COMPREHENSIVE GERIATRIC ASSESSMENT IN OLDER POST-STROKE PATIENTS: A CROSS-SECTIONAL STUDY

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This study aims to identify the components of comprehensive geriatric assessment (CGA) in older post-stroke patients. A cross-sectional study was conducted on 137 post-stroke patients aged ≥ 60 years old being treated at the National Geriatric Hospital. The components of CGA were assessed as medical status (nutrition; urinary incontinence, frailty, visual and hearing ability); functional status (Barthel index, instrumental activity daily living, risk of fall); neuropsychological status (cognition and depression). 66.4% of patients had an ischemic stroke, and 33.6% of patients had a hemorrhage stroke. In both ischemic and hemorrhagic post-stroke groups, domains such as functional impairment, malnutrition, vision loss, high risk of falls, cognitive impairment, and depression account for a high rate (≥ 50%). There was no statistically significant difference in rates of CGA domains between the two groups of patients with ischemic and hemorrhage stroke. This study showed a high prevalence of most components of CGA in older post-stroke patients both in ischemic stroke and hemorrhage stroke patients.

Keywords: Comprehensive Geriatric Assessment, Post-stroke, Older patient.

I. INTRODUCTION

Stroke is one of the leading causes of mortality and disability worldwide. In 2013, a Global Burden of Disease study reported that there were an estimated 25.7 million stroke survivors, 6.5 million deaths from stroke, 113 million disability-adjusted life years (DALYs) due to stroke, and 10.3 million new cases.[1] The incidence of stroke disease increases with age, in both males and females with approximately 50% of all strokes occurring in people over the age of 75 and 30% over the age of 85.[2] Stroke has become a health concern in Vietnam in recent years. Patient database from Stroke Center in Military Central Hospital 108, Vietnam suggested that the age distributions of patients 61 to 75 and over 75 years old were 45.5% and 23% respectively.[3]

With the rapidly rising number of older stroke patients, there is an emerging need for a tool that is effective in comprehensively assessing this group of patients. In treating and taking care of elder stroke patients, geriatric syndromes should be evaluated concurrently with the medical treatment. Comprehensive Geriatric Assessment (CGA) is a multidisciplinary diagnosis process used to identify the medical, psychological, and functional capacity of older adults to develop a coordinated and integrated plan for treatment and long-term follow-up.[4] CGA is now applied internationally and has a central position in systems of geriatric care rather than only at the point of entry into institutional long-term care.[5]

Worldwide, several studies have been looking at the level of effectiveness of CGA in older patients. However, published studies on CGA in Vietnam were limited, especially in older post-stroke patients. Thus, we conducted

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this research to identify the components of comprehensive geriatric assessment (CGA) in older post-stroke patients at the National Geriatric Hospital.

II. METHODS

The study was performed on 137 older patients diagnosed with a stroke at the National Geriatric Hospital from February to November 2019.

1. Study subject

Inclusion criteria: (1) patients aged 60 years and older diagnosed with stroke according to clinal symptoms and diagnostic imaging; (2) post-stroke duration was greater than or equal to 2 weeks.[6]

Exclusion criteria: (1) the patient was diagnosed with Transient ischemic attack (TIA) or suffered from brain trauma before this time; (2) the patient had a severe condition like respiratory failure, using a ventilator...; (3) patients with an inability to communicate; (4) subjects could not complete the cognitive test.

2. Methods

The study was a cross-sectional study. The sample size was calculated using a single population proportion formula:

$$n = Z^2_{(1-\alpha/2)} \cdot \frac{p(1-p)}{d^2}$$

With n = the required sample size, $Z_{1-\alpha/2}$ = 1.96 (with α = 0.05 and 95% confidence interval) and d = precision (assumed as 0.08). With p = 0.277 (according to the proportion of depression in post-stroke patients according to the previous study by Santos, et al).[7] From the formula, the estimated sample size is n = 120 elderly post-stroke patients. A convenience sampling method was used. The number of elderly post-stroke patients in our study was 137. Data were collected by using a unified research record.

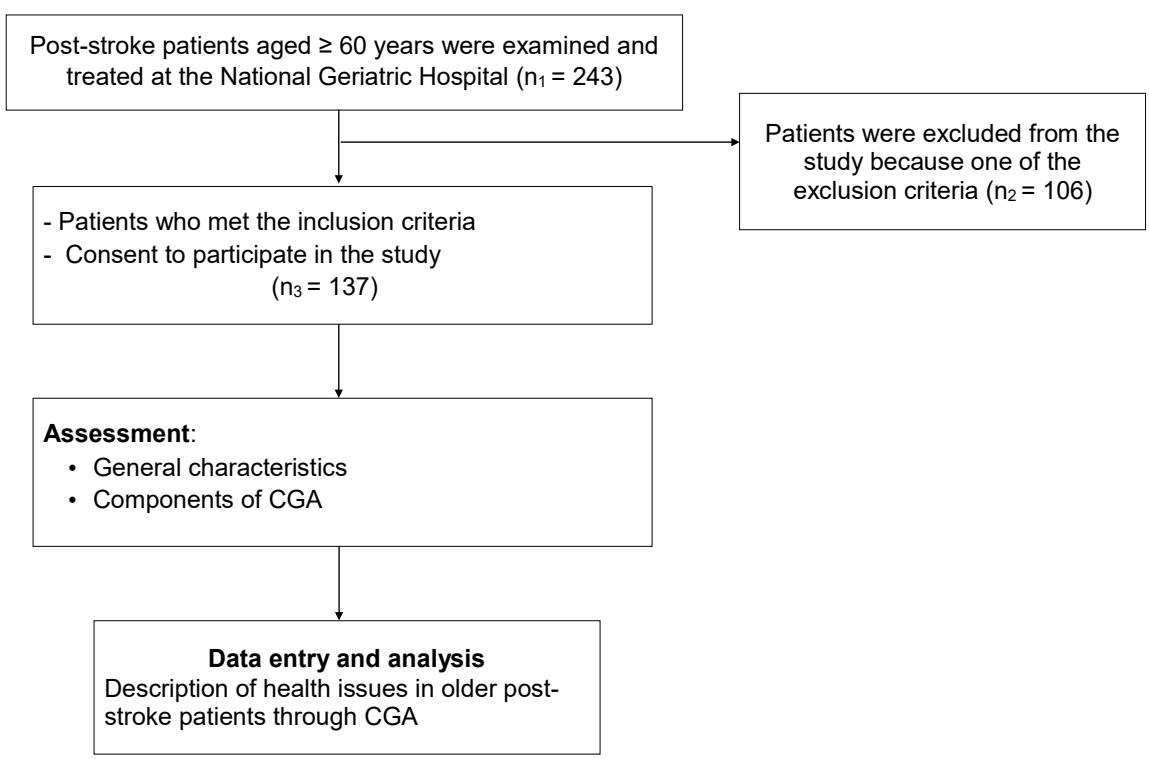

Figure 1. Research process

Variables:

- General information: age, gender.

- Stroke characteristics: stroke at the first time or recurrent stroke (medical records); post-stroke duration (weeks); stroke type (ischemic or hemorrhage stroke).

- CGA's components:

+ *Medical assessments:* nutrition status was assessed using the Mini Nutritional Assessment short-form (MNA-SF) with 8-11 points indicating the person is at risk of malnutrition; 0-7 points indicating the person is malnourished. Frailty syndrome was assessed using the Reported Edmonton Frail Scale (REFS). The 3 Incontinence Questions (3IQ) were used to determine patients' presence of urinary incontinence. The Snellen chart was used to assess visual acuity and the Whisper voice test is a simple and accurate test for detecting hearing impairment.

+ *Functional status:* Instrumental Activities of Daily Living scale (IADLs) was used to evaluate the functional status of the participants. The maximum of a normal healthy person is 8 points, less than 8 points classifies the person as dependent. The *Barthel Index* for Activities of Daily Living (ADL) assessed functional independence. The Berg Balance Scale (BBS) is the most commonly used tool for evaluating the balance of older patients. A score of lower than 20 indicates individuals are at greater risk of falling. A score from 21 to 40 indicates moderate fall risk and higher than 40 indicates low fall risk.

+ *Neuro-Psychological assessments:* Cognitive impairment was assessed by using the Mini-Mental State Examination (MMSE). Evaluation results: MMSE is a 30-point questionnaire with a cut-off point is 24 points: normal cognition (24 - 30 points); mild cognitive impairment (20 - 23 points); moderate cognitive impairment (14 - 19 points); severe cognitive impairment (≤13 points). Geriatric Depression Scale 15 items (GDS-15) was used to assess depression. A total score of 0 - 5 is considered normal; 6-9 indicates mild depression; 10 - 15 indicates moderate to severe depression.

Data processing and data analysis

The process of data coding, entry, and analysis was done by using SPSS software (version 22.0). Descriptive statistics were adopted to examine characteristic data: frequency, percentage, and mean. Comparisons between groups were assessed using Chi-square tests for categorical variables. Statistical significance was accepted with a p-value < 0.05.

3. Research ethics

The study subjects were explained clearly the purpose of the study, and they were willing to participate in the study. Collected data was used for research. The results of the study were proposed for improving the health of the community, not for other purposes.

III. RESULTS

1. General characteristics

Table 1. General characteristics of post-stroke patients (n = 137)

Characteristics		Frequency (n)	Percentage (%)
Age group	60 - 69	80	58.4
	≥ 70	57	41.6
Gender	Male	92	67.2
	Female	45	32.8

Characteristics		Frequency (n)	Percentage (%)
Number of strokes	≥ 2	38	28.7
	1	99	72.3
Post-stroke duration	2 - 4 weeks	116	84.7
	> 4 weeks	21	15.3
Type of stroke	Ischemic	91	66.4
	Hemorrhage	46	33.6

The mean age of the participants was 69.7 ± 8.0 years, with the youngest being 60 years old and the oldest being 94 years old. The participants were mainly 60 - 69 years of which males were predominant. The male: female ratio was 2.05. The patients with first-ever strokes were predominant (72.3%). Ischemic stroke accounted for the majority 66.4%.

2. Components of CGA in older post-stroke patients

Medical assessments

Table 2. Medical assessments in older post-stroke patients

Medical assessment	Ischemic stroke (n = 91)		Hemorrhage stroke (n = 46)		p-value
	n	%	n	%	
Malnutrition (yes)	68	74.7	36	78.3	0.650
Urinary incontinence (yes)	27	29.7	14	30.4	0.864
Frailty syndrome (yes)	27	29.7	13	28.3	0.926
Hearing loss (yes)	23	25.3	6	13.0	0.098
Vision loss (yes)	67	73.6	34	73.9	0.970

Prevalence of malnutrition and visual acuity declined in older post-stroke patients were high. Prevalences of hearing impairment were lowest. There was no statistically significant difference between the two groups of patients with ischemic and hemorrhage stroke (p > 0.05).

Functional assessment

Table 3. Functional assessments in older post-stroke patients

Functional assessment		Ischemic stroke (n = 91)		Hemorrhage stroke (n = 46)		p-value
		n	%	n	%	
Barthel index	Independence or slight dependency	10	11.0	3	6.5	0.58
	Moderate dependency	26	28.6	11	23.9	
	Severe or total dependency	55	60.4	32	69.6	

Functional assessment		Ischemic stroke (n = 91)		Hemorrhage stroke (n = 46)		p-value
		n	%	n	%	
IADL	Impaired	83	91.2	43	93.5	0.75
	Normal	8	8.8	3	6.5	
Risk of fall	High	59	64.8	31	67.4	0.61
	Moderate	17	18.7	10	21.7	
	Low	15	16.5	5	10.9	

The rates of severe or total dependency, IADL impairment, and high risk of falls in the study subjects were high. There was no statistically significant difference in functional activity (Barthel index and IADL scale) and risk of falls between the group of patients with ischemic and hemorrhage stroke.

Neuropsychological assessments

Table 4. Neuropsychological assessments in older post-stroke patients

Neuropsychological assessment		Ischemic stroke (n = 91)		Hemorrhage stroke (n = 46)		p-value
		n	%	n	%	
Cognitive impairment	No	25	27.4	14	30.4	0.70
	Mild to moderate	34	37.4	18	39.1	
	Severe	32	35.2	14	30.5	
Depression	No	42	46.7	23	50	0.56
	Mild	22	24.6	14	30.4	
	Moderate to severe	26	28.7	9	19.6	

The proportion of participants with cognitive impairment and depression are both above 50%. There was no statistically significant difference in rates of cognitive impairment and depression between the two groups of patients with ischemic and hemorrhage stroke.

IV. DISCUSSION

The study was conducted at National Geriatric Hospital in post-stroke patients 60 years old and over. The result of statistic analyzing indicated a high prevalence of CGA components in both ischemic and hemorrhage stroke patients such as functional decline (Barthel index and IADL impairment), vision loss, malnutrition, cognitive impairment, depression, frailty syndrome, and high risk of falls.

Disability after stroke and stroke rehabilitation outcomes are usually assessed by formal observation and scoring of the Barthel index and instrumental activities of daily living. The total or severe dependence rates in patients with cerebral infarction and cerebral hemorrhage were 60.4% and 69.6%, respectively. The IADLs scale is widely used for this study in older post-stroke patients in a

comprehensive way. In this study, older post–stroke patients have the lowest IADLs score of 0 points and highest scores of 8 points. The proportion of respondents classified as having a disability in one or more instrumental activities of daily living IADLs was 91.2% in ischemic patients and 93.5% in hemorrhage patients. It is the same line as the mean age in the study of Taketa dos Santos-Lima: the mean score was 3.5 ± 1.3.[8] However, this mean score was lower in comparison with reported scores from Umaru Muhammad Badaru's research and colleagues: 8.77 ± 6.52.[9] BBS was used to assess balance and fall risk of participants. 64.8% of ischemic patients and 67.4% of hemorrhage patients were classified as high risk of falling. This result was higher than Maeda's and colleagues' study in Japan, of the 53 stroke patients 19 (35.8%) were fallers and 34 (64.2%) were non-fallers. The reason might be our study had a much large population than his study and our mean age was wider (69.7 ± 8.02 years) compared with 67 ± 11.1 (years).[10]

The MMSE is a wide test of cognition among older patients. The lower score indicates more severe impairment. In our study, the mean score of MMSE was 18.6 ± 8.1. This result was lower than Godefroy's study in 2011 and Bour's study at the Neurology Department of the University Hospital Maastricht: MMSE' mean score was 22.5 ± 6.5.[11] The difference may be related to assessment methods, definitions, and sample characteristics. There 35.2% of ischemic patients and 30.5% of hemorrhage patients were classified as having severe cognitive impairment, 22.0%, 19.5% were moderate and 15.4 and 19.6% were mild cognitive impairment, respectively. There was no statistically significant difference between the two groups of patients with ischemic and hemorrhage strokes. It also resembled the results of to study of Nys in the Netherlands: 70% of patients were impaired in at least 1 cognitive domain as assessed with the MMSE examination.[12]

The depression status of the patients was assessed by the GDS-15 scale. In this study, there were 28.7% of ischemic patients and 19.6% of hemorrhage patients were classified as moderate to severe depression; 24.6% of ischemic patients and 30.4% of hemorrhage patients were mild depression. The proportion of depression observed in this study was higher than that in Santos' research: the proportion in older stroke patients was 27.7%.[7]

The REFS was given to the patients to evaluate frailty syndrome. In particular, 29.7% of ischemic patients and 28.3% of hemorrhage patients were identified with frailty syndrome. This result is lower than the findings observed in Winovich's research: 73.2% of participants were classified as frailty.[13] Due to the reason we had the same study subject: older post – stroke patients. It is fully consistent with the prevalence of frailty syndrome in post-stroke patients. Frailty is common in older adults and is associated with poor outcomes following an illness. In the elderly after stroke, motor paralysis, functional limitations, caregiver dependence, and inadequate nutrition may increase the incidence of frailty.

V. CONCLUSION

This study showed the high prevalence of CGA's components (such as functional impairment, malnutrition, vision loss, high risk of falls, cognitive impairment, and depression) in older post-stroke patients both in the ischemic and hemorrhagic groups. There was no statistically significant difference between the two groups of ischemic and hemorrhage stroke patients.

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