Prevalence and Incidence of Delirium in Thai Older Patients: A Study at General Medical Wards in Siriraj Hospital

Rungnirand Praditsuwan MD*,
Duangsawang Limmathuroskul MD*, Jintana Assanasen MD*,
Sorapop Pakdeewongse MD*, Waricha Eiamjinnasuwat MD*,
Achara Sirisuwat MD*, Varalak Srinonprasert MD*

** Department of Medicine, Faculty of Medicine, Siriraj Hospital, Mahidol University, Bangkok, Thailand*

Background: *Delirium, an acute decline in attention and cognition, is found to be a common life-threatening clinical syndrome among hospitalized older patients. However, there has been no study to date regarding prevalence and incidence of delirium in Thai older patients.*
Objective: *The authors aimed to determine prevalence and incidence of delirium in older patients admitted to general medical wards in a university hospital in Thailand.*
Material and Method: *A prospective observational study was conducted in Siriraj Hospital. All patients aged 70 years or older admitted to general medical wards during study period were included. Delirium assessments were undertaken initially within the first 24 hours of admission and serially every 48 hours until patients developed delirium or were discharged. Delirium was diagnosed by experienced geriatricians based on the DSM-IV criteria. Prevalence was based on delirium identified at the first assessment, whereas incidence was defined based on cases developed during hospitalization.*
Results: *Two hundred and twenty five patients were enrolled. The prevalence of delirium was 40.4%, while the incidence of delirium was 8.4 %. Therefore, the total occurrence rate of delirium was remarkably high (48.9%). Occurrence rate of delirium significantly increased with age ($p = 0.003$) and illness severity ($p < 0.001$). Number of impaired activities of daily living was also associated with occurrence rate of delirium in older patients.*
Conclusion: *In conclusion, the prevalence of delirium among older patients admitted to general medical wards in the present study were alarmingly high. Meanwhile, the incidence of delirium was comparable to other studies. Obviously, it requires serious attention from physicians, nurses and hospital administrators. These findings may reflect the importance of delirium detection for proper management. To lower morbidity and mortality in older patients, effective preventive strategies of delirium should be implemented promptly during hospital admission.*

Keywords: *Delirium, Older patients, Hospitalized, Prevalence, Incidence*

J Med Assoc Thai 2012; 95 (Suppl. 2): S245-S250
Full text. e-Journal: *http://www.jmat.mat.or.th*

Delirium, an acute decline in attention and cognition, is a life-threatening clinical syndrome among older people[1]. Delirium can be a presenting symptom of various serious medical illnesses in older patients. Unfortunately, it is commonly missed in clinical practice and leads to delayed treatment and several adverse clinical outcomes[2-4]. Nevertheless, many causes of delirium, such as drug toxicity, electrolyte imbalances, and systemic infections, are treatable. It is, therefore, crucial to identify delirious patients in a timely manner in order to correct those reversible causes and improve patients' outcomes. Moreover, delirium is a preventable condition. An example of successful models for preventing delirium in older medical in-patients stems from identifying risk factors; such as cognitive impairment, sleep deprivation, immobility, vision and hearing impairment, including dehydration and modifying those factors accordingly[5].

Delirium is a common problem in the elderly. Prevalence of delirium in older patients at hospital admission ranges from 14 to 24 percent and its incidence

Correspondence to:
Praditsuwan R, Division of Geriatric Medicine, Department of Medicine, Faculty of Medicine Siriraj Hospital, Mahidol University, 2 Prannok Road, Bangkok Noi, Bangkok 10700, Thailand.
Phone: 0-2419-7196
E-mail: sirpd@mahidol.ac.th

during hospitalization ranges from 6 to 56 percent[6]. In a recent systematic literature review[7], the prevalence of delirium at hospital admission ranges from 10 to 31 percent, and the incidence of new delirium in older patients per admission ranges from 3 to 29 percent.

In Thailand, older people are the population with the highest growth rate over the last decade and have become the major portion of hospital admissions[8]. Since delirium is a challenging health issue both on patients and families and an aspect and a burden on the health care system, the magnitude of this problem in older patients should be probed. However, little is known about prevalence and incidence of delirium among Thai older medical in-patients. The present study thus aims to determine the prevalence and incidence of delirium in hospitalized older patients admitted to general medical wards in Siriraj Hospital, a university hospital in Thailand.

Material and Method

A prospective observational study was conducted at Department of Medicine, Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok, Thailand. All consecutive patients age 70 or older admitted to general medical wards during January to March 2009 were eligible for the present study. Exclusion criteria included endotracheal intubation at admission, aphasia, comatose or uncooperative patients. All enrolled subjects were assessed within 24 hours of admission and included patients were subsequently followed every 48 hours for eliciting symptoms of delirium until developing delirium or until discharge. A diagnosis of delirium was made by experienced geriatricians according to DSM-IV criteria[9]. Three geriatricians in the study had excellent agreement for diagnosis of delirium with Kappa of 0.88-1.0 (result from pilot study). Initial assessment included a patient interview, a proxy interview and a review of the medical record. The patient interview included cognitive assessment using Thai Mental State Examination (a cognitive screening tool assessing six cognitive domains with a total possible score of 30 where the lower scores indicates more impairment)[10]. The rating for illness severity[11] was performed by geriatricians during the first assessment. The scale was a 9-point ordinal scale rated according to physician clinical judgement on patients' overall condition. This was conducted by having physician to response to question of 'how sick the patient is the patient now'(the higher score indicates the more severity). Illness severity was further classified into mild (1-3), moderate (4-6) and severe illness (7-9) according to the score marked. Inter-rater reliability for rating illness severity from the present study was high, demonstrated by intraclass correlation of 0.93 (95% CI 0.84-0.97) (result from pilot study). The proxy interview included an assessment of patient's dementia status using Modified IQCODE[12] and assessments of preadmission activities of daily living (ADLs), both basic ADLs[13] and instrumental ADLs[14]. Dementia was ascertained when patients demonstrate a score of less than 3.42 on Modified IQ code or preexisting diagnosis was made. Depression was defined according to depression screening items[15] or preexisting diagnosis. Depression screening was defined as positive if the response was 'yes' to one of the following verbally asked items: 1. during the past month have you often been bothered by feeling down, depressed, or hopeless. 2.during the past month have you often been bothered by little interest or pleasure in doing things. With respect to basic ADLs, ability to independently perform 10 tasks namely bathing, grooming, eating, dressing, controlling bowels, controlling bladder, toileting, doing stairs, transferring and ambulating were enquired. Decrease in ability to perform any of these ADLs was classified as impaired ADL. Polypharmacy was defined by number of medications taken of 5 or more. Information regarding demographic data, co-morbid illnesses and functional status was also collected from the patient, proxy and medical record. Laboratory results and reasons for admissions were collected at admission and presence of infection was prospectively collected during the admission (prior to delirium, if it occurs). In this study, azothemia was defined as serum BUN/Cr ratio more than 20. The prevalence was defined as the delirium cases presented at the first assessment of hospital admission. The incidence was defined as new delirium cases arising during hospitalization. Occurrence of delirium was the summation of prevalence and incidence. Informed consents were obtained from both patient and the proxy. The present study was approved by the Siriraj Institutional Review Board.

Statistical analysis

Prevalence of delirium in hospitalized older patients was estimated to be 20%. Desired precision of the confidence internal was set at 10% with confidence interval of 90%. Required sample size for delirious subjects would be 44 and total sample size of 220. Descriptive statistics were used for subject characteristics. The associations between occurrence rate of delirium and age-group, disease severity and

number of impaired BADLs were explored using Chi-square test and p-for linear-by-linear association was reported. Statistical value < 0.05 was determined as significant. All statistical analyses were performed using SPSS version 17.0.

Results

Of the 452 patients, age 70 or older, admitted to general medical wards during the present study period, 225 were included in the present study. Excluded reasons were being endotracheal-intubated (n = 126), unable to communicate (n = 34), uncooperative (n = 10), other reasons such as transferred to other units, death within 48 hour or too unwell to be assessed (n = 57).

Table 1 showed baseline characteristics of the study population. The numbers of males and females were similar. Mean age of patients were 78 $\pm$ 5.9 years old whereas 30% were older than 80. Almost half of them had more than 4 co-morbid illnesses. Sixty four percent of patients took more than 5 medications per day. Forty two percent of study population was demented while 60% had impaired basic ADLs. Approximately 30% of patients were rated as having severe illness at the time of admission.

Of the 225 included older patients, one hundred and ten (48.9%) developed delirium and ninety one had delirium at the admission. Nineteen patients developed delirium during hospital admission. In other words, the prevalence of delirium at admission was 40.4% while the incidence of delirium during the hospital stay was 8.4%.

Fig. 1 illustrates prevalence of delirium according to age-group showing increasing in delirium prevalence with increasing age with significant linear trend (p = 0.003). Increased of illness severity is also

Table 1. Baseline characteristics of included population (n = 225)

Characteristic	Number (percentage)
Female, n (%)	111 (49.3%)
Age > 80 years old, n (%)	68 (30.2%)
Have 4 or more co-morbid illnesses, n (%)	109 (48.4%)
Underlying disease	
DM, n (%)	92 (40.9%)
HT, n (%)	151 (67.1%)
Heart failure, n (%)	24 (10.7%)
COPD, n (%)	14 (6.2%)
Malignancy, n (%)	56 (24.9%)
Stroke, n (%)	26 (11.6%)
Anemia (Hct <30%), n (%)	90 (40.0%)
Prerenal azothemia, n (%)	108 (48.0%)
Hyponatremia, n (%)	76 (33.8%)
Presence of infection, n (%)	94 (41.8%)
Visual impairment (total number = 161) , n (%)	137 (85.1%)
Hearing impairment (total number = 183) , n (%)	10 (5.5%)
Polypharmacy , n (%)	143 (63.6%)
Benzodiazepine use, n (%)	32 (14.2%)
Antipsychotic use, n (%)	19 (8.4%)
Impaired BADLs, (total number = 193) n (%)	115 (59.6%)
Impaired IADLs, (total number = 193) n (%)	173 (89.6%)
Dementia, n (%)	94 (41.8%)
Depression, n (%)	26 (11.6%)
Lack of education, n (%)	38 (16.9%)
Illness severity (total number = 222)	
Mild, n (%)	26 (11.7%)
Moderate, n (%)	129 (58.1%)
Severe, n (%)	67 (29.8%)

*Total subjects = 225 except missing data in some variables as noted

significantly associated with higher delirium prevalence as demonstrated in Fig. 2 (p for trend < 0.001). Level of dependency is also significantly associated with prevalence of delirium as shown in Fig. 3. Delirium was identified at higher rate in older patients with higher number of impaired in basic ADLs (p for trend < 0.001). Occurrence rate of delirium was significantly higher in demented older patients (72.3 % in demented compared to 37.1% in non-demented group). Females were more likely to become delirious, as well as patients with higher number of co-morbid illnesses.

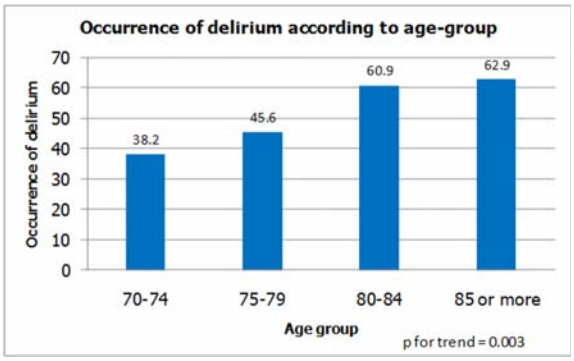

Fig. 1 Occurrence of delirium according to age-group

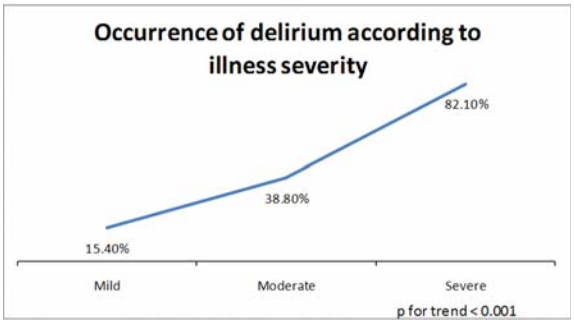

Fig. 2 Occurrence of delirium according to illness severity

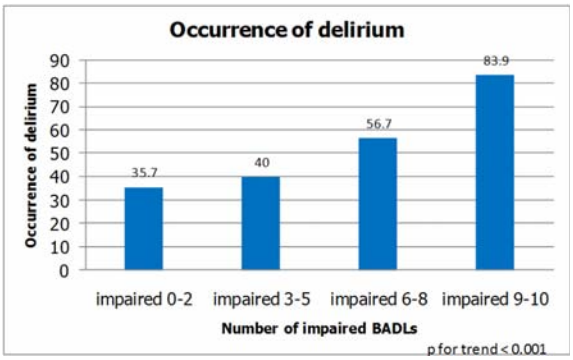

Fig. 3 Occurrence of delirium according to number of impaired in basic ADLs

Discussion

It is clear from the presented study that delirium is very common in Thai older general medical in-patients. The prevalence of delirium in this study was 40.4%, which is much higher when compared with other previous studies[6,7,16,17]. The main reason of this finding may be in relation to the characters of our studied population. The present study was conducted in a university hospital which serves as a tertiary center which would admit more critically ill patients as indicated by high proportion of patients with severe illness (score of 7 or more on illness severity scale). Moreover, a significant number of our included patients had dementia and functional dependence. It has been documented that dementia is an important predisposing risk factor of delirium[1,6]. Another factor related to higher prevalence found in this study may be the sensitive surveillance methods we used to detect delirium in the included patients at hospital admission. However, the present study showed the incidence of delirium was 8.4%, which is similar to the findings from previous studies[6,7]. This finding might reflect a good quality of care for older patients in the hospital[18].

The present study demonstrated well that the prevalence of delirium increased with age. Patients older than 80 years old had very high chance of becoming delirious. The result is in concordance with other studies. Illness severity and level of dependency were also significantly associated with prevalence of delirium in linear manner. More severely ill patients and older patients with a high level of dependency were more likely to be delirious. These findings were similar to the findings from previous reviews[1,6]. Although delirium can be caused by a single factor, it more typically develops due to the interrelationship between patient vulnerability at hospital admission or predisposing factors and noxious insults or precipitating factors occurring during the course of hospitalization[1,6].

The strengths of the present study are several. First, the present study design was a prospective observational study. Second, diagnosis of delirium in all patients from the admission throughout hospitalization was ascertained. All eligible subjects were assessed according to study criteria to detect delirium, both hyper- and hypoactive types, within 24 hours of admission. The diagnosis of delirium was made by experienced geriatricians using the DSM-IV criteria, a standardized, validated diagnostic instrument. In addition, the authors followed our older patients

serially every 48 hours until discharge; this might allow us to make timely diagnosis of delirium throughout hospitalization. Thus, findings from the present study should reflect the real prevalence and incidence of delirium in older patients in clinical practice.

The limitation of the present study should also be highlighted. The authors hospital is the biggest university hospital in the country, accepted as "the hospital of the land". Therefore, a significant portion of older patients in general medical wards are critically ill when admitted. This was evidence by a high proportion of admitted patients being excluded due to being endotracheally intubated, comatose or dead at admission. Thus, the generalizibility of the results to other settings, such as community hospitals or general hospitals, where patients are admitted with less severe conditions may not be ascertained.

Conclusion

In conclusion, the prevalence of delirium among older patients admitted to general medical wards in this study were alarmingly high. Meanwhile, the incidence of delirium was comparable to other studies. Obviously, it requires serious attention from physicians, nurses and hospital administrators. These findings may reflect the importance of delirium detection, especially the hypoactive type, for proper management. To lower morbidity and mortality in older patients, effective preventive strategies of delirium should be implemented promptly in this group of the population.

Potential conflicts of interest

None.

References

1. Inouye SK. Delirium in older persons. N Engl J Med 2006; 354: 1157-65.
2. Francis J, Kapoor WN. Delirium in hospitalized elderly. J Gen Intern Med 1990; 5: 65-79.
3. Cole MG, Primeau FJ. Prognosis of delirium in elderly hospital patients. CMAJ 1993; 149: 41-6.
4. O'Keeffe S, Lavan J. The prognostic significance of delirium in older hospital patients. J Am Geriatr Soc 1997; 45: 174-8.
5. Inouye SK, Bogardus ST Jr, Charpentier PA, Leo-Summers L, Acampora D, Holford TR, et al. A multicomponent intervention to prevent delirium in hospitalized older patients. N Engl J Med 1999; 340: 669-76.
6. Inouye SK. Delirium in hospitalized older patients. Clin Geriatr Med 1998; 14: 745-64.
7. Siddiqi N, House AO, Holmes JD. Occurrence and outcome of delirium in medical in-patients: a systematic literature review. Age Ageing 2006; 35: 350-64.
8. Chunharas S. Situation of the Thai elderly 2007. Bangkok. The Foundation of Thai Gerontology Research and Development Institute; 2007.
9. American Psychiatric Association. Diagnostic and statistical manual of mental disorder. 4th ed. Text revision ed. Washington, DC: American Psychiatric Association; 2000.
10. Train the Brain Forum. Thai mental state examination. Siriraj Hosp Gaz 1993; 45: 359-74.
11. Charlson ME, Sax FL, MacKenzie CR, Fields SD, Braham RL, Douglas RG Jr. Assessing illness severity: does clinical judgment work? J Chronic Dis 1986; 39: 439-52.
12. Siri S, Okanurak K, Chansirikanjana S, Kitayaporn D, Jorm AF. Modified Informant Questionnaire on Cognitive Decline in the Elderly (IQCODE) as a screening test for dementia for Thai elderly. Southeast Asian J Trop Med Public Health 2006; 37: 587-94.
13. Mahoney FI, Barthel DW. Functional evaluation: the barthel index. Md State Med J 1965; 14: 61-5.
14. Lawton MP, Brody EM. Assessment of older people: self-maintaining and instrumental activities of daily living. Gerontologist 1969; 9: 179-86.
15. Arroll B, Khin N, Kerse N. Screening for depression in primary care with two verbally asked questions: cross sectional study. BMJ 2003; 327: 1144-6.
16. Iseli RK, Brand C, Telford M, LoGiudice D. Delirium in elderly general medical inpatients: a prospective study. Intern Med J 2007; 37: 806-11.
17. Holden J, Jayathissa S, Young G. Delirium among elderly general medical patients in a New Zealand hospital. Intern Med J 2008; 38: 629-34.
18. Inouye SK. The dilemma of delirium: clinical and research controversies regarding diagnosis and evaluation of delirium in hospitalized elderly medical patients. Am J Med 1994; 97: 278-88.

ความชุกและอุบัติการณ์ของภาวะสับสนเฉียบพลันในผู้ป่วยสูงอายุไทย: การศึกษาในหอผู้ป่วยอายุรศาสตร์สามัญในโรงพยาบาลศิริราช

รุ่งนิรันดร์ ประดิษฐสุวรรณ, ดวงสว่าง ลิ้มมธุรสกุล, จินตนา อาศนะเสน, สรภพ ภักดีวงศ์, วริชา เอี่ยมจิณณสุวัฒน์, อัจฉรา ศิริสุวัฒน์, วราลักษณ์ ศรีนนท์ประเสริฐ

ภูมิหลัง: *ภาวะสับสนเฉียบพลัน (delirium) เป็นภาวะที่มีการเปลี่ยนแปลงอย่างเฉียบพลันพลันของความใส่ใจและสมรรถภาพของสมอง และเป็นภาวะที่คุกคามต่อชีวิตที่พบได้บ่อยในผู้สูงอายุที่รักษาตัวโรงพยาบาล อย่างไรก็ตาม ยังไม่มีการศึกษาเกี่ยวกับความชุกและอุบัติการณ์ภาวะนี้ในผู้ป่วยสูงอายุไทย*

วัตถุประสงค์: *เพื่อศึกษาความชุกและอุบัติการณ์ของภาวะสับสนเฉียบพลันในผู้สูงอายุที่เข้ารับการรักษาในหอผู้ป่วยสามัญอายุรศาสตร์ที่โรงพยาบาลศิริราช*

วัสดุและวิธีการ: *คณะผู้นิพนธ์ได้ทำการศึกษาแบบเก็บข้อมูลไปข้างหน้าในหอผู้ป่วยสามัญอายุรศาสตร์ โรงพยาบาลศิริราช ในผู้ป่วยทุกคนที่มีอายุตั้งแต่ 70 ปีขึ้นไปที่เข้ารับการรักษาเป็นผู้ป่วยในช่วงเดือน มกราคม ถึง มีนาคม พ.ศ. 2552 โดยประเมินผู้ป่วยภายใน 24 ชั่วโมง และติดตามต่อเนื่องทุก 48 ชั่วโมง จนกว่าจะออกจากโรงพยาบาล เพื่อดูว่ามีภาวะสับสนเฉียบพลันหรือไม่ การวินิจฉัยภาวะสับสนเฉียบพลันทำโดยอายุรแพทย์ผู้เชี่ยวชาญทางด้านผู้สูงอายุโดยเป็นไปตามเกณฑ์ DSM IV ความชุกของภาวะสับสนเฉียบพลันได้จากจำนวนผู้ที่มีภาวะนี้ตั้งแต่แรกประเมิน ส่วนอุบัติการณ์หมายถึงผู้ที่มีภาวะสับสนเฉียบพลันเกิดขึ้นขณะรักษาตัวอยู่ในโรงพยาบาล*

ผลการศึกษา: *ในผู้ป่วย 225 คนที่เข้าร่วมการศึกษา ความชุกของภาวะสับสนเฉียบพลันเป็นร้อยละ 40.4 ในขณะที่อุบัติการณ์เป็นร้อยละ 8.4 เมื่อคิดรวมอัตราการเกิดภาวะสับสนเฉียบพลันทั้งหมด คือ ร้อยละ 48.9 อัตราการเกิดภาวะสับสนเฉียบพลันเพิ่มขึ้นตามอายุที่เพิ่มขึ้นอย่างมีนัยสำคัญทางสถิติ ($p < 0.001$) จำนวนของความบกพร่องของความสามารถในการช่วยเหลือตัวเองมีความสัมพันธ์โดยตรงกับการเกิดภาวะสับสนเฉียบพลันเช่นกัน*

สรุป: *ความชุกของภาวะสับสนเฉียบพลันในผู้ป่วยที่เข้ารับการรักษาในหอผู้ป่วยอายุรศาสตร์ อยู่ในอัตราที่สูงมาก ในขณะที่อุบัติการณ์ของภาวะนี้อยู่ในอัตราที่ใกล้เคียงกับการศึกษาจากต่างประเทศ ภาวะสับสนเฉียบพลันจึงเป็นปัญหาที่ควรได้รับความสนใจจากแพทย์ พยาบาล และผู้บริหารโรงพยาบาล ที่จะให้การดูแลรักษาและทำการป้องกันอย่างเหมาะสมเพื่อลดอัตราการเสียชีวิตและการเกิดทุพพลภาพในผู้ป่วยสูงอายุที่นอนในโรงพยาบาล*