Bệnh viện Trung ương Huế

A STUDY THE VARIATION OF CONCENTRATION OF HS-CRP AND BARTHEL INDEX SCORE IN PATIENTS WITH CEREBRAL INFARCTION

Nguyen Ta Dong[1], Dang Thi Mien[1], Tran Thua Nguyen[1]

ABSTRACT

Background: *Cerebral infarction is a fairly common disease, with mortality rate ranked third after cancer and cardiovascular disease.*

Objectives:

1. To survey the variation of concentration of hs-CRP in patients with cerebral infarction in acute and subacute phases.

2. To assess the severity and prognosis of recovery in patients with cerebral infarction in acute and subacute phase by Barthel's scale.

Subjects and methods: *59 patients were diagnosed with cerebral infarction, aged 18 and above, were inpatients at Hue Central Hospital from 2013 to 2014. Method used is cross – descriptive .*

Results: *Concentrations of Hs-CRP in patients with cerebral infarction: The mean hs - CRP level in patients in the acute phase was 10.75 ± 8.38, the concerntration in subacute phase was 8.47 ± 6.09. According to Barthel's scale in patients with cerebral infarction, the mean of Barthel's score in the acute phase was 57.54 ± 22.32, that of subacute phase was 62.37 ± 22.98.*

Conclusions: *Mean concentrations of serum hs- CRP in patients with acute stroke is higher than that of subacute phase. Barthel's score in patients with acute stroke was lower than subacute phase.*

Key words: *Barthel index, cerebral infarction.*

I. BACKGROUND

Stroke (Cerebral infarction) is a fairly common disease, with mortality rate ranked third after cancer and cardiovascular disease. According to the World Health Organization, every year there are more than 5 million people who die due to stroke. Today, the modern equipment are used to diagnose, and assess the severity of Cerebral infarction. Using stroke scale of the National Institutes of Health USA, Glasgow, Barthel and biological markers such as C-reactive protein (CRP) to evaluate the recovery of patients is popular. So, we conduct a study on the topic "Studying the variation of the concentration of hs-CRP and Barthel's scale in patients with cerebral infarction," with the following objectives:

1. To survey the changes of concentrations of hs-CRP in patients with cerebral infarction in acute and subacute phase.

2. To assess the severity and prognosis of recovery in patients with cerebral infarction in acute and subacute phase by Barthel's scale.

II. SUBJECTS AND METHODS

2.1. Subjects: 59 patients were diagnosed with cerebral infarction, aged 18 and above, were inpatients at Hue Central Hospital from 2013 to 2014.

1. Hue Central Hospital

Corresponding author: Nguyen Ta Dong
Email: bsdonghue@gmail.com
Received: 24/10/2015;
Revised: 25/12/2015 by Dao Thi Dua
Accepted: 28/12/2015

* Criteria of patient selection: Based on clinical criteria of the World Health Organization: There are focal neurological symptoms, that occur suddenly, without brain injury, cranial CT- scaner shows low density infarct 20-30 [6].

2.2. Methods: The method is cross-sectional.

How onset: sudden onset after a bout of hypertension, after strenuous activity or may be stroke even while the patient is sleeping.

+ The functional symptoms of the disease: headaches, vomiting, confusion and convulsions consciousness. Onset: sudden onset, usually after a bout of hypertension, after stressnuous activity or cerebral infarction may happen even while the patient is sleeping.

+ The functional symptoms of the disease: headaches, vomiting, confusion and convulsions consciousness.

+ Neurologic examination marks entity: assess patients through Barthel's scale.

* Transcript of Barthel's scale is divided into three levels: Independence: 90-100 points; Help: 50 - 85 points; Depends: 0- 45 points. Rating Stage 1: 48 - 72 hours after onset. Stage 2: The 14 - 21st days of the disease.

* Quantitative serum Hs-CRP: The immunizational method is used to measure turbidity (Turbidimetric). Normal hs- CRP concentration of Vietnamese ranger from 0 to 5 mg / L. Quantification Stage 1: 48 - 72 hours after onset. Stage 2: The 14 - 21st days of the disease.

* Data processing: Using SPSS 19.0 statistical software

Barthel index score

Activity	Score
FEEDING	
0 = unable	
5 = needs help cutting, spreading butter, etc., or requires modified diet	
10 = independent	_____
BATHING	
0 = dependent	
5 = independent (or in shower)	_____
GROOMING	
0 = needs to help with personal care	
5 = independent face/hair/teeth/shaving (implements provided)	_____
DRESSING	
0 = dependent	
5 = needs help but can do about half unaided	
10 = independent (including buttons, zips, laces, etc.)	_____
BOWELS	
0 = incontinent (or needs to be given enemas)	
5 = occasional accident	
10 = continent	_____
BLADDER	
0 = incontinent, or catheterized and unable to manage alone	
5 = occasional accident	
10 = continent	_____

TOILET USE

0 = dependent

5 = needs some help, but can do something alone

10 = independent (on and off, dressing, wiping) _____

TRANSFERS (BED TO CHAIR AND BACK)

0 = unable, no sitting balance

5 = major help (one or two people, physical), can sit

10 = minor help (verbal or physical)

15 = independent _____

MOBILITY (ON LEVEL SURFACES)

0 = immobile or < 50 yards

5 = wheelchair independent, including corners, > 50 yards

10 = walks with help of one person (verbal or physical) > 50 yards

15 = independent (but may use any aid; for example, stick) > 50 yards _____

STAIRS

0 = unable

5 = needs help (verbal, physical, carrying aid)

10 = independent _____

TOTAL (0–100): _____

III. RESULTS

3.1. General characteristic of subjects:

Table 3.1. Distribution of ischemic stroke by age and sex

Sex / Age (years)	Men		Women		All	
	n	%	n	%	n	%
< 60	12	30.00	3	15.79	15	25.42
≥ 60	28	70.00	16	84.21	44	74.58
All	40	100	19	100	59	100
$\bar{X} \pm SD$	65.40 ± 11.18		72.47 ± 12.00		67.68 ± 11.82	

The male/female incidence ratio was 2.1. 74.58% patients were ≥ 60 years.

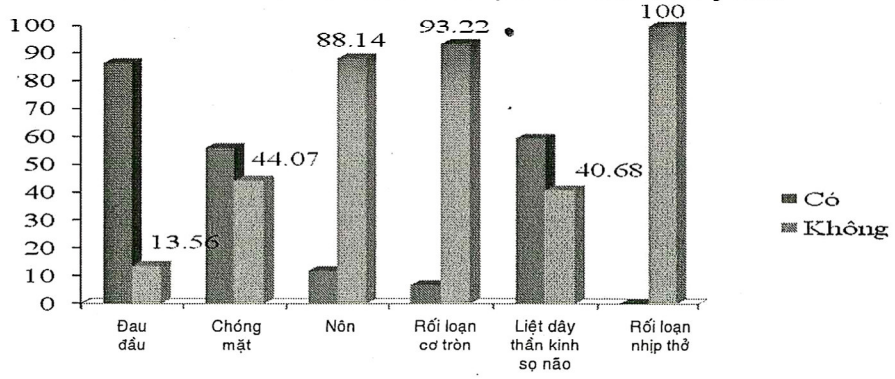

Figure 3.1. Clinical Symtoms

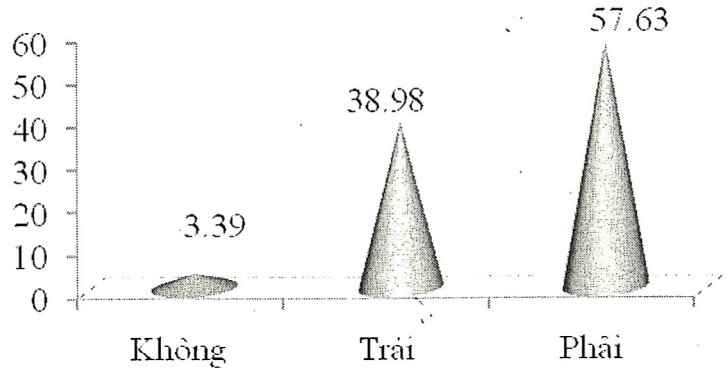

Figure 3.2. The rate of hemiparesis

The common symptoms in patients were headache (86.44%), cranial nerve paralysis (59.32%), dizziness (55.93%). There was over 95% of patients had hemiparesis.

3.2. The change of hs - CRP concentration and Barthel's score in acute stroke and subacute stroke.

3.2.1. Barthel's score in acute stroke and subacute stroke

Table 3.2: Barthel's score in acute stroke and subacute stroke

Period / Barthel	Acute		Subacute	
	n	%	n	%
Independent (90 - 100)	11	18.64	29	49.21
With Help (50 - 85)	30	50.85	23	39.01
dependent (0 - 45)	18	30.51	7	11.89
p	<0.05			
$\bar{X} \pm SD$	57.54 ± 22.31		77.12 ± 20.41	
p	< 0.001			

In Acute stroke, The highest rate was 50.85% (with help) and the rate of "independent" score was highest in subacute stroke (49.21%). The mean Barthel's score were 57.54 ± 22.31 and 77.12 ± 20.41.

3.2.2. The change of HsCRP concentration in acute stroke and subacute stroke.

Table 3.3 The change of HsCRP concentration in acute stroke and subacute stroke

Phase / hs-CRP	Acute		Subacute	
	n	%	n	%
Non high (≤ 3mg/l)	20	33.90	35	59.32
high (> 3 mg/l)	39	66.10	24	40.68
p	< 0.01			
$\bar{X} \pm SD$	10.78 ± 8.30		7.01 ± 5.02	
p	< 0.001			

In our study, the concentration of hs-CRP average of the acute phase was 10.78mg / l and subacute was 7.01mg / l. The difference between hs-CRP levels in two phase was significance.

3.2.1 The correlation between hs - CRP levels and Barthel's scale in acute stroke and subacute stroke

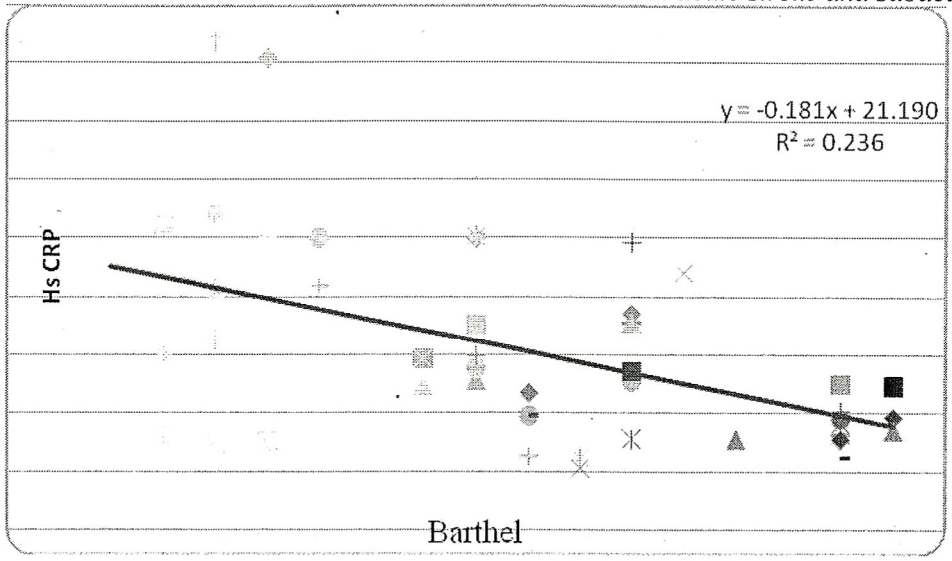

Figure 3.3. The correlation between hsCRP levels and Barthel's scale in acute stroke

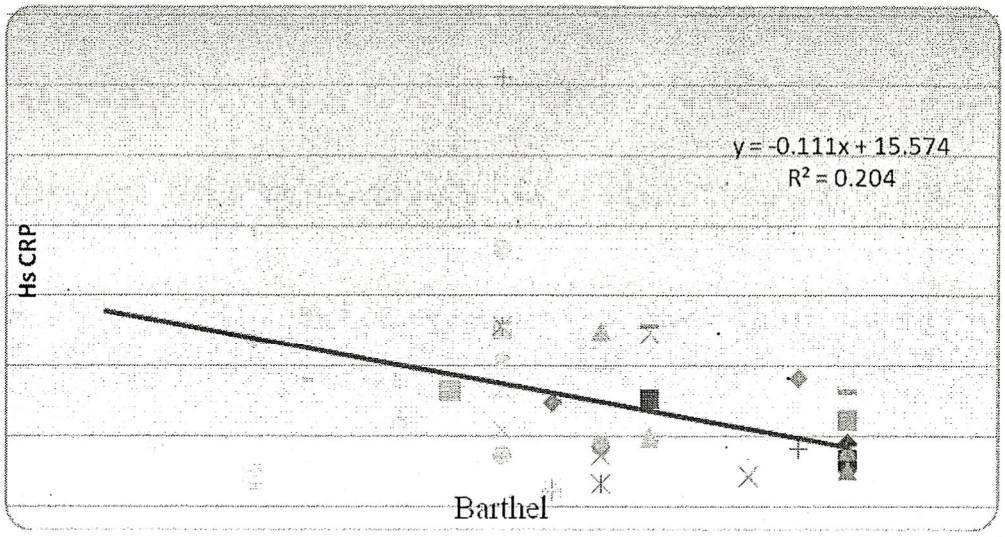

Figure 3.4. The correlation between hs - CRP levels and Barthel's scale in subacute stroke.

IV. DISCUSION

4.1. The concentration variation of hs-CRP in patients with cerebral infarction in acute and subacute phase.

According to Nguyen Dinh Toan, at 48 hours after onset, percentage of patients with ≥ 60 Barthel's score were 25.00% [2]. In the study of Nguyen Tan Dung with 202 patients, the rate of patients at "independent" level was 8.4%, the rate of "require assistance" was 22.3% and the rate of "depending" was 69.3% [1]. The results of some authors were higher than our result. However, according to the author when the patient was discharged, the rate changed significantly: 29.7% independent, need help was 56.4% and 13.9% depending [6]. Research of To Hoang Linh and Nguyen Van De on 36 patients stroke, the average score of Barthel acute phase and subacute was 57.35% and 74.17% respectively. According to Wood-Dauphinee, Granger et al., the Barthel score ranged from 0 points (completely dependent) to 100 points (independent daily activities, Barthel's scale prognosis of survival, rehabilitation, and plans discharge [14].

In the research by Ha Thi Kim Chi at the same time, the average mean of hs-CRP respectively was 11.44mg / l and 7.19mg / l and this difference was significant (p = 0.000) [3]. In the studies of Napolis [20] at the same time, the average mean of hs-CRP was 10 mg / l and 6 mg / l and this difference was significant (p = 0.0002). In the study of Winbeck, hs-CRP in the survey at the time of hospitalization, for 24 hours and repeat the next 24 hours with average mean were respectively 8.6mg/l, 12.2mg/l and 17.5mg/l, the difference of these means were significant (p = 0.003). So we can to conclusion: The average mean of the hs-CRP at each point in each study had a change and this change was significant.

In the acute phase of stroke that have an ischemic, it is the onset of an ischemic that has inflammatory process and contributes to more severe brain damage. CRP reflects increased activity of the inflammatory process related to pathophysiological of stroke and reflects the extent of infarction [2]. The process of inflammation is regulated by the concentration of cytokines in place, the bonding element, the acute phase protein, macrophage and leukocyte, the intensity of the responses related to clinical resilience early and late [13]. However, numerous studies have also recorded many patients (≈25%) with normal CRP levels after stroke (20% in studies of Napoli) and proves that stroke was not entirely due to inflammation [3], [14].

4.2. Assess the severity and prognosis of recovery in patients with cerebral infarction in acute and subacute phase by Barthel's scale.

The results of our study showed that there was a moderate inversely correlation between hs-CRP levels and Barthel's scores in the acute phase (p <0.01, r = - 0.486), in subacute phase hs-CRP levels and Barthel's scores had inverse correlation also, quite closely (p <0.01, r = -0.452).

Yoshiyuki and colleagues found that CRP was related to neurological defects and disabilities, CRP also increased after ĐQ related to mortality risk. The authors concluded that CRP would help identify high-risk groups that should be monitored closely and appropriate anticoagulant treatment should be used anti-inflammatory [15].

According to Craig J Smith et al, The CRP levels in the first week was correlated with disease severity and clinical rehabilitation according to Barthel's scale at 3 months (p <0.001, r = -0.58) and after 12 months (p <0.001, r = -0.63) [18].

Therefore, the acute phase and subacute of stroke had an inverse correlation between hs-CRP levels and Barthel's scores. This can be explained that hs-CRP higher concentrations demonstrate that strong inflammatory reaction occurs may be due to brain lesions large area; this has been demonstrated in a study by Smith et al [18]. Some studies have concluded that hs-CRP levels rise and low Barthel's score in patients with subacute cerebral infarction levels are very meaningful predictions for rehabilitation and subsequent cardiovascular events and risk of death mortality after stroke. Hs-CRP concentrations have increased after acute stroke and may last a few months reflecting the ongoing inflammatory process is and seems to be at highest risk of cardiovascular events after stroke.

V. CONCLUSION

1. Hs-CRP concentrations in patients with stroke: The mean of hs-CRP levels in patients with acute phase was 10.75 ± 8.38 , subacute phase was 8.47 ± 6, 09.

2. Barthel's scale in patients with stroke: The mean of Barthel's score in the acute phase was 57.54 ± 22.32, the subacute was 62.37 ± 22.98.

REFERENCES

1. Nguyễn Tấn Dũng (2012), "Nghiên cứu chất lượng cuộc sống và hiệu quả phục hồi chức năng nâng cao chất lượng cuộc sống của người bệnh sau tai biến mạch máu não tại Đà Nẵng". Luận văn tiến sĩ y học, Đại học Y Hà Nội.
2. Nguyễn Đình Toàn (2012), "Nghiên cứu nồng độ PAI-1, TNF-Alpha huyết tương ở bệnh nhân nhồi máu não giai đoạn cấp", Luận án tiến sĩ y

học, Đại học Y Dược Huế.

3. Arlt S[1], Lindner R, Rösler A, von Renteln-Kruse W. "Adherence to medication in patients with dementia: predictors and strategies for improvement." Ther Adv Neurol Disord. 2012 Nov; 5(6): 349–358.
4. Teasdale G, Jennett B (2013): "Assessment of coma and impaired consciousness: a practical scale". Lancet 1974;2:81-3.
5. Teasdale G, Murray G, Parker L, Jennett B (1979): "Adding up the Glasgow Coma Scale". Acta Neurochir 1979; Suppl 28:13-6.
6. Brott T, Adams HP, Olinger CP, Marler JR, Barsan WG, Biller J, Spilker J, Holleran R, Eberle R, Hertzberg V, Rorick M, Moomaw CJ, Walker M (1989): "Measurements of acute cerebral infarction: a clinical examination scale". Stroke 1989; 20:864-70.
7. Cote R, Hachinski VC, Shurvell BL, Norris JW, Wolfson C(1986): "The Canadian Neurological Scale: a preliminary study in acute stroke". Stroke 1986; 17:731-7.
8. Rankin J (2007): "Cerebral vascular accidents in patients over the age of 60". Scott Med J 2007;2:200-15.
9. Bonita R, Beaglehole R (1988): "Modification of Rankin Scale: Recovery of motor function after stroke". Stroke 1988 Dec;19(12): 1497-1500.
10. Van Swieten JC, Koudstaal PJ, Visser MC, Schouten HJ, van Gijn J (1988): "Interobserver agreement for the assessment of handicap in stroke patients". Stroke 1988; 19(5): 604-7.
11. Mahoney FI, Barthel DW(1995): "Functional evaluation: the Barthel Index". Maryland State Med J 1995;14:61-5.
12. Wade DT, Collin C (2008): "The Barthel ADL Index: a standard measure of physical disability?". Int Disabil Stud 2008; 10(2):64-7.
13. PECS. Harvey RF, Jellinek HM (2011): "Functional performance assessment: a program approach". Arch Phys Med Rehabil 2011;62:456-6.
14. S.L. Wood-Dauphinee, PhD, PT, J. Ivan Williams, PhD, and S.H. Shapiro, PhD (1990): "Examining Outcome Measures in a Clinical Study of Stroke". Stroke 1990:21:731-73.
15. Elizabeth L. Inness, Avril Mansfield, Louis Biasin, Karen Brunton, Mark Bayley, William E. McIlroy (2015): "Clinical implementation of a reactive balance control assessment in a sub-acute stroke patient population using a 'lean-and-release' methodology". February 2015; Volume 41, Issue 2, Pages 529–534.
16. Dromerick AW, Edwards DF, Diringer MN (2003): "Sensitivity to changes in disability after stroke: A comparison of four scales useful in clinical trials". Journal of Rehabilitation Research and Development 40 (1): 1 – 8.
17. Eales CJ, Noakes TD, Stewart AV, Becker P (2004): "Self-responsibility predicts the successful outcome of coronary artery bypass surgery". The South African Journal of Physiotherapy 60 (2): 11 – 19.
18. Craig J. Smith, Hedley CA Emsley, Carole M Gavin, (2004). "Peak plasma interleukin-6 and other peripheral markers inflammation in the first week ò ischaemic stroke correlate with brain infact volume, stroke severity and long-term outcome". BMC Neurology 1004(4): 2
19. Kerstin Winbeck (2002) "Prosgnotic Relevance of early Serial C-Reactive Protein Measurements after first ischemic stroke". Stroke 33: 2459-2464.
20. Mario Di Napoli, Francessa Papa and Vittorio Bocola (2001), "C-reactive Protein in ischemic stroke: an independent Prognostic Factor", Stroke 32, pp 917-924.
21. Mario Di Napoli, Francessa Papa and Vittorio Bocola (2001), "Prosgnotic influence of increased C-reactive Protein and fibrinogen levels in ischemic stroke: an independent Prognostic Factor", Stroke 32, pp 133-138.