The Montreal Cognitive Assessment as a Screening Tool for Preoperative Cognitive Impairment in Geriatric Patients

Phongthara Vichitvejpaisal MD, PhD*,
Benjamas Preechakoon BNS, PhD**, Wannipa Supaprom BNS**, Sasitorn Sriputtaruk BNS**,
Saichol Rodpaewpaln BNS, MS***, Rattanaporn Saen-Ubol BNS***, Kitiya Vessuwan BNS***

** Department of Anesthesiology, Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok, Thailand*
*** Perioperative Nursing Division, Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok, Thailand*
**** Surgical and Orthopaedic Nursing Division, Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok, Thailand*

Objective: *Study the prevalence of cognitive impairment using the Montreal Cognitive Assessment (MoCA), its relationship to physiologic age-related change, and the preoperative drugs used in geriatric patients.*
Material and Method: *At the preoperative visit, the co-researchers invited 322 general/vascular patients (190 male, 132 female) and 260 urological patients (220 male, 40 female) who met the inclusion criteria and were scheduled for elective surgery to join the study. They went for the MoCA interview, and their preoperative drugs used were recorded in a medication reconciliation file. A cut-off score 24 or above was considered normal.*
Results: *Ninety-two general/vascular and 126 urological patients had taken drugs before admission, but those did not show any correlation with the MoCA score. There were 231 and 91 general/vascular patients and 175 and 85 urological patients with formal education of less than six years and equal/more than six years respectively. The 286 and 36 general/vascular patients and 212 and 48 urological patients posted scores of less than 24 and equal/more than 24 respectively. Gender and education correlated positively and significantly with the score; however, age proved negatively significant.*
Conclusion: *The prevalence of cognitive impairment featured highly in preoperative geriatric patients. The gender, age, and education but not preoperative drugs used affected cognitive function.*

Keywords: *Montreal cognitive assessment, Geriatrics, Cognitive impairment, Preoperative management*

J Med Assoc Thai 2015; 98 (8): 782-9
Full text. e-Journal: *http://www.jmatonline.com*

Advancement in medicine prolongs human life. Between 2000 and 2050, the world's population aged 60 years and over is expected to increase from 605 million to 2 billion[1]. However, most of them have several health problems such as diabetes mellitus and heart disease. In USA, 25-50% of geriatric patients admitted to a hospital are expected to undergo surgery under anesthesia once before they demise[1,2]. The physiologic age-related changes and drug-disease interactions in the elderly can cause adverse effects of pharmacokinetics and pharmacodynamics[3,4]. These result in morbidity and mortality in perioperative geriatric patients[5]. Many of them lose their ability to live independently because of limited physical conditions or mental health problems. Some develop impairment of cognitive function including attention, memory, producing and understanding language, learning, reasoning, problem-solving, and decision-making[6]. As a result, they require some forms of long-term care, which include home nursing and assisted living, and long hospital stay[7].

Many neuropsychological tests such as Mini-Mental Status Test (MMST) and Digit Symbol Substitution Test (DSST) have been commonly used to assess brain functions for early diagnosis and supportive treatment[8,9]. The MMST can detect early signs of cognitive impairment by asking patients about orientation, memory, intention, calculation, and language. The DSST can reveal the severity of brain damage by asking patients to match numbers with symbols in a time limit[10]. However, these tests need specialists and prove impractical in daily practice.

On the other hand, Montreal Cognitive Assessment (MoCA) is gaining popularity as bedside clinical evaluation for mild cognitive dysfunction. Ziad Nasreddine in Montreal, Canada invented the assessment in 1996[11]. The assessment examines different cognitive domains, attention and concentration, executive functions, memory, language, visuoconstructional skills, conceptual

Correspondence to:
Vichitvejpaisal P, Department of Anesthesiology, Faculty of Medicine Siriraj Hospital, Mahidol University, 2 Prannok Road, Bangkok Noi, Bangkok 10700, Thailand.
Phone: +66-2-4197990, Fax: +66-2-4113256
E-mail: phongthara@gmail.com

thinking, calculations, and orientation. The test takes 15 minutes to complete. It consists of eight aspects. 1) Background data including age, gender, and education. 2) Visuospatial/executive that includes alternative trail-making, a three-dimensional cube copy, and a clock-drawing task, for five points. 3) Naming, which includes three animals (lion, camel, and rhinoceros), for three points. 4) Attention, which includes forward digit span, backward digit span, vigilance, and serial 7s, for six points. 5) Language, which includes repetition of two syntactically complex sentences and verbal fluency, for three points. 6) Abstraction, which looks at similarity, for two points. 7) Memory and delayed recall, which includes face, velvet, church, daisy, and red, for five points. Finally, 8) orientation, which includes date, month, year, day, place, and city, for six points. The total possible score is 30 points and a score of 26 or above is considered normal.

The MoCA test validation study[11,12] has shown that it was a promising tool for detecting Mild Cognitive Impairment (MCI). The sensitivity and specificity of the MoCA (n = 94) subjects were 90% and 87% respectively, compared with 18% and 100% for the MMST.

Surgery/anesthesia is claimed to be one of the risk factors of postoperative cognitive dysfunction, while the prevalence of preoperative MCI is rarely reported[8,9,13,14]. The authors decide to use the MoCA test to examine this problem in the elderly potentially affected by physiologic age-related changes and drug-disease interactions.

Material and Method

Siriraj Institutional Review Board (Si-IRB) approved the study under project number COA: Si628/2011 (12/01/2011). Written informed consent was obtained from all subjects. The trial was registered at ClinicalTrials.gov, number NCT01496222 (12/20/2011).

The present study enrolled consecutive inpatients scheduled to undergo elective cases in two main divisions of the surgical department: general/vascular (GenVas) and urological (Uro) wards. Inclusion criteria were male or female, over 65 years of age, ASA I-III, understanding of the instructions and communication ability both oral and written. Exclusion criteria were illiteracy, dependence, insulin-dependent diabetes, renal insufficiency (creatinine above 2.0 mg⁄dL), renal dialysis, uncontrolled congestive heart failure (American Heart Association Classification III or IV congestive heart failure), unstable angina, untreated cardiac arrhythmia, ileus and⁄or acute obstruction or perforation, ileostomy, and active gastrointestinal bleeding.

At the preoperative visit, the co-researchers invited GenVas and Uro patients who met the inclusion criteria to join the study. All participants understood the process under the project in details before giving their informed consent. The co-researchers recorded patients' preoperative drugs in a medication reconciliation file. Afterwards, they conducted a MoCA interview with each respondent at their leisure. Performing data analysis were three co-researchers indirectly involved in patient interviews or patient contacts and located at a different site.

For the Thai version, a MoCA score of 24 shows high internal consistency (Cronbach's alpha 0.914) with sensitivity and specificity of 80%[15]. Furthermore, adding one point would compensate for any individual with less than six years of formal education. Thus a cut-off score 24 or above is considered normal[16].

Statistical analysis

As a university hospital, Siriraj's 30,000 surgical patients undergo anesthesia each year. Among these, 35% or 10,000 patients are over 65 years of age, 2,000 (60% male and 40% female) undergo GenVas surgery, and 800 (85% male and 15% female) Uro surgery. For statistical significance, the authors defined P as the proportion of cognitive impairment among patients = 0.5, and d as the standard error of measurement = 0.05 with a 95% confidence interval (CI).

95% CI = 50%±5%

$n = Z_{\alpha/2}^2 P(1 - P)/d^2$

when $1-\alpha$ = confidence level

$= 0.95$, $Z_{0.025}$

$= 1.96$

Then $n = 385$

To adjust n to the population (N)

$n' = n/(1 + n/N)$

for GenVas patients, $N = 2,000$

$n' = 385/(1+385/2,000)$

$= 322$ (190 male, 132 female)

for Uro patients, $N = 800$

$n' = 385/(1+385/800)$

$= 260$ (220 male, 40 female)

Continuous data were tested for normality. Normally distributed data presented by using mean and standard deviation were compared by using unpaired

two-tailed t-tests. Categorical data were summarized by using a number (%) and were compared by using a contingency coefficient. The test of independence of two samples was done by using Chi-square tests (Linear-by-Linear Association). An odds ratio (OR) with a 95% confidence interval (CI) was calculated to measure the strength of association. Statistical significance was defined as p less than 0.05.

Results

The 582 participants were made up of 322 (M190/F132) GenVas and 260 (M220/F40) Uro patients. Males accounted for 410 (70.5%) of the respondents, with 172 (29.5%) female. The ages of GenVas and Uro patients ranged from 65 to 90 and from 65 to 94, with an average of 72.3±5.6 (M71.6±5.6/F74.0±5.1) and 73.6±5.2 (M70.7±5.4/F75.2±4.6) respectively. Ninety-two (M62/F30) GenVas and 126 (M94/F32) Uro patients had taken some drugs before admission, summarized as follows: alpha-blocker 61 and 113, Angiotensin coverting enzyme 47 and 55, beta-blocker 59 and 54, Benzodiazepines 15 and 8, Ca-blocker 41 and 70, Corticosteriod 10 and 8, Diuretics 25 and 56, Tricyclic antidepressants 2 and 4, Vasodilators 7 and 10, and others (antidiabetics, vitamins, minerals, etc.) 225 and 193, respectively (Table 1). However, an odd ratio revealed that these patients did not show any correlation with the MoCA score, (Kendall's tau-c = 4.411 and Spearman correlation = 0.097), Chi-square tests (Linear-by-Linear Association) = 0.024 with $p = 0.044$) (Table 2).

There were 231 (M124/F107) and 91 (M66/F25) GenVas patients and 175 (M138/F37) and 85 (M83/F2) Uro patients with formal education of less than six years and equal or more than six years respectively. The MoCA score of the low-education and high-education patients varied from 6 to 27 and from 7 to 28, with an average of 18.7±4.7 and 26.3±1.5 as well as 19.9±4.5 and 26.1±1.3 respectively. The 286 (M162/F124) and 36 (M28/F8) GenVas patients and 212 (M176/F36) and 48 (M44/F4) Uro patients posted scores of less than 24 and equal or more than 24.

Education correlated positively and significantly with the MoCA score in all aspects except Delayed Recall domain (Kendall's tau-c = -0.176 and Spearman correlation = -0.248), Chi-square tests (Linear-by-Linear Association) = 42.041 with $p = 0.000$). However, the scores correlated positively and significantly with Attention, Visuospatial/Executive and Orientation domain (Table 3).

Gender correlated positively and significantly with the MoCA score. Males posted much higher scores than females (Table 4). However, age correlated negatively and significantly with the score. Older subjects commanded much more abnormal cognitive function than younger ones (Table 5).

Table 1. Patients' demographic data, education and use of preoperative drugs

	GenVas patients (n = 322)		Uro patients (n = 260)	
	Male (%)	Female (%)	Male (%)	Female (%)
Gender	190	132	220	40
Age (year), mean (SD)	71.6 (5.6)	74.0 (5.1)	70.7 (5.4)	75.2 (4.6)
Education				
Less than 6 years	124 (65.3)	107 (81.1)	138 (62.7)	37 (92.5)
Equal/more than 6 years	66 (34.7)	25 (18.9)	82 (37.3)	3 (7.5)
Preoperative drugs				
No drugs	84 (44.2)	72 (54.5)	93 (42.3)	21 (52.5)
Alpha-blockers	42 (22.1)	19 (14.4)	87 (39.5)	26 (65.0)
Angiotensin coverting enzyme	25 (13.2)	22 (16.7)	38 (17.2)	17 (42.5)
Beta-blockers	52 (27.4)	7 (5.3)	49 (22.3)	5 (12.5)
Benzodiazepines	3 (1.6)	12 (9.1)	1 (0.4)	7 (17.5)
Ca-blockers	41 (21.6)	0	66 (30.0)	4 (10.0)
Corticosteriod	0	10 (7.6)	0	8 (20.0)
Diuretics	13 (6.8)	12 (9.1)	32 (14.5)	24 (60.0)
Tricyclic antidepressants	0	2 (1.5)	1 (0.4)	3 (7.5)
Vasodilators	7 (3.6)	0	9 (4.1)	1 (2.5)
Others*	127 (66.8)	98 (74.2)	169 (76.8)	24 (60.0)

GenVas = general/vascular; Uro = urological

* Others e.g., vitamins, minerals

Table 2. Correlation between patients' use of preoperative drugs and MoCA score

Patients	Drugs	MoCA		Total	Correlation *p*-value	Ratio	Value	95% CI	
		Less than 24	Equal/more than 24					Lower	Upper
GenVas	Yes (%)	135 (42.3)	31 (9.6)	166 (51.9)	0.028 (0.503)	Odds	0.585	0.119	2.863
	No (%)	133 (41.0)	23 (7.1)	156 (48.1)		Risk	0.908	0.639	1.289
	Count (%)	268 (83.3)	54 (16.7)	322 (100)					
Uro	Yes (%)	122 (46.9)	24 (9.3)	146 (56.2)	0.023 (0.583)	Odds	0.824	0.412	1.648
	No (%)	97 (37.3)	17 (6.5)	114 (43.8)		Risk	0.971	0.867	1.087
	Count (%)	219 (84.2)	41 (15.8)	260 (100)					

MoCA = Montreal Cognitive Assessment

Table 3. Patients' education and MoCA score, mean (SD)

Education (year)	GenVas patients (n = 322)		Uro patients (n = 260)	
	Less than 6	Equal/more than 6	Less than 6	Equal/more than 6
MoCA score (male/female)				
Less than 24	111/104	51/20	119/35	57/1
Equal/more than 24	13/3	15/5	19/2	25/2
Alternating trail (0-1)	0.4 (0.5)	0.8 (0.4)	0.5 (0.5)	0.9 (0.4)
Visuoconstructional skills				
Rectangle drawing (0-1)	0.2 (0.4)	0.7 (0.5)	0.2 (0.4)	0.7 (0.5)
Cubic drawing (0-3)	1.5 (1.0)	2.3 (0.9)	1.6 (1.0)	2.3 (0.9)
Naming (0-3)	2.5 (0.8)	2.9 (0.4)	2.6 (0.8)	2.9 (0.3)
Attention				
Forward/backward (0-2)	1.6 (0.6)	1.8 (0.5)	1.6 (0.6)	1.8 (0.5)
Vigilance (0-1)	0.7 (0.5)	0.8 (0.4)	0.7 (0.4)	0.8 (0.4)
Serial 7s (0-3)	2.0 (0.9)	2.6 (0.8)	2.0 (0.5)	2.6 (0.7)
Language				
Sentence repetition (0-2)	0.4 (0.6)	1.0 (0.8)	0.5 (0.7)	0.9 (0.8)
Verbal fluency (0-1)	0.2 (0.4)	0.5 (0.5)	0.2 (0.4)	0.5 (0.5)
Abstraction (0-2)	1.0 (0.8)	1.6 (0.6)	1.2 (0.8)	1.7 (0.5)
Delayed recall (0-5)	0.9 (1.5)	0.9 (1.6)	1.6 (1.7)	1.4 (1.7)
Orientation (0-6)	5.2 (1.1)	5.8 (0.6)	5.3 (1.1)	5.8 (0.7)
Average score	18.7 (4.7)	26.3 (1.5)	19.9 (4.5)	26.1 (1.3)

Table 4. Correlation between gender and MoCA score

Count	Gender	MoCA		Total	Phi correlation	*p*-value
		Normal (0)	Abnormal (1)			
All patients	Male	72 (17.56)	338 (82.44)	410	0.137	0.001
	Female	12 (6.98)	160 (93.02)	172		
	Total	84 (14.43)	498 (85.57)	582		
GenVas	Male	28 (14.74)	162 (85.26)	190	0.135	0.015
	Female	8 (6.06)	124 (93.94)	132		
	Total	36 (11.18)	286 (88.82)	322		
Uro	Male	44 (20.00)	176 (80.00)	220	0.093	0.134
	Female	4 (10.00)	36 (90.00)	40		
	Total	48 (18.46)	212 (81.54)	260		

Table 5. Correlation between age and MoCA score

	Range	Mean	SD	CV	Pearson correlation	*p*-value
All patients (n = 582)						
Age (year)	65-94	73.48	5.36	7.30	-0.161	0.000
MoCA score	6-30	19.29	4.61	23.92		
GenVas (n = 322)						
Age (year)	65-90	73.35	5.41	7.38	-0.193	0.001
MoCA score	6-30	18.73	4.66	24.90		
Uro (n = 260)						
Age (year)	65-94	73.63	5.31	7.21	-0.130	0.036
MoCA score	7-29	19.99	4.46	22.32		

CV = coefficient of variation

Discussion

The present study indicated the presence of geriatric patients' cognitive impairment before surgical/anesthetic procedures. Gender, age, education, but not preoperative medications posed the risk. The reasons for this covered several aspects.

Firstly, since the functional capacity of an individual's biological differences (including genetic and physiological factors such as telomere attrition, hormonal and cellular responses to stress between the sexes) does exist, males have greater susceptibility to ageing related pathologies than females[17,18]. Thus, women on average live longer than men and lose their ability to live independently or contracting physical or mental health problems.

Telomere is a structure at the end of chromosomes that enhance their stability and protect their ends during DNA replication. Its length is maintained in cells of the germline. Changes in its size, usually a shortening of the sequences, are associated with disease and ageing[19]. Moreover, there is a link between high-anxiety-related behavior and oxidative stress[20]. The chronic psychological stress may dampen telomerase activities and accelerate ageing at the cellular level, and free radicals of oxidative stress can damage DNA including telomere shortening. Fortunately, scientists have recently discovered telomerase, an enzyme that makes and can replenish the telomeric sequences at the ends of DNA[21-23].

This finding agreed with Gems[24], who claimed that the gender gap in ageing is attributable to androgens. Androgen-generated secondary sexual characteristics in men increase reproductive success earlier in life, but shorten their lifespans[24].

Secondly, since education was apparently a significant factor for the MoCA test[25], it was difficult for 69.8% of the applicants with education of less than six years to earn higher scores. The current study showed that participants with education level of equal/more than six years scored higher in Attention, Visuospatial/Executive and Orientation domain.

In the early 1930s, most people, particularly Thai women, received rather poor education because females depended on their husbands for the provision of economic and social well-being[26,27]. In addition, schooling was not a Thai culture, especially among the low-income families who had to spend their hard-earned money to feed themselves before attending school. Moreover, since the National Health Security Initiative allocates an increasing surplus of money for public health services each year, government hospitals bear the responsibility for providing all social members with medical care. Thus, families of working-class background form the majority of their daily customers. These workers had neither money nor degrees. Therefore, a lower MoCA score was inevitable.

This finding agreed with Robertson et al[28] who tested the six-domain structure, orientation, memory, attention/working memory, visuospatial/executive function of the MoCA in 2,340 participants. They claimed that subjects with upper education scored higher in all domains.

Thirdly, as the elderly suffer from ill health such as cardiovascular instability, diabetes, mental illnesses, or sensory impairments, they must take many kinds of medicine in their daily life. Since drug-disease interactions have detrimental effects on cognitive function, preoperative medications might influence the MoCA score[29]. Anticholinergics, antispamodics, or psychoactive drugs can increase confusion and delirium in dementia patients. Antihypertensives, beta-blockers, or benzodiazepines can precipitate or exacerbate depression in the elderly. Richardson et al[30] demonstrated that patients who received midazolam

(40 microgram/kg) were cognitively impaired for up to 30 minutes postoperatively, whereas those who received placebos were not. In contrast, Fredman et al[31] reported that midazolam (0.5 or 2 mg given 30 minutes preinduction) had no effect on psychomotor tests in patients undergoing minor urological surgeries. It highlighted poor correlation of cognitive function tests and discharge. This finding apparently supports our current study. The present study's odds ratio revealed that patients using drugs before admission showed neither any correlation with the MoCA score nor cognitive functions in all aspects, which might be because the number of patients using drugs before admission was only 37.5% of all participants. In addition, medical reconciliation showed very small series of drugs used by each individual.

Finally, as in psychological assessment, participants needed concentration in response to small details of the tests. Patients scheduled for surgery/anesthesia naturally worried about their ailments and appeared unwilling to answer the questionnaires. Some might well lose their good intentions easily. Assessment became naturally or inevitably distorted by physical pain, sickness, or emotional background.

Conclusion

The MoCA test revealed that geriatric patients experienced cognitive impairment before surgical/anesthetic procedures. The elderly, particularly women with low education and with or without preoperative drugs used, lost their ability to live independently or developed disabilities of physical or mental health.

Suggestion

For further study, the MoCA test should be used as a screening tool to verify geriatrics' mental status before and after surgical/anesthetic procedures. In addition, anesthetic management including drugs and techniques, could become a major concern for this risk.

What is already known on this topic?

Most geriatric patients admitted to a hospital are expected to undergo surgery under anesthesia once before they demise. The physiologic age-related changes and drug-disease interactions result in morbidity and mortality in perioperative geriatric patients. Many of them lose their ability to live independently because of limited physical conditions or mental health problems.

Many neuropsychological tests such as MMST and DSST have been commonly used to assess brain functions and detect early signs of cognitive impairment. However, these tests need specialists and prove impractical in daily practice.

What this study adds?

Since surgery/anesthesia is claimed to be one of the risk factors of postoperative cognitive dysfunction, and MoCA is gaining popularity as bedside clinical evaluation for this impairment. The authors used MoCA to interview preoperative geriatric patients. It revealed that the cognitive impairment featured highly among them. The gender, age and education but not preoperative drugs they used posed this risk.

Potential conflicts of interest

None.

References

1. Muravchick S. Anesthesia for the geriatric patient. In: Barash PG, Cullen BF, Stoelting RK, editors. Clinical anesthesia. 4th ed. Philadelphia: Lippincott-Williams & Wilkins; 2001: 1205-16.
2. Morgan GE Jr, Mikhail MS, Murray MJ. Geriatric anesthesia. In: Morgan GE, Mikhail MS, Murray MJ, editors. Clinical anesthesiology. 3rd ed. New York: McGraw-Hil; 2002: 875-81
3. The National Academies Collection: Reports funded by National Institutes of Health. Pharmacokinetics and drug interactions in the elderly: Washington DC: National Academy Press; 1977.
4. Fick DM, Cooper JW, Wade WE, Waller JL, Maclean JR, Beers MH. Updating the Beers criteria for potentially inappropriate medication use in older adults: results of a US consensus panel of experts. Arch Intern Med 2003; 163: 2716-24.
5. Dunlop WE, Rosenblood L, Lawrason L, Birdsall L, Rusnak CH. Effects of age and severity of illness on outcome and length of stay in geriatric surgical patients. Am J Surg 1993; 165: 577-80.
6. Sternberg RJ, Sternberg K. Cognitive psychology. 6th ed. Belmont CA: Wadsworth, Cengage Learning; 2009.
7. World Health Organization. Ageing and life course [Internet]. 2014 [cited 2015 Jan 13]. Available from: http://www.who.int/ageing/about/facts/en/
8. Price CC, Garvan CW, Monk TG. Type and severity of cognitive decline in older adults after

noncardiac surgery. Anesthesiology 2008; 108: 8-17.
9. Monk TG, Weldon BC, Garvan CW, Dede DE, van der Aa MT, Heilman KM, et al. Predictors of cognitive dysfunction after major noncardiac surgery. Anesthesiology 2008; 108: 18-30.
10. Ancelin ML, de Roquefeuil G, Ledesert B, Bonnel F, Cheminal JC, Ritchie K. Exposure to anaesthetic agents, cognitive functioning and depressive symptomatology in the elderly. Br J Psychiatry 2001; 178: 360-6.
11. Nasreddine ZS, Phillips NA, Bedirian V, Charbonneau S, Whitehead V, Collin I, et al. The Montreal Cognitive Assessment, MoCA: a brief screening tool for mild cognitive impairment. J Am Geriatr Soc 2005; 53: 695-9.
12. Smith T, Gildeh N, Holmes C. The Montreal Cognitive Assessment: validity and utility in a memory clinic setting. Can J Psychiatry 2007; 52: 329-32.
13. Marcantonio ER, Goldman L, Mangione CM, Ludwig LE, Muraca B, Haslauer CM, et al. A clinical prediction rule for delirium after elective noncardiac surgery. JAMA 1994; 271: 134-9.
14. Moller JT, Cluitmans P, Rasmussen LS, Houx P, Rasmussen H, Canet J, et al. Long-term postoperative cognitive dysfunction in the elderly ISPOCD1 study. ISPOCD investigators. International Study of Post-Operative Cognitive Dysfunction. Lancet 1998; 351: 857-61.
15. Tangwongchai S, Charernboon T, Phannasathit M, Akkayagorn L, Hemrungrojn S, Phanthumchinda K. Nasreddine ZS. The validity of Thai version of Montreal Cognitive Assessment (MoCA-T). Dment Neuropsychol 2009; 3: 172. [abstract]
16. Hemrungrojn S, Charernboon T, Phannasathit M, Akkayagorn L, Tangwongchai S, Phanthumchinda K. Nasreddine ZS. The cognitive domains from Thai-Montreal cognitive assessment test to discriminate between amnestic MCI and mild AD from normal aging. Abstracts of the International Psychogeriatric Association 14th International Congress, 1-5 September 2009, Montreal, Canada. Int Psychogeriatr 2009; 21 (Suppl 2): S1-224. [abstract]
17. Seifarth JE, McGowan CL, Milne KJ. Sex and life expectancy. Gend Med 2012; 9: 390-401.
18. Eskes T, Haanen C. Why do women live longer than men? Eur J Obstet Gynecol Reprod Biol 2007; 133: 126-33.
19. Epel ES, Lin J, Dhabhar FS, Wolkowitz OM, Puterman E, Karan L, et al. Dynamics of telomerase activity in response to acute psychological stress. Brain Behav Immun 2010; 24: 531-9.
20. Bouayed J, Rammal H, Soulimani R. Oxidative stress and anxiety: relationship and cellular pathways. Oxid Med Cell Longev 2009; 2: 63-7.
21. Barrett EL, Richardson DS. Sex differences in telomeres and lifespan. Aging Cell 2011; 10: 913-21.
22. Aubert G, Lansdorp PM. Telomeres and aging. Physiol Rev 2008; 88: 557-79.
23. Wikgren M, Maripuu M, Karlsson T, Nordfjall K, Bergdahl J, Hultdin J, et al. Short telomeres in depression and the general population are associated with a hypocortisolemic state. Biol Psychiatry 2012; 71: 294-300.
24. Gems D. Evolution of sexually dimorphic longevity in humans. Aging (Albany NY) 2014; 6: 84-91.
25. Gómez F, Zunzunegui M, Lord C, Alvarado B, Garcia A. Applicability of the MoCA-S test in populations with little education in Colombia. Int J Geriatr Psychiatry 2013; 28: 813-20.
26. Phananiramai M. Changes in women's economic role in Thailand. 1995. In: Horton S, editor. Women and industrialization in Asia. London: Routledge; 1995.
27. Costa L. Exploring the history of women's education and activism in Thailand [Internet]. 1997 [cited 2015 Jan 13]. Available from: http://www2.hawaii.edu/~seassa/explorations/v1n2/art4/v1n2-frame4.html
28. Robertson DA, Coen R, King-Kallimanis BL, Kenny RA. Montreal cognitive assessment (MoCA): gender and education effects. Eur Geriatr Med 2013; 4 (Suppl 1): S199.
29. Copersino ML, Fals-Stewart W, Fitzmaurice G, Schretlen DJ, Sokoloff J, Weiss RD. Rapid cognitive screening of patients with substance use disorders. Exp Clin Psychopharmacol 2009; 17: 337-44.
30. Richardson MG, Wu CL, Hussain A. Midazolam premedication increases sedation but does not prolong discharge times after brief outpatient general anesthesia for laparoscopic tubal sterilization. Anesth Analg 1997; 85: 301-5.
31. Fredman B, Lahav M, Zohar E, Golod M, Paruta I, Jedeikin R. The effect of midazolam premedication on mental and psychomotor recovery in geriatric patients undergoing brief surgical procedures. Anesth Analg 1999; 89: 1161-6.

การใช้แบบประเมิน Montreal Cognitive Assessment ในการคัดกรองความผิดปกติทางสติปัญญาของผู้ป่วยสูงอายุก่อนการผ่าตัด

พงศ์ธารา วิจิตเวชไพศาล, เบญจมาศ ปรีชาคุณ, วรรณิภา สุภาพรหม, ศศิธร ศรีปุตตะรักษ์, สายชล รอดแผ้วพาล, รัตนภรณ์ แสนอุบล, กิติยา เวศสุวรรณ์

วัตถุประสงค์: คณะผู้นิพนธ์ได้นำแบบทดสอบ MoCA ศึกษาความชุกของความผิดปกติทางสติปัญญาในผู้ป่วยสูงอายุ และความสัมพันธ์กับการเปลี่ยนแปลงทางสรีรวิทยาที่สัมพันธ์กับอายุและยาที่ใช้ก่อนการผ่าตัด

วัสดุและวิธีการ: *ในการเยี่ยมผู้ป่วยก่อนการผ่าตัด ผู้วิจัยร่วมได้เชิญชวนผู้ป่วยหน่วยศัลยศาสตร์ทั่วไป/ศัลยศาสตร์หลอดเลือด จำนวน 322 ราย (ชาย 190 ราย หญิง 132 ราย) และศัลยศาสตร์ระบบทางเดินปัสสาวะจำนวน 260 ราย (ชาย 220 ราย หญิง 40 ราย) ผู้ผ่านเกณฑ์การคัดเลือกและเตรียมตัวเข้ารับการผ่าตัดแบบไม่เร่งด่วนเข้าร่วมโครงการศึกษา ผู้วิจัยร่วมซักถามประวัติการใช้ยาจากผู้ป่วยโดยตรงและจากบันทึกข้อมูลยาที่ผู้ป่วยใช้จากแบบสอบทานยา (medication reconciliation) จากนั้นผู้ป่วยจะตอบแบบประเมิน MoCA โดยมีจุดตัดคะแนนสำหรับการวินิจฉัยความผิดปกติทางสติปัญญาน้อยกว่า 24 คะแนน*

ผลการศึกษา: *ผลการศึกษาพบว่า ผู้ป่วยหน่วยศัลยศาสตร์ทั่วไป/ศัลยศาสตร์หลอดเลือดจำนวน 92 ราย และศัลยศาสตร์ระบบทางเดินปัสสาวะจำนวน 126 ราย มีประวัติการใช้ยาก่อนการผ่าตัดแต่ไม่พบความสัมพันธ์กับคะแนน MoCA ผู้ป่วยหน่วยศัลยศาสตร์ทั่วไป/ศัลยศาสตร์หลอดเลือดจำนวน 231 ราย และ 91 ราย และศัลยศาสตร์ระบบทางเดินปัสสาวะจำนวน 175 ราย และ 85 ราย มีระดับการศึกษาน้อยกว่า 6 ปี และเท่ากับหรือมากกว่า 6 ปี ตามลำดับ ผู้ป่วยหน่วยศัลยศาสตร์ทั่วไป/ศัลยศาสตร์หลอดเลือดจำนวน 286 ราย และ 36 ราย และศัลยศาสตร์ระบบทางเดินปัสสาวะจำนวน 212 ราย และ 48 ราย ผ่านการประเมิน MoCA ด้วยคะแนนน้อยกว่า 24 คะแนน และเท่ากับหรือมากกว่า 24 คะแนน ตามลำดับ เพศและระดับการศึกษามีความสัมพันธ์ในเชิงบวกอย่างมีนัยสำคัญกับคะแนน MoCA ในขณะที่อายุมี ความสัมพันธ์ในเชิงลบอย่างมีนัยสำคัญ*

สรุป: *ผู้ป่วยสูงอายุมีความชุกของความผิดปกติทางสติปัญญาก่อนการผ่าตัดค่อนข้างสูง โดยเพศ อายุ และระดับการศึกษา ยกเว้นยาที่ผู้ป่วยใช้ก่อนการผ่าตัด มีผลกระทบต่อความผิดปกตินี้*