-Related Quality of Life 6 Months After Discharge From Intensive Care Unit (ICU) in Survivors

Domain	Pre-ICU	Post-ICU	*P* Value
Physical functioning	73.50 (25.86)	58.83 (30.54)	**<0.001**
Role-physical	57.80 (30.75)	44.16 (30.29)	**<0.001**
Bodily pain	38.09 (27.50)	34.12 (26.84)	0.174
General health	60.73 (13.28)	60.33 (15.53)	0.806
Vitality	41.81 (11.02)	44.26 (10.27)	0.064
Social functioning	47.52 (12.89)	48.25 (12.19)	0.626
Role emotional	63.66 (29.79)	59.19 (31.20)	0.213
Mental health	48.09 (11.11)	49.78 (10.90)	0.211

Data are mean (SD).

Table 5. The Impact of Number of Organ Dysfunctions on the Quality of Life After Intensive Care

	One Organ Dysfunction or No Organ Dysfunction N=76	More Than One Organ Dysfunctions N=61	*P* Value
Difference in PF	13.09 (34.19)	16.64 (34.78)	0.471
Difference in RP	13.90 (40.75)	13.32 (33.22)	0.972
Difference in BP	2.13 (35.23)	6.23 (32.20)	0.795
Difference in GH	–0.20 (20.31)	1.15 (17.85)	0.759
Difference in VT	–1.5 (15.27)	–3.64 (15.32)	0.592
Difference in SF	–2.0 (18.04)	0.82 (16.90)	0.481
Difference in RE	–3.0 (42.37)	13.66 (39.15)	**0.016**
Difference in MH	–1.67 (15.88)	–1.72 (15.62)	0.925

Data are mean (SD).
PF, physical functioning; RP, role-physical; BP, bodily pain; GH, general health; VT, vitality; SF, social functioning; RE, role emotional; MH, mental health.

A statistically significant decrease in PF and RP was identified in long-term ICU patients six months after discharge as compared with pre-ICU performance.

Then the dependence between changes in the quality of life and organ dysfunction was surveyed. No correlation with reduced quality of life was established based on measuring organ failure in accordance with the SOFA score. Spearman correlation coefficient revealed no correlation between any of the eight domains of HRQOL and SOFA points ($P>0.1$).

Later on, a hypothesis that organ system dysfunction affects the quality of life, particularly PF and RP, was tested. Likewise, dependence of changes in the life quality, if any, on the number of impaired organ systems was analyzed.

One organ dysfunction or no organ dysfunction was established in 76 patients (55.5%); 48 patients (35.0%) had two and 13 patients (9.5%) had more than two organ dysfunctions. The difference between preadmission HRQOL and HRQOL six months following ICU discharge in patients with at least one organ dysfunction and patients with more than one organ dysfunction on ICU discharge were compared. The findings are presented in Table 5.

Since the number of patients with two or more organ dysfunctions on ICU discharge was low, their data were not analyzed separately.

The quality of life in patients with more than one organ dysfunction on ICU discharge and with one or no organ dysfunction was the same in all HRQOL domains, except for RE. Patients with more than one organ dysfunction experienced higher RE ($P=0.016$). On ICU admission, patients' severity of illness in both groups was the same according to the SAPS 3 score; the group with more than one organ dysfunction had higher APACHE II scores ($P=0.016$); no differences were found in the length of MV and stay in the ICU.

We also tried to detect the dysfunction that would have fundamental effects on the quality of life.

As respiratory system dysfunction was present and CNS dysfunction was absent nearly in all patients, it was impossible to measure the impact of these organ dysfunctions on the quality of life. The quality of life in patients with and without renal dysfunction on ICU discharge was the same in all domains. Differences were identified in the impacts of circulatory, hepatic, and coagulation systems on specific domains of the quality of life. Relevant data are presented in Table 6.

Patients with circulatory dysfunction on discharge from the ICU had poorer PF and RE. They also demonstrated worse RP as compared with patients without such a system dysfunction.

As severity of illness according to the APACHE II and SAPS 3 scores on admission was the same as was the length of stay in the ICU and MV in patients with circulatory dysfunction and without it on ICU discharge, this suggests a significant correlation between changes in the HRQOL and impairment of the mentioned system.

PF and RP were higher in patients with hepatic dysfunction as compared with those without hepatic dysfunction. However, patients with hepatic dysfunction suffered from worse pain and had worse GH. They stayed shorter in the ICU as compared

with patients without hepatic dysfunction (11.38 [SD, 3.75] vs. 17.4 [SD, 12.04] days; *P*=0.084) in addition to shorter length of MV (54.54 [SD, 90.17] vs. 222.72 [SD, 278.45] hours; *P*=0.008). We found no differences in age and severity of illness according to the APACHE II and SAPS 3 scores, and organ failure according to the SOFA score on ICU admission between patients with hepatic dysfunction and without it.

Coagulation dysfunction on ICU discharge did not reduce the quality of life six months after discharge from the ICU. On the contrary, these patients reported improved VT, which was statistically significant, as compared with patients without coagulation dysfunction identified on ICU discharge. Patients with coagulation dysfunction on discharge had higher SAPS 3 scores and APACHE II scores on ICU admission (65.94 [SD, 21.94] vs. 55.43 [SD, 13.49]; *P*=0.077 and 19.71 [SD, 8.41] vs. 16.55 [SD, 6.89]; *P*=0.075, respectively) as compared with patients without the mentioned dysfunctions as well as more severe organ dysfunction on admission to the ICU (8.71 [SD, 2.84] vs. 6.25 [SD, 3.38]; *P*=0.003). However, they had a shorter length of MV (118.18 [SD, 193.23] vs. 219.3 [SD, 278.31]; *P*=0.01), while age and length of stay in the ICU were the same as in patients without coagulation dysfunction.

These findings are commented on in more details in the discussion of the results.

Pre-ICU and post-ICU changes in the quality of life in patients with diagnosed severe CINMA and without CINMA were also compared. The data are presented in Table 7.

Patients with severe CINMA on ICU discharge demonstrated higher reduction in PF and RP as compared with patients without CINMA (*P*=0.007 and *P*=0.019). There was no difference in age between these groups of patients (*P*=0.139). Patients who acquired CINMA had higher APACHE II scores (20.67 [SD, 10.03] vs. 14.40 [SD, 5.01]; *P*=0.011) and SAPS 3 scores (69.06 [SD, 17.51] vs. 52.87 [SD, 9.25]; *P*=0.001); they had more severe organ dysfunctions according to the SOFA score (9.17 [SD, 4.05] vs. 5.55 [SD, 2.76]; *P*=0.001); duration of MV and stay in the ICU was longer (574.44 [SD, 379.28] vs. 144.42 [SD, 159.27] hours; *P*<0.001, and 31.89 [SD, 17.81] vs. 14.19 [SD, 6.89] days; *P*<0.001, re-

Table 6. The Impact of Circulatory, Hepatic, and Coagulation Dysfunctions in the Specific Quality-of-Life Domains

	Circulation		Liver		Coagulation	
	No Dysfunction n=115	Dysfunction n=22	No Dysfunction n=124	Dysfunction n=13	No Dysfunction n=120	Dysfunction n=17
Difference in PF	11.83 (34.40)	29.54 (30.86)	17.30 (34.30)	–10.38 (24.28)	16.37 (32.45)	2.65 (45.14)
P value	**0.016***		**0.003***		0.177	
Difference in RP	11.30 (38.89)	25.85 (26.25)	15.93 (37.63)	–8.17 (28.57)	15.21 (37.32)	2.57 (37.63)
P value	**0.066***		**0.027***		0.221	
Difference in BP	5.17 (34.70)	–2.27 (28.94)	1.38 (33.37)	28.46 (29.11)	3.36 (33.40)	8.23 (37.62)
P value	0.298		**0.004***		0.472	
Difference in GH	0.83 (19.65)	–1.82 (16.80)	–0.85 (18.93)	12.31 (18.10)	–0.04 (19.23)	3.53 (19.10)
P value	0.549		**0.014***		0.568	
Difference in VT	–2.58 (15.82)	–1.78 (12.21)	–2.92 (15.50)	1.92 (12.60)	–1.22 (14.76)	–11.03 (16.46)
P value	0.745		0.180		**0.016***	
Difference in SF	–0.33 (17.56)	–2.84 (17.65)	–1.12 (17.96)	2.88 (12.66)	–1.15 (17.53)	2.21 (17.81)
P value	0.672		0.415		0.388	
Difference in RE	–0.51 (41.25)	30.30 (34.07)	6.84 (42.07)	–17.95 (30.21)	4.55 (42.51)	3.92 (36.10)
P value	**0.001***		**0.03***		0.995	
Difference in MH	–2.01 (16.08)	0.00 (13.80)	–1.26 (16.14)	–5.76 (10.38)	–1.78 (16.26)	–1.76 (11.45)
P value	0.622		0.239		0.903	

Data are mean (SD). Abbreviations are explained in the second footnote to Table 5.

Table 7. Comparison of Changes in Quality of Life in Patients With Severe and Without Critical Illness Neuromuscular Abnormalities

	Severe Critical Illness Neuromuscular Abnormalities (N=18)	No Critical Illness Neuromuscular Abnormalities (N=47)	*P* value
Difference in PF	40.0 (24.61)	18.19 (30.90)	**0.007**
Difference in RP	37.15 (24.58)	12.50 (40.98)	**0.019**
Difference in BP	0.59 (31.12)	2.55 (37.15)	0.957
Difference in GH	–5.88 (20.10)	–1.38 (19.96)	0.177
Difference in VT	–2.21 (14.14)	–3.13 (12.10)	0.869
Difference in SF	–3.68 (20.14)	0.53 (15.41)	0.257
Difference in RE	11.27 (35.59)	5.14 (45.00)	0.4
Difference in MH	–4.41 (12.49)	2.23 (15.74)	0.255

Data are mean (SD). Abbreviations are explained in the second footnote to Table 5.

spectively). As neuromuscular abnormalities were absent before ICU admission and acquired during the stay in the ICU, it can be stated that the identified changes in PF and RP do correlate with the mentioned abnormalities.

Patient health state on discharge from the ICU is also reflected by the amount of nursing workload they require, which is measured by the number of therapeutic interventions. This indicator was assessed on the basis of the TISS-28 score; the changes in the quality of life of the patients who were physiologically stable on ICU discharge, i.e., requiring prophylactic observation only (TISS-28 score, <20 points), and the patients requiring more intensive treatment and care (TISS-28 score, ⩾20 points) prior to ICU admission and six months after discharge from the ICU were compared. The data are presented in Table 8.

Compared with patients requiring less care on discharge from the ICU, patients requiring intensive care and continuous monitoring on discharge from the ICU had lower quality of life six months after intensive care: they had lower GH (P=0.038) and lower PF (P=0.077; indicative of a trend). These differences cannot be explained by age as there was no age difference between the two cohorts. Likewise, there were no differences between the groups of patients according to the severity of health state on ICU admission (APACHE II and SAPS 3 scores), organ dysfunction on the first and last day of the stay in the ICU according to the SOFA score, and the length of ICU stay and MV. Therefore, to explore further into the impacts of the need for care on the patients' quality of life in future, the causes of ICU admission (medical and surgical) were analyzed. GH in surgical patients was lower compared with medical patients. This finding is statistically significant (P=0.015). Therefore, we can say that the need for more intensive care on discharge from the ICU is associated with the lower quality of life following intensive care namely for surgical patients.

Discussion

Survey results show that the quality of life in ICU patients changes over time. It considerably decreases in all domains during the stay in the ICU and gradually improves thereafter. However, it is established that the quality of life remains poor even several months or years after intensive care as compared with that of the general population (1, 4). Factors unrelated to intensive care (severity of health state on admission, age, gender, diagnosis, and type of operation) and intensive care-dependent factors (length of stay in the ICU, length of MV, and degree of organ dysfunction during the stay in the ICU) are indicated as influencing post-ICU quality of life (2, 6). In our study, the impact of patient health state on the last day in the ICU on the quality of life was analyzed.

Analysis of all patients included in the study evidenced that the quality of life in patients with a length of stay in the ICU exceeding 7 days remained worse six months after ICU discharge as compared with the pre-ICU quality of life. Some surveys confirm that intensive care impairs the quality of life nearly in all domains of the quality of life (2). Results of other surveys (4, 19) suggest that the quality of life in the domain of PF and RP improves from 6 to 9 months after intensive care as compared with PF and RP before ICU admission. Our results contradict the data presented above. In our study, the most significant decrease in the quality of life was observed in physical domains of the quality of life (PF and RP), and no differences were observed in other domains of the quality of life before ICU admission and six months after intensive care. One of the reasons that might explain such nonconformity between our study results and other surveys can be longer stay of our patients in the ICU and longer duration of MV.

The Impact of Organ Dysfunction on the Last Day of Intensive Care on the Quality of Life. No correlation was established between organ failure based on the SOFA score and the quality of life six months after intensive care. In addition, the findings cannot be compared with the data found in the literature because organ dysfunctions of patients participating in the study considerably differ from those established in other surveys: the average of the SOFA points on discharge from the ICU was 2.97±1.62, while according to Moreno et al. (20) the SOFA scores for patients on ICU discharge were 1.69±2.06. This difference can be explained by the fact that our study included only the patients with a prolonged stay in the ICU (>7 days) and more severe organ dysfunc-

Table 8. Comparison of Changes in the Quality of Life in Patients Requiring Different Nursing Workload

	TISS-28 Score <20 Points N=54	TISS-28 Score ⩾20 Points N=83	*P* Value
Difference in PF	8.21 (32.02)	18.75 (35.36)	**0.077**
Difference in RP	9.55 (39.96)	16.22 (35.79)	0.328
Difference in BP	1.92 (36.03)	5.24 (32.58)	0.754
Difference in GH	–3.75 (18.89)	2.98 (19.03)	**0.038***
Difference in VT	–0.60 (15.52)	–3.61 (15.09)	0.355
Difference in SF	0.96 (17.48)	–1.79 (17.59)	0.271
Difference in RE	2.08 (45.13)	5.95 (39.55)	0.514
Difference in MH	–3.17 (12.68)	–0.77 (17.33)	0.116

Data are mean (SD). Abbreviations are explained in the second footnote to Table 5.

tion on ICU admission as compared with the study by Moreno et al. (SOFA 6.67±3.38 vs. 2.75±2.81). It is namely the severity of illness that can explain respiratory dysfunction on discharge from the ICU in majority of our patients.

The identified impact of some organ dysfunction on certain domains of the quality of life is to be associated with the original illness. Patients with hepatic dysfunction on discharge from the ICU experience changes in the quality of life as compared with pre-ICU condition. There is a significant improvement in their physical activity and performance. However, out of 13 patients, 5 were postliver transplant patients. It is namely the increase in their PF and RP that have determined positive changes in this cohort. Comparison within the cohort revealed statistically significant differences (P=0.011 and P=0.065, respectively). The same reason contributed to higher RE. Worse results in the domains of BP and GH were associated with a bigger proportion of postoperative patients in the cohort with hepatic dysfunction (P<0.001).

Increased VT in patients with coagulation defects on discharge from the ICU is also found to be associated with the illness itself rather than the stay in the ICU. Most of such patients were hematologic patients after chemotherapy and bone marrow transplantation, who had coagulation dysfunction observed on admission to the ICU (P<0.001) as compared with the rest of the patients. Better cognitive and emotional state of such patients has already been observed in earlier surveys, too (21).

The Impact of Severe Neuromuscular Abnormalities Acquired During Intensive Care on the Quality of Life. There is a clear correlation between prolonged MV and stay in the ICU with the development of CINMA (22). It was found that patients with severe CINMAs had significantly longer MV and intensive care than patients without neuromuscular abnormalities. Furthermore, in this study severe CINMA was proved to cause long-term reduced PF and RP.

The Impact of the Amount of Nursing Workload on the Last Day of Intensive Care on the Quality of Life. Mortality is the most common parameter studied in the surveys addressing the impact of the number of therapeutic interventions on long-term outcomes of intensive care patients (16, 23). Our study attempted to measure the impact of ICU therapeutic interventions on the survivors' quality of life. GH was the only domain of the quality of life demonstrating statistically significant difference six months after ICU discharge in our patients with a greater number of therapeutic interventions on discharge from the ICU. Patients with more therapeutic interventions on the date of discharge from the ICU had generally worse health perceptions, were more pessimistic about their health improvement, and felt more ill six months after ICU discharge. However, no surveys that might have been used for comparison with our results were found.

Conclusions

Intensive care unit survivors were established to have worse health-related quality of life 6 months after discharge from the intensive care unit: they had lower physical functioning and role physical as compared with preintensive care unit performance. There is no correlation between organ failure according to the SOFA score on discharge from intensive care unit and the quality of life six months following intensive care. Circulatory dysfunction and severe critical illness neuromuscular abnormality correlate with lower physical function and role physical. Impairment in other organ systems on discharge from intensive care unit is not associated with quality of life of intensive care unit survivors. The postintensive care unit quality of life may improve only in specific groups of patients (hematologic patients and posttransplant patients). The greater amount of nursing workload required by postoperative patients on discharge from the intensive care unit correlates with lower general health and physical function 6 months after discharge from the intensive care unit.

Statement of Conflict of Interest

The authors state no conflict of interest.

Ligonio būklės iškėlimo iš intensyviosios terapijos skyriaus metu įtaka gyvenimo kokybei

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Raktažodžiai: intensyvioji terapija, su sveikata susijusi gyvenimo kokybė, SOFA skalė, TISS-28 skalė, kritinių būklių neuroraumeninis pažeidimas.

Santrauka. Su sveikata susijusios gyvenimo kokybės (SSSGK) pablogėjimas – viena iš tiriamų baigčių po gydymo intensyviosios terapijos skyriuje (ITS). Jos pokyčiai priklauso nuo daugelio veiksnių.

Tyrimo tikslas. Nustatyti, ar ilgai ITS gydyto ligonio būklė iškėlimo iš ITS dieną turi įtakos SSSGK praėjus 6 mėn.

Tirtųjų kontingentas ir tyrimo metodai. Prospektyviai ištyrėme 137 ligonius, gydytus ITS ilgiau nei septynias paras. Įvertinome organų sistemų nepakankamumo (pagal SOFA skalę), terapinių intervencijų skaičiaus (pagal TISS-28 skalę) ir kritinių būklių neuroraumeninio pažeidimo (KBNRP) iškėlimo iš ITS metu įtaką SSSGK praėjus 6 mėn.

Rezultatai. Paskutinės gydymo ITS dienos SOFA buvo 2,91±1,57, TISS-28 balų skaičius –21,79±4,53. Nustatėme, kad išgyvenusiems ligoniams yra pablogėjęs fizinis aktyvumas (FA) ir padidėjęs veiklos apribojimas dėl fizinės būklės (VADFB).

Kraujotakos pažeidimas turėjo įtakos FA sumažėjimui (p=0,016) bei veiklos tiek dėl fizinės (p=0,066), tiek dėl emocinės būklės (p=0,001) apribojimo padidėjimui. Ligoniams, kuriems iškėlimo iš ITS metu buvo pažeista daugiau nei viena organų sistema, VADFB nustatytas didesnis nei esant pažeistai tik vienai sistemai (p=0,016). Sunkų KBNRP diagnozavome 18 ligonių. Jų FA buvo mažesnis (p=0,007), o VADFB – didesnis (p=0,019) lyginant su grupe ligonių, kuriems nebuvo KBNRP. Ligonių, kuriems pagal TISS-28 buvo nustatyta daugiau nei 20 balų, SSSGK buvo blogesnė FA (p=0,077) ir bendrojo sveikatos vertinimo (p=0,038) srityse.

Išvada. Ilgai ITS gydytų ligonių gyvenimo kokybė, susijusi su sveikata, pablogėja dėl fizinio aktyvumo ir veiklos apribojimo fizinės būklės srityse. Tam įtakos turi kraujotakos pažeidimas, kritinių būklių neuroraumeninis pažeidimas ir didesnis terapinių intervencijų skaičius iškėlimo iš ITS metu.

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