

Cognitive Impairment and Psychological Distress at Discharge from Intensive Care Unit

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This study aimed to investigate cognitive impairment and psychological distress of critically ill patients at discharge from intensive care unit (ICU). This study included 30 critically ill patients who had neither pre-existing dementia nor ongoing delirium. At ICU discharge, they performed a screening test for cognitive impairment (Mini-Cog test) and completed questionnaires for depression (Patient Health Questionnaire-2, PHQ-2) and for 4 stressful experiences during ICU stay including nightmares, severe anxiety or panic, severe pain, and trouble to breathe or feeling of suffocation (Post-Traumatic Stress Syndrome 14-Question Inventory, PTSS-14 Part A). Thirteen patients (43.3%) screened positive for cognitive impairment and 18 patients (60.0%) exhibited depressive symptoms. Twenty three patients (76.7%) recollected one or more stressful in-ICU experiences. Female patients (88.9%) was more likely to feel depressed at ICU discharge, compared to male patients (47.6%) ($\chi^2=4.47$, $p=0.03$). To the best of our knowledge, this is the first report on cognitive and psychological outcomes of ICU survivors in Korea. In this study, we observed that a considerable number of critically ill patients had experienced cognitive impairment or psychological distress at ICU discharge.

Psychiatry Investig 2017;14(3):376-379

Key Words Critical care, Cognitive impairment, Psychological distress, Post-intensive care syndrome.

INTRODUCTION

Critically ill patients experience extreme levels of physical and psychological stresses in the intensive care unit (ICU). These experiences may result in long-term cognitive or psychological morbidity in patients surviving critical illness, known as post-intensive care syndrome (PICS).¹ Cognitive decline occurs in up to 78% of survivors one year after ICU discharge.² Systematic reviews of long-term psychological morbidity in general ICU survivors found that the point prevalence of clinically significant depressive symptoms and PTSD symptoms was 28% and 22%, respectively.^{3,4} The new or worsening impairments in cognition and mental health after critical illness may lead to reduced quality of life.⁵ Given the large number of acutely ill patients being treated in the ICU every year, long-term cognitive or psychological morbidity after

critical illness may be a growing public health problem.

It is important to detect these psychiatric problems early following critical illness and to determine the risk of future cognitive and psychological morbidity.^{6,7} However, until now, most ICU survivors in Korea are discharged from the hospital without assessment of cognitive impairment and psychological distress following critical illness, and some of them might continue to suffer from long-term cognitive or psychological morbidity. Researchers in the US and UK have investigated post-ICU physical, cognitive, and mental health problems more than 10 years ago.²⁻⁴ Some studies had been performed to detect the patients at high risk for cognitive impairment after critical care and recent researches assessing the effect of early rehabilitation on long-term cognitive outcomes are underway.^{8,9} The 2009 National Institute for Health and Clinical Excellence (NICE) guideline stated that patients should be assessed in the ICU for acute distress and risk of future psychological morbidity.¹⁰ However, in Korea, little is known about how many patients have experienced cognitive or psychological problems after ICU discharge. In this retrospective study, we assessed the acute impact of critical care on cognitive function and mental health and investigated its association with clinical ICU data in Korean ICU survivors. To the best of our knowledge, this is the first report on cognitive

Received: January 6, 2016 **Revised:** March 15, 2016

Accepted: May 17, 2016 **Available online:** February 4, 2017

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and psychological outcomes of ICU survivors in Korea.

METHODS

In this study, we reviewed the medical records of 43 patients who were referred to the psychiatric consultation service from June 2014 to May 2015 for the evaluation of cognitive impairment or mood disturbances at discharge from the medical intensive care unit (MICU), coronary care unit (CCU), or surgical intensive care unit (SICU) of Samsung Medical Center, a 1960-bed, university-affiliated, tertiary referral hospital in Seoul, Korea. Following the routine protocol for psychiatric evaluation of critically ill patients, the patients were assessed for ongoing delirium with the Confusion Assessment Method for the ICU (CAM-ICU)¹¹ and for pre-existing dementia with the Short Form of the Samsung Dementia Questionnaire (S-SDQ)¹² at ICU discharge. They also underwent a screening test for cognitive impairment (Mini-Cog test)^{13,14} and completed questionnaires for depressive symptoms (Patient Health Questionnaire-2, PHQ-2)¹⁵ and for 4 stressful experiences during ICU stay including nightmares, severe anxiety or panic, severe pain, and difficulty in breathing or feeling of suffocation (Post-Traumatic Stress Syndrome 14-Question Inventory, PTSS-14 Part A).¹⁶ Among them, 30 patients who had neither ongoing delirium (CAM negative) nor pre-existing dementia (S-SDQ score <8) were included in the analysis. The point prevalence of cognitive impairment, depressive symptoms, and distressing memories of the ICU stay was analyzed with descriptive statistics. In addition, we investigated its association with demographic and clinical data which were obtained from chart review, using the chi-square test or Mann-Whitney U test. The Institutional Review Board of Samsung Medical Center approved the review of information obtained from the patients' records. The requirement of informed consent was waived because of the retrospective nature of the study.

RESULTS

Characteristics of the patients during the ICU stay are presented in Table 1. On the Mini-Cog test, 13 patients (43.3%) screened positive for cognitive impairment [recall of 0 item (n=8) or recall of 1–2 items with an abnormal clock face (n=5)]. Although not statistically significant, patients with cognitive impairment at ICU discharge were more likely to have a higher Sequential Organ Failure Assessment (SOFA) score at ICU admission (U=70.00, p=0.09). Eighteen patients (60.0%) expressed depressive symptoms with a PHQ-2 score ≥ 3 (median PHQ-2 score 3, IQR 1-5). Female patients (88.9%) were more likely to feel depressed at ICU discharge, com-

Table 1. Demographic and clinical characteristics

Variables	No. of patients (%) or median (IQR)
Age, y	61 (50–72)
Sex, female	9 (30.0)
<High school graduate	5 (16.7)
Type of ICU	
Medical ICU	22 (73.3)
Coronary Care Unit	2 (6.7)
Surgical ICU	6 (20.0)
Major reasons for ICU admission	
Cardiovascular	2 (6.7)
Respiratory	17 (56.7)
Endocrine	1 (3.3)
Severe sepsis or septic shock	3 (10.0)
Postoperative	7 (23.3)
GCS score at ICU admission	14 (10–15)
SOFA score at ICU admission	7 (3–10)
Duration of mechanical ventilation, d	5.5 (0–14)
Duration of delirium, d	4 (0–9)
ICU length of stay, d	11 (7–16)

IQR: interquartile range, ICU: intensive care unit, GCS: glasgow coma scale, SOFA: sequential organ failure assessment

pared to male patients (47.6%) ($\chi^2=4.47$, p=0.03). With regard to memories of the ICU stay, 23 patients (76.7%) recollected one or more stressful in-ICU experiences including nightmares (n=9, 30.0%), severe anxiety or panic (n=18, 60.0%), severe pain (n=9, 30.0%), and difficulty in breathing or feeling of suffocation (n=13, 43.3%). We observed trends suggesting that longer ICU length of stay was associated with post-ICU memory of severe anxiety or panic during the ICU stay (U=66.00, p=0.08) and longer duration of mechanical ventilation was associated with post-ICU memory of difficulty in breathing or feeling of suffocation during the ICU stay (U=69.50, p=0.09).

DISCUSSION

Acute impact of critical illness on cognitive function has not been deeply studied. To the best of our knowledge, two studies have assessed cognitive function of non-delirious patients at ICU discharge. Jones et al.¹⁷ described that 26 of 30 patients (86.7%) showed significant problems with strategic thinking and problem solving 1 week after ICU discharge. Torgersen et al.¹⁸ reported that 18 of 28 patients (64.3%) had a cognitive impairment at ICU discharge. These studies used the Cambridge Neuropsychological Test Automated Battery (CANTAB),¹⁹ a computerized neuropsychological test battery,

and assessed cognitive function of patients across multiple cognitive domains. On the other hand, in the current study, only 43.3% of non-demented and non-delirious patients who were just discharged from the ICU screened positive for cognitive impairment. Because ICU survivors often find it difficult to complete neuropsychological tests immediately after discharge from the ICU due to their poor physical condition, we used the Mini-Cog test, a very simple screening tool consisting of 3-item recall and clock-drawing, to minimize the burden on patients. Considering that the sensitivity and specificity of the Mini-Cog test for cognitive impairment are known to be comparable to those achieved using conventional neuropsychological test batteries,^{13,14} the difference in the prevalence can be explained by differences in test performance of patients. In addition, we did not find any association between cognitive impairment at ICU discharge and its risk factors, including age ($U=86.00$, $p=0.32$), pre-existing cognitive impairment (S-SDQ score) ($U=103.00$, $p=0.77$), and duration of delirium in the ICU ($U=84.00$, $p=0.28$), but we only observed a trend for association with the initial severity of illness (SOFA score at ICU admission) ($U=70.00$, $p=0.09$). Several in-ICU illness factors including hypoxia and hypotension, sepsis, and dysglycemia have been identified as risk factors for cognitive impairment following critical illness.²

Early post-ICU depressive symptoms and post-ICU memories of in-ICU experiences have been shown to be the strongest risk factors for long-term depression and PTSD, respectively,^{3,4} and therefore, ICU survivors need to be screened for early psychological distress following critical illness no later than the day of hospital discharge to minimize future psychological morbidities. Because general depression or PTSD screening tools are not suitable for assessing severely ill patients, we simply examined whether the patients who were just discharged from the ICU had been bothered by depressed mood or loss of interest and memories of in-ICU stressful experiences, using very short questionnaires such as PHQ-2 and PTSS-14 Part A. In this study, more than half of the patients exhibited depressive symptoms at ICU discharge and this rate seems to be higher than the prevalence rate of depression at hospital discharge in previous studies (i.e., 14–36%).³ This discrepancy might be due to differences in measurement time or screening tools. We also observed that about three-fourths of the patients had one or more stressful memories of in-ICU experiences at ICU discharge, and this rate is comparable to that reported by Samuelson et al.²⁰ In addition, we found a significant association between post-ICU depressive symptoms and female sex, and trends of association between post-ICU memories and ICU length of stay and duration of mechanical ventilation. These demographic and in-ICU illness and treatment factors had been

identified as significant predictors of post-ICU depression or PTSD in some previous studies.^{3,4}

There are some limitations to this study. First, as the sample size was small, we might not have been able to detect a significant effect of probable risk factors on cognitive and psychological outcomes. Second, since it was a retrospective study, some selection bias might have affected the results. Third, some important variables (severity of delirium and exposure to sedative and analgesic medications) could not be included in the current analysis. Therefore, our results should be interpreted as preliminary findings. However, it is meaningful that we could assess cognitive function and psychological status of critically ill patients at ICU discharge, using simple screening tools to which even severely ill patients can easily respond. In the current study, we observed that a considerable number of patients had experienced cognitive impairment or psychological distress at ICU discharge. Further prospective studies are warranted to investigate the short- and long-term cognitive and psychological morbidities following critical illness and their risk factors in Korean ICU survivors.

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