Original article

Factors associated with delirium in mechanically ventilated patients in Medical Intensive Care Units

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Background Delirium is a condition frequently found among hospitalized patients, particularly those in an intensive care unit (ICU) setting. Recent studies in Western and Asian countries have shown that delirium in ICU patients is associated with multiple complications and adverse outcomes.

Objective To explore factors associated with delirium in mechanically ventilated patients in intensive care units, outcomes of delirium on 30-day all-cause mortality, and length of ICU and hospital stay.

Methods A prospective cohort study was conducted in the medical and coronary ICUs at a tertiary care, university-based hospital. The subjects were adult patients undergoing mechanical ventilation who had been admitted to the medical or coronary ICU from May through August, 2012. All patients were assessed for delirium using the Thai version of the Confusion Assessment Method for the Intensive Care Unit (CAM-ICU). Patient outcomes, including duration of stay in the ICU and in the hospital and 30 day mortality were compared between patients with delirium and delirium-free patients.

Results Of a total of 60 patients enrolled and followed during their ICU admission, 10 (16.67%) developed delirium. The patients with delirium had a longer duration of hospital and ICU stay (32 days vs. 10.5 days, p=0.001; 12.5 days vs. 3 days, p<0.001, respectively). The development of delirium was associated with higher dosages of fentanyl (OR 10.68; 95% CI, 1.59–71.84) and reintubation (OR 97.14; 95% CI, 3.51–2685.49).

Conclusion Delirium in mechanically ventilated patients in a medical ICU is associated with prolonged hospital and ICU stay. Independent risk factors for developing delirium include the accumulative dosage of fentanyl and reintubation. **Chiang Mai Medical Journal 2018;57(4):173-81.**

Keywords: delirium, mechanically ventilated patients, medical intensive care unit, 30-day mortality

Introduction

Delirium is a condition frequently found among hospitalized patients, particularly in the intensive care unit (ICU) where the prevalence has been reported to vary from 11% to 80% depending on the diagnosis, the rating of the severity of the illness (1-5) and psychomotor behavior (6,7).

Delirium in ICU patients has been associated with increased incidence of various complications and poor treatment outcomes, including patients pulling out endotracheal tubes and caval catheters (2), failed extubation (8), pro-

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longed hospital stay (9), higher expenses for medical treatment (10), higher 6-month mortality rates (1,4,5,11), and long-term cognitive impairment (12).

To date, there have been relatively few studies on risk factors affecting associated with delirium in ICU patients, unlike the many studies conducted on non-ICU patients which have identified a number of different risk factors. Although some factors associated with ICU delirium have been found, their impact and the likelihood for prediction of each condition remain inconclusive. Those factors included hypertension, alcoholism, severity of illness, sedative and analgesic use, history of smoking, hyperbilirubinemia, genetic characteristics, age-related cognitive impairment, metabolic disturbances, acute infection, respiratory disease, acidosis, anemia, and low blood pressure (13-18).

Delirium among patients in hospitals has been frequently overlooked and incorrectly diagnosed in about 75% of cases (13,14). Effective tools for screening and diagnosing delirium are needed, especially in high risk groups such as mechanically ventilated ICU patients. Three tools were used in evaluating delirium in this study: the Confusion Assessment Method for the ICU (CAM-ICU), the Nursing Delirium Screening Scale (Nu-DESC), and the Delirium Detection Score (DDS), all of which have been validated with the gold standard diagnosis, the Diagnostic and Statistical Manual of Mental Disorders–fourth edition (DSM IV) criteria (15). The DSM reported that the both tests had comparable sensitivity, but that CAM-ICU had a higher specificity. CAM-ICU is currently widely accepted for its efficiency and has been validated in more than 20 translated versions, including Thai.

Our study is the first conducted using the Thai version of CAM-ICU in the aforementioned patient group in ICU patients.

Objectives

To explore factors associated with delirium in mechanically ventilated patients in intensive care units including 30-day all-cause mortality and length of ICU and hospital stay.

Methods

This prospective cohort study was conducted at the medical and coronary ICUs at Maharaj Nakorn Chiang Mai Hospital from May through August 2012. The study was approved by the Research Ethics Committee, Faculty of Medicine, Chiang Mai University. Adult patients over 16 years of age undergoing mechanical ventilation who were admitted to either the medical or the coronary ICUs were enrolled. We excluded the patients with any of the following conditions: stroke syndrome or other primary neurologic diseases, vision or hearing impairment, inability to communicate in Thai, extubation, and post-cardiac arrest prior to enrollment.

Data collection

Data collection included a review of medical records and clinical evaluations during the patients' ICU stay. Baseline characteristics including age, gender, nationality, vision and hearing, history of smoking and alcohol consumption, congenital diseases, and diagnosis on ICU admission were collected. Initial clinical data during the ICU admission process were collected as well, including date of admission, APACHE II score (the first 24 hours in ICU), vital signs, Glasgow Coma Score, inotropic drug usage, date of first being ventilated, ventilator setting, and results of arterial blood gas, laboratory results in the first 24 hours (complete blood count, blood urea nitrogen, creatinine, electrolytes, calcium, phosphate, magnesium, liver function test, urinalysis, cultures, chest radiograph, and electrocardiogram), plus usage and dosage of sedatives and painkillers. Invasive procedures including urinary catheter, central venous catheter, arterial catheter, double lumen catheter, nasogastric tube, intercostal tube, etc, were also recorded. Delirium evaluation data during the ICU stay were obtained by trained medical and coronary ICU nurses using the Thai version of CAM-ICU (14-16). The evaluation consisted of two steps: evaluation for sedation using the Richmond Agitation and Sedation Scale (RASS) and evaluation for delirium. The patients were evaluated three times a day (once during each eight-hour nursing shift) every day during the patient's stay in the ICU.

Outcomes and follow up

All patients were followed up for 30 days from the day of enrollment. If the patients were discharged from the ICU or from the hospital before 30 days, we continued to follow up in an outpatient setting. The duration of mechanical ventilator, ICU and hospital length of stay, and deaths were also recorded.

Definitions

The definition of "delirium" used in this study is based on the American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders–fourth edition (DSM IV) criteria, which are as follows:

A. Disturbance of consciousness (i.e., reduced clarity of awareness of the environment) with reduced ability to focus, sustain, or shift attention.

B. A change in cognition (such as memory deficit, disorientation, language disturbance) or the development of a perceptual disturbance that is not better accounted for by a preexisting, established, or evolving dementia.

C. The disturbance develops over a short period of time (usually hours to days) and tends to fluctuate during the course of the day.

D. There is evidence from the history, physical examination, or laboratory findings that the disturbance is caused by the direct physiological consequences of a general medical condition.

Data analysis

The data was compared between the patients with delirium and those without delirium. Categorical variables were analyzed using Fisher's exact test. Continuous variables were compared using the Student t-test or Mann-Whitney U test as appropriate.

Univariable and multivariable logistic regression were performed to identify the risk factors related to delirium in the ICU. The odds ratio (OR) and its 95% confidence intervals (CI) were estimated. Each variable with a *p*-value of < 0.05 in the univariable analysis was considered a risk factor to be analyzed later in the multivariable model to define the final independent risk factors. A *p*-value of < 0.05 was considered statistically significant. Survival analysis was used to compare the survival outcome between delirium and non-delirium patients. All statistical calculations were performed using SPSS version 17.

Results

Baseline characteristics

A total of 60 mechanically ventilated patients admitted to the ICUs from May 1 to August 31, 2012, were enrolled in the study. Of

Table 1. Baseline characteristics of the patients

	Number (%)		
Characteristic	No delirium (n=50)	Delirium (n=10)	*p*-value
Ward			
- ICU	45(90.0)	10(100.0)	0.578
- CCU	5(10.0)	0	0.488
Gender, Male	26(52.0)	4(40.0)	0.318
Age (mean±SD)	62.0±14.9	56.7±16.4	0.159
Active smoking	16(32.0)	1(10.0)	0.794
Active alcohol drinking	13(26.0)	3(30.0)	0.355
Underlying conditions			
- Hypertension	22(44.0)	6(60.0)	0.811
- Diabetes/metabolic disorder	18(36.0)	4(40.0)	0.101
- Coronary artery disease	11(22.0)	0	1.000
- Cerebrovascular disease	4(8.0)	1(10.0)	0.602
- Chronic kidney disease	14(28.0)	2(20.0)	0.628
- Chronic lung disease	8(16.0)	1(10.0)	1.000
- Chronic liver disease	4(8.0)	0	0.857
- Malignancy	6(12.0)	1(10.0)	0.126
- HIV infection	2(4.0)	2(20.0)	1.000
- Psychiatric disorder	4(8.0)	0	0.204
Principal ICU admission diagnosis			
- Acute kidney injury	26(52.0)	3(30.0)	0.817
- Severe sepsis/septic shock	23(46.0)	5(50.0)	0.811
- Pneumonia	18(36.0)	4(40.0)	0.689
- Urinary tract infection	12(24.0)	3(30.0)	0.190
- Skin and soft tissue infection	3(6.0)	2(20.0)	0.528
- Gastrointestinal diseases	3(6.0)	1(10.0)	1.000
- Exacerbation of chronic lung disease	3(6.0)	0	1.000
- Acute coronary syndrome	2(4.0)	0	0.578
- Others	5(10.0)	0	

Abbreviations: ICU, Intensive Care Unit; CCU, Coronary Intensive Care Unit.

these, 55 patients were in the medical ICU and 5 patients were in the coronary ICU (CCU). Ten patients (16.7%) developed delirium during their ICU stay (delirium group). Fifty patients (83.3%) had no delirium during the evaluation period. The baseline characteristics of the two groups (age, gender, nationality, vision and hearing, histories of smoking and alcohol consumption, congenital disease, and diagnosis on ICU admission) were not significantly different. The average age was 56.7 years for the group with delirium and 62 years for the group with no delirium. The most common principal diagnosis was acute kidney injury (29 cases, 48.3%), followed by severe sepsis/septic shock (28 cases, 46.7%).

Initial clinical data at ICU

Within the first 24 hours of ICU admission, the patients were evaluated for disease severity by APACHE II score. The patients with no delirium were likely to have higher APACHE II scores than those with delirium (23.1 and 21.6, respectively, p=0.507). When divided into subgroups on the basis of APACHE II, 42% of the patients in the no delirium group had APACHE II ≥25, compared to 20% in the delirium group. However, the Glasgow coma scores, the inotropic drug usage data, and the results of the arterial blood gas at initial admission were not significantly different (Table 2).

The initial laboratory results at ICU admission revealed the mean serum albumin in pa-

Table 2. Initial clinical and laboratory data of the patients

	Number (%)		
Characteristic	No delirium (n=50)	Delirium (n=10)	*p*-value
APACHE II (mean ±SD)	23.1±6.7	21.6±3.8	0.507
- Less than 25, n (%)	29 (58.0)	8 (80.0)	0.191
- 25 and more, n (%)	21 (42.0)	2 (20.0)	
SBP (mmHg) (mean±SD)	113.2±30.0	103.2 ± 23.1	0.182
DBP (mmHg) (mean±SD)	66.8±15.1	67.8 ± 18.0	0.860
PR (beats/min) (mean±SD)	109.5±25.3	124.2 ± 37.2	0.127
RR (breaths/min) (median, IQR)	22.0 (20.0, 28.0)	25.5 (16.0, 31.5)	0.795
Body temperature (Celsius) (median, IQR)	37.0 (36.5,37.8)	38.1 (36.5, 39.1)	0.161
GCS (median, IQR)	11.0 (8.5, 11.0)	11.0 (9.5, 11.0)	0.515
Inotrope used at admission, n (%)	25 (50.0)	4 (40.0)	0.563
Arterial blood gas			
- pH (median, IQR)	7.4 (7.2,7.5)	7.5 (7.3,7.5)	0.174
- pO2 (mmHg) (median, IQR)	125.5 (91.5, 172.2)	110.0 (85.5, 176.0)	0.706
- pCO2 (mmHg) (median, IQR)	28.8 (25.2, 33.8)	27.2 (24.3, 31.7)	0.500
- HCO3 (mEq/L) (mean±SD)	19.1±7.9	20.3±5.5	0.678
- Base excess (median,IQR)	-6.1 (-11.9, 0.2)	-2.0 (1.0, 3.9)	0.285
- SpO2 (%) (mean±SD)	98.4 ±3.2	98.8±2.7	0.945
Hemoglobin (g/dL) (mean±SD)	9.8±2.8	10.3±2.7	0.586
Hematocrit (%) (mean±SD)	30.9±8.9	30.7±7.8	0.931
Blood glucose (mg/dL) (mean±SD)	138.1±55.5	146.3±55.9	0.672
BUN (mg/dL) (median, IQR)	35.5 (21.7,65.7)	23.5 (13.7,67.7)	0.284
Creatinine (mg/dL) (median, IQR)	2.7 (1.4,3.5)	1.5 (0.9,2.3)	0.084
Na (mEq/L) (mean±SD)	139.5±6.3	137.5±7.2	0.373
K (mEq/L) (mean±SD)	4.3±1.1	3.7±0.8	0.113
Cl (mEq/L) (median, IQR)	104.0 (100.0, 108.0)	109.5 (99.5, 111.2)	0.306
Ca (mg/dL) (mean±SD)	8.3±0.9	8.3±0.9	0.915
P (mg/dL) (mean±SD)	5.8±2.9	5.2±1.4	0.496
Mg (mg/dL) (mean±SD)	1.9±0.5	1.5±0.2	0.031
Albumin (g/dL) (mean±SD)	2.7±0.9	2.0±0.7	0.036
- Albumin less than 2.5 g/dL, n (%)	18 (36.0)	8 (80.0)	0.010
Positive urine culture, n (%)	15 (32.6)	4 (40.0)	0.655
Positive blood culture, n (%)	11 (22.0)	4 (40.0)	0.230
Positive sputum culture, n (%)	33 (67.3)	5 (50.0)	0.296

tients with delirium was significantly lower than the no delirium group (2.0 vs 2.7 mg/dL, *p*= 0.036). Dividing the patients into subgroups based on initial serum albumin showed that 80% of patients with delirium had a mean initial serum albumin lower than 2.5 mg/dL compared to only 36% in patients without delirium (*p*=0.010). In addition, the mean initial serum magnesium in the group with delirium was significantly lower than in the group with no delirium (1.5 vs 1.9 mg/dL, *p*=0.031). However, there were no statistically significant differences for other chemical evidence or results of cultures between the two groups (Table 2).

Delirium evaluation during stay in ICU

The most frequently used sedatives in the ICU were diazepam and midazolam. The number of patients requiring these two drugs was not significantly different between the groups; however, the mean cumulative dosage of diazepam used in the delirium group was significantly higher (29.0 vs 13.8 mg, *p* =0.009) while the mean cumulative dosage of midazolam was not significantly different between the two groups. Among the sedatives and narcotics, it was discovered that the use of fentanyl in the delirium group was significantly higher than in the no delirium group (60.0% vs 16.0%, *p*=0.003). However, the use of morphine as well as atracurium was not different between two groups (Table 3).

The patients in the group with delirium had a longer period of intubation than those in the group with no delirium (mean 10 days and 3 days, respectively). The data also revealed that 90.0% of the patients in the delirium group required intubation for more than four days compared with 40.0% in the group with no delirium. Moreover, the patients with delirium

Table 3. Data of dosage and usage of sedatives and narcotics in ICU of mechanically ventilated patients compared between delirium and no delirium group.

	Number (%)		
Characteristic	No delirium (n=50)	Delirium (n=10)	*p*-value
Diazepam	17 (34.0)	5 (50.0)	0.393
- Cumulative dose (mg) (median, IQR)	10 (10.0,20.0)	25 (20.0,40.0)	0.009
Midazolam	13 (26.0)	5 (50.0)	0.131
- Cumulative dose (mg) (median, IQR)	245 (4.0, 789.0)	240 (4.0,742.0)	0.849
Fentanyl	8 (16.0)	6 (60.0)	0.003
- Cumulative dose (mcg) (median, IQR)	350 (25.0, 3431.2)	1860 (43.7,8306.2)	0.662
Morphine	5 (10.0)	3 (30.0)	0.089
- Cumulative dose (mg) (median, IQR)	3 (2.5,6.5)	9 (6,12)	0.071

Table 4. Data of endotracheal intubation, catheter type and duration during ICU admission.

	Number (%)		
Characteristic	No delirium (n=50)	Delirium (n=10)	*p*-value
Endotracheal intubation			
- Duration of intubation (days) (median, IQR)	3 (2.0, 6.0)	10 (4.0,18.5)	0.002
- Duration ≥ 4 days	20 (40.0)	9 (90.0)	0.004
- Re-intubation	1 (2.0)	3 (30.0)	0.013
Urinary catheter	48 (96.0)	10 (100)	1.000
- Duration (days) (median, IQR)	5(3,9.7)	12 (8,2)	0.003
Central venous catheter	2 (64.0)	9 (90.0)	0.107
- Duration (days) (median, IQR)	3.5 (3.0,7.5)	10 (9.0,18)	0.002
Arterial line	25 (50)	8 (80)	0.082
- Duration (days) (median, IQR)	3 (2.0,8.5)	13 (9.2,22.7)	0.001
Double lumen catheter	16 (32)	2 (20)	0.450
- Duration (days) (median, IQR)	3 (2.0,5.7)	13 (9.2,22.7)	0.118
Nasogastric tube	49 (98)	10 (100)	1.000
- Duration (days) (median, IQR)	3 (3.0,7.0)	12 (9.7,18.2)	<0.001

needed reintubation which was significantly higher than in those with no delirium (30.0% vs 2.0%, *p*=0.013). Patients in the delirium group had a significantly longer duration of catheter placement for urinary catheter, central venous catheter, arterial line, and nasogastric tube (Table 4).

Nevertheless, when data were analyzed using multivariable analysis, the significantly factors associated with delirium were the use of fentanyl (OR 10.68; 95% CI, 1.59-71.84; *p*= 0.015) and reintubation (OR 97.14; 95% CI, 3.51-2685.49; *p*=0.007). Serum albumin below 2.5 g/dL tended to be related to delirium as well, but the association was not statistically significant (OR 9.47; 95% CI, 0.97–91.04, *p*= 0.053) (Table 5).

Table 5. Factors associated with delirium among patients in ICU by using multivariables analysis

Variable	OR	95% CI	*p*-value
Fentanyl usage	10.68	1.59-71.84	0.015
Re-intubation	97.14	3.51–2685.49	0.007
Serum albumin <2.5 g/dL	9.41	0.97–91.04	0.053

Outcomes of delirium among patients in ICU

Determination of the mortality rates 30 days after the enrollment revealed that the patients in the group with no delirium had a higher mortality rate than those in the delirium group (48.0% vs 10.0%, respectively, *p*=0.026). Also, the ICU and hospital length of stay in the group with delirium were significantly longer than that in the group with no delirium (Table 6 and Figure 1).

Discussion

This study found that the incidence of delirium in ICU patients was 16.67%; previous studies (1-5) have reported incidence rates that varied from 11 to 80%. However, there have been no studies conducted on ICUs at other hospitals in Thailand with which to compare our results.

Similar to the studies conducted in other countries, all participants in our study were intubated and mechanically ventilated. The mean age range in this study was 55 years to 65 years. The most frequent principal ICU diagnoses were acute kidney injury, severe sepsis/septic shock, and pneumonia. The average APACHE II score at admission was not different between the two groups, but was higher than scores reported in other countries. A study conducted by Ouimet et al (1) in 2007 found that a high APACHE II score at admission was a risk factor for developing delirium among the ICU patients.

Factors related to delirium in the ICU identified in this study are the use of fentanyl and reintubation. The use of fentanyl was associated with a 10.7 fold increased risk of delirium, which corresponds to a report by Pandharipande et al (17) That 2008 study of 100 patients conducted in the surgical and accident ICUs of Vanderbilt University hospital in the US found that the consumption of fentanyl was a risk factor associated with delirium in the surgical ICU (*p*=0.007).

We also found that the serum albumin at admission below 2.5 g/dL was associated with a 9.4 increase in the incidence of developing delirium in the ICU (*p*=0.053). A study in Taiwan by Lin et al (18) in 2008 found that hy-

Table 6. Outcomes of the patients

Primary outcome	Number (%)		
	No delirium (n=50)	Delirium (n=10)	*p*-value
30-day survival			
- Survived	26(52)	9(90)	0.026
- Dead	24(48)	1(10)	
Length of hospital stay (days)			
- Median, IQR	10.5 (6,20.5)	32.0 (19.5,54.2)	0.001
Length of ICU stay (days)			
- Median, IQR	3.0 (2,5.2)	12.5 (8.7,23.0)	<0.001

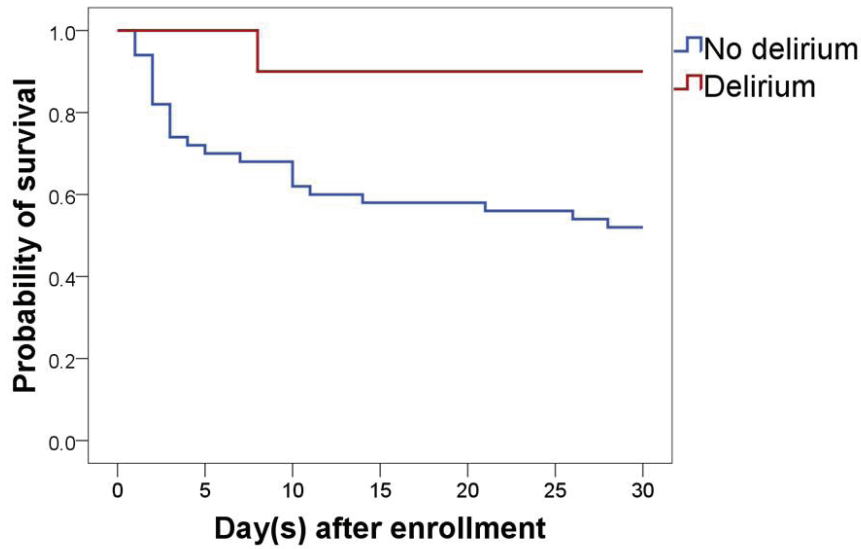

Figure 1. The survival rate between delirium and non delirium

poalbuminemia was also associated with an increased risk of delirium in ICUs (OR 5.94; 95% CI, 1.23-28.77). However, a study in Turkey by Aldemir et al (19) in 2001 found no relationship between hypoalbuminemia and delirium in surgical ICUs.

A primary outcome from our study was that delirium in ICUs was associated with significantly prolonged ICU and hospital lengths of stay, a finding which is consistent with previous studies in other countries. In contrast to other reports, however, our study found that the 30-day mortality rate in the group with no delirium was significantly higher than that of the group with delirium (48% vs 10%, respectively, p=0.026). Lin et al (11) conducted a study of 102 mechanically ventilated patients in medical ICUs and found that delirium was associated with an increased 60-day mortality rate (p=0.003; hazard ratio = 2.57; 95% CI, 1.56-8.15). These contrasting results might be the result of differences in the patients' medical conditions in the ICU, especially the disease severity. Patients in our study had a higher mean APACHE II score than in any previous study. Although the APACHE II score in the two groups were not significantly different, the group without delirium was likely to have a higher score than the delirium group (23.08 and 21.60, respectively). In addition, more than twice as many of the patients with delirium had an APACHE II over 25 than the no delirium patients (42% vs 20%). This might be the result of severely ill patients dying before they developed delirium. However, our study investigated only relative short-term mortality (30 days). No previous studies have examined the mortality rate over this short a period. Most previous reports have focused on the mortality rate at six months or longer.

In addition to the relatively short follow-up period, our study has some other limitations. First, this study primarily focused on the delirium status of the patients but not the disease severity. As mentioned, patients with greater disease severity might have had a higher risk of death, trended to stay shorter and leaved the rest of their population to develop less delirium. Second, there was a limitation in the data collected on sedatives use. Fentanyl use was recorded as the cumulative dosage during the entire ICU period, so it was not possible to divide this into dosage before and after developing delirium.

Conclusions

Patients with delirium have a longer length of stay both in the ICU and in the hospital compared to delirium-free patients. However, ICU patients without delirium have a significantly

higher risk of mortality in the first 30 days. Independent risk factors associated with developing delirium among ICU patients include the use of fentanyl and reintubation.

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ปัจจัยที่สัมพันธ์กับการเกิดภาวะสับสนของผู้ป่วยหนักที่ได้รับการใส่ท่อช่วยหายใจในหอผู้ป่วยวิกฤต

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ภาควิชาอายุรศาสตร์ คณะแพทยศาสตร์ มหาวิทยาลัยเชียงใหม่

ภูมิหลัง ภาวะสับสนพบได้บ่อยในผู้ป่วยที่นอนโรงพยาบาลโดยเฉพาะผู้ป่วยหนักในหอผู้ป่วยวิกฤต การศึกษาในต่างประเทศพบว่า ภาวะสับสนสัมพันธ์กับภาวะแทรกซ้อนและส่งผลเสียต่อผลลัพธ์ของการรักษา ข้อมูลดังกล่าวในประเทศไทยยังมีจำกัด

วัตถุประสงค์ เพื่อศึกษาปัจจัยที่สัมพันธ์กับการเกิดภาวะสับสนในหอผู้ป่วยวิกฤตและผลกระทบต่ออัตราการตายที่ 30 วัน ระยะเวลานอนในหอผู้ป่วยหนัก และโรงพยาบาล

วิธีการ การศึกษาแบบไปข้างหน้าในผู้ป่วยที่ได้รับการใส่ท่อและเครื่องช่วยหายใจในหอผู้ป่วยวิกฤตอายุรกรรมทั่วไป (medical ICU) และหอผู้ป่วยวิกฤตโรคหลอดเลือดหัวใจ (coronary ICU) โรงพยาบาลมหาราชนครเชียงใหม่ คณะแพทยศาสตร์ มหาวิทยาลัยเชียงใหม่ ตั้งแต่เดือนพฤษภาคมถึงสิงหาคม พ.ศ. 2555 ประเมินการเกิดภาวะสับสนด้วย Confusion Assessment Method for the Intensive Care Unit (CAM-ICU) ฉบับภาษาไทยและเปรียบเทียบผลลัพธ์ระหว่างกลุ่มผู้ป่วยที่เกิดและไม่เกิดภาวะสับสน

ผลการทดลอง ผู้ป่วยทั้งหมด 60 ราย ถูกคัดเลือกเข้าการศึกษา มีผู้ป่วย 10 ราย ที่เกิดภาวะสับสน (ร้อยละ 16.67) ข้อมูลพื้นฐานและการวินิจฉัยแรกรับที่เข้าหอผู้ป่วยวิกฤตในทั้งสองกลุ่มไม่มีความแตกต่างกันอย่างมีนัยสำคัญทางสถิติ ผู้ป่วยกลุ่มที่เกิดภาวะสับสนมีระยะเวลานอนในหอผู้ป่วยวิกฤตและโรงพยาบาลนานกว่า (ค่ามัธยฐาน 32 วัน เทียบกับ 10.5 วัน, p=0.001 และค่ามัธยฐาน 12.5 วัน เทียบกับ 3 วัน, p<0.001; ตามลำดับ) การเกิดภาวะสับสนสัมพันธ์กับการใช้ยา fentanyl (OR 10.68; 95% CI, 1.59-71.84) และการใส่ท่อช่วยหายใจซ้ำ (OR 97.14; 95% CI, 3.51-2685.49)

สรุป การเกิดภาวะสับสนในผู้ป่วยที่ได้รับการใส่ท่อและเครื่องช่วยหายใจสัมพันธ์กับการเพิ่มระยะเวลาการนอนในหอผู้ป่วยวิกฤตและโรงพยาบาล ปริมาณการใช้ยา fentanyl และการใส่ท่อช่วยหายใจซ้ำ **เชียงใหม่เวชสาร 2561;57(4):173-81.**

คำสำคัญ: ภาวะสับสน ผู้ป่วยที่ได้รับการใส่เครื่องช่วยหายใจ หอผู้ป่วยวิกฤตอายุรกรรม อัตราการตายที่ 30 วัน