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Original Research

SERUM HS - CRP AND HS - TROPONIN T CONCENTRATION IN PATIENTS WITH CHRONIC CORONARY ARTERY DISEASE BEFORE AND AFTER PERCUTANEOUS CORONARY INTERVENTION

Nguyen Dang Duy Quang[1], Ho Anh Binh[1] ✉, Nguyen Ngoc Son[1], Hoang Van Quy[1], Đong Van Kien[1]

[1]Department of Emergency and Interventional Cardiology, Hue Central Hospital

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Corresponding author:
Ho Anh Binh
Email:
drhoanhbinh@gmail.com
Phone: 0973606763

ABSTRACT

Introduction: *Coronary artery disease is a popular disease pattern nowadays. Biomarkers help in diagnosis and prognosis during short - term and long - term in PCI patients. This study aims to explore the changing of serum hs-CRP, hs-Troponin T concentration before and after PCI*

Method: *97 chronic CAD patients are percutaneous coronary intervened at Department of Emergency and Cardiovascular Intervention - Hue Central Hospital. Descriptive and Cross - sectional study*

Results: *Mean hs-CRP increases from 4.21 ± 6.49 mg/L to 4.61 ± 5.88 mg/L (p=0.6) after PCI. Mean hs-Troponin T increases from 0.072 ± 0.147 ng/mL to 0.077 ± 0.121 ng/mL (p=0.6) after PCI*

Conclusion: *There is positive correlation between hs-CRP and hs-Troponin T before (p=0.022 < 0.05; r = 0.232) and after (p=0.04 < 0.05; r = 0.205) PCI 24 hours.*

Keywords: *hs-CRP, hs-Troponin T, chronic coronary artery disease.*

I. BACKGROUND

The world's pattern of diseases over decades has been changing gradually from infectious diseases to non-infectious diseases, in which coronary artery disease is one of the most common diseases and the leading cause of death in developed countries. Besides being treated with optimal medications therapy or surgery, coronary artery disease is also treated with percutaneous coronary intervention, a popular method with many advantages nowadays [1,2]

Serum hs-Troponin T concentration is important in diagnosing and predicting coronary artery disease with high sensitivity [3,4]. Furthermore, serum hs-CRP concentration has a direct relation to atheroma. It is an independent predictor of major cardiovascular events in the short - term and long-term that have been done by many studies [5,6].

The importance of combining these two biomarkers in clinical settings of coronary artery disease, especially in patients undergoing percutaneous coronary intervention, needs to be clearly investigated. This is the reason why we run this research. The present study aims to explore the changing of serum hs-CRP and hs-Troponin T before and after percutaneous intervention in chronic coronary artery disease

II. METHODS

A cross - sectional descriptive study with longitudinal and retrospective follow - up in patients admitted to the Department of Emergency and Cardiovascular Intervention, Hue Central Hospital.

Inclusion criteria were patients diagnosed with chronic coronary artery disease who underwent percutaneous coronary intervention

Exclusion criteria were: (1) Complications occurred during or immediately after intervention such as death, requiring emergency coronary artery bypass surgery. (2) Some disease conditions: Muscular trauma, myocarditis, all - cause shock, renal failure, systemic disease, pacemaker

implantation, trauma or cerebrovascular accidents less than 3 months. (3) Samples of serum hs-CRP concentration > 50mg/L are also considered exclusion criteria because of infectious suspicion that is not detected clinically. (4) Patients do not cooperate with this study

III. RESULTS

Table 1: Distribution of patient by gender

Gender	Number	Percentage %
Male	61	62.90
Female	36	37.10
Total	97	100

The ratio of male per female is approximately 2/1

Table 2: Distribution of risk factors of coronary artery disease

Risk factor	Number	Percentage %
Obese	30	30.90
Diabetes	16	16.50
Hypertension	65	67.00
Dyslipidemia	64	66.00
Smoking	16	16.50

Hypertension and dyslipidemia are predominant and reach 65% and 64%, respectively

Table 3: Distribution of characteristics of coronary artery lesions

Characteristic		Number	Percentage %
Number of lesion branches	1	44	45.40
	2	34	35.1
	3	19	19.60
Lesion location	LAD	77	79.40
	LCx	56	57.70
	RCA	50	51.50
	LM	1	1.00
Lesion type	A	22	22.70
	B	57	58.80
	C	18	18.60
Lesion length	< 10 mm	16	16.50
	10 - 20 mm	59	60.80
	> 20mm	22	22.70
Lesion diameter	≤ 1mm	90	92.80
	> 1 mm	7	7.20
TIMI	0	2	2.10
	1	10	10.30
	2	21	21.60
	3	64	66.00

Coronary artery disease with 1 lesion branch is 45.4%. 79.4% of lesion locates at LAD. Type B lesion is high 58.8%. The lesion length 10 - 20 mm and the lesion diameter lesion ≤ 1mm are high ratio 60.08% and 92.8%, respectively. There are 66% lesion of TIMI 3

Table 4: Distribution of serum hs-CRP and hs-Troponin T concentration before and after percutaneous coronary intervention

Index	Value	Before PCI	After PCI 24 hours	P
Hs-CRP (mg/L)	Min	0.07	0.00	0.6
	Max	38.1	41.00	
	Average	4.21±6.49	4.61±5.88	
Hs-TnT (ng/mL)	Min	0.003	0.003	0.6
	Max	0.92	0.82	
	Average	0.072±0.147	0.077±0.121	

The average serum hs-CRP concentration increases from 4.21 ± 6.49 to 4.61 ± 5.88 (p=0.6) after PCI 24 hours. The average serum hs-Troponin T concentration increases from 0.072 ± 0.147 to 0.077 ± 0.121 (p=0.6) after PCI 24 hours.

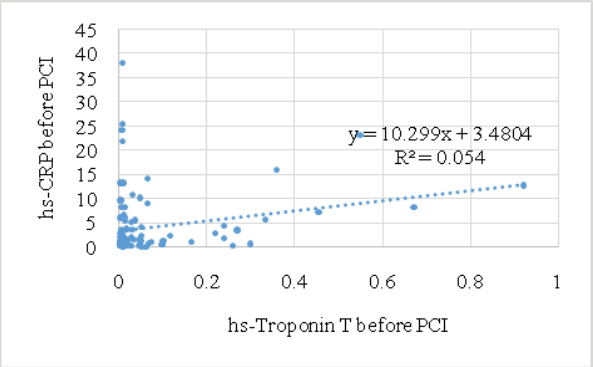

Figure 1: Correlation between serum hs-CRP and hs-Troponin T concentration before PCI

There is slight positive correlation between serum hs-CRP and hs-Troponin T concentration before PCI (p=0.022 < 0.05; r = 0.232)

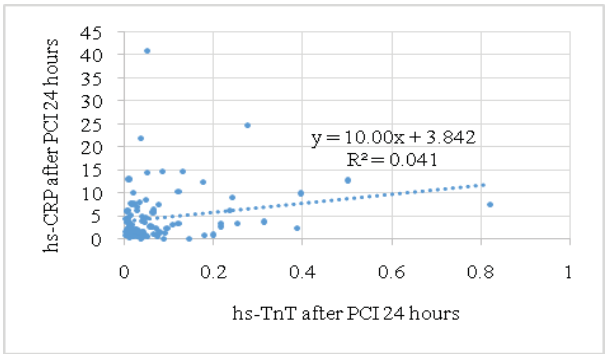

Figure 2: Correlation between serum hs-CRP and hs-Troponin T concentration after PCI 24 hours

There is slight positive correlation between serum hs-CRP and hs-Troponin T concentration 24-hour after PCI (p=0.04 < 0.05; r = 0.205).

V. DISCUSSION

According to our study, the average serum hs-CRP concentration of patients before PCI was 4.21 ± 6.49 mg/L, which is higher than in normal people. Studies worldwide show that the risk of ischemic heart disease increases significantly in people with serum hs-CRP concentration > 3 mg/L compared to people with serum hs-CRP concentration < 1 mg/L. An explanation for the relationship between elevated serum hs-CRP concentration and coronary artery disease may include the possibility that hs-CRP is a biomarker of different factors that play an important role in promoting cardiovascular disease, or ischemic cardiac disease increases serum CRP concentration. The alteration of average serum hs-CRP concentration after PCI increases to 4.61 ± 5.88 mg/L (p=0.6). Similar to Le Phuc Nguyen et al, there was also an elevation of serum hs-CRP concentration after PCI 72 hours to 19.47 ± 17.89 mg/L [7].

The average serum hs-Troponin T concentration of patients after PCI tends to increase from 0,072 ± 0,147 ng/mL to 0,077 ± 0,121 ng/mL (p=0.6). Many studies worldwide show that hs-Troponin T level has prognostic value in coronary artery disease in general and myocardial infarction in particular. However, the association between serum hs-Troponin T concentration and PCI is still controversial today. Zanchin T. et al (2016) studied the association between serum hs-Troponin T concentration before PCI with clinical outcomes in stable coronary artery disease and recognized that there were ¼ cases whose serum hs-Troponin T concentration before PCI elevated, the increase of hs-Troponin T concentration is proportional to the risk of death and considered as an independent prognostic value for mortality of all causes during 1 year [8].

There was positive correlation at slight level between serum hs-CRP and hs-Troponin T concentration before PCI (p=0.022 < 0.05; r = 0.232) and after PCI 24 hours (p=0.04 < 0.05; r = 0.205). Le Anh Tuan et al concluded in their study that there was a moderate positive correlation between serum Troponin I and hs-CRP concentration before PCI (r=0.46 and p<0.001) [9]. James et al (2003) studied the combination of serum CRP and Troponin T concentration in prognosis of 30-day mortality in acute coronary syndrome and found that: CRP and Troponin T are 2 independent factors of 30-day mortality. The 30 - day mortality rate was highest (9.1%) in patients with elevation of both CRP and Troponin T at the highest quartile compared to the group of patients whose CRP and Troponin concentration at the lowest quartile (0.3%). Patients with Troponin T concentration in the lowest quartile (Troponin T ≤ 0.01 µg/L) but with elevated CRP concentration (>1.84 mg/L versus ≤1.84 mg/L) had relation to increased 30 - day mortality (1.5% vs 0.3%; OR 5.1; CI 1.2 - 2.7). In patients with Troponin T concentration in the highest quartile (>0.47 µg/L), there was an increase in CRP concentration (>1.84 mg/L vs ≤1.84 mg/L) had relation to increased 30 - day mortality (7.9% vs 3.6%; OR 2.3; CI 1.15 - 2.60). Similarly, patients with CRP at the lowest quartile (≤1.84 mg/L) and highest quartile (>9.62 mg/L), the increase in Troponin T concentration (>0.01 µg/L vs ≤0.01 µg/L) were associated with

30-day increase in mortality 3.0% and 0.3%, respectively (OR 10.3; CI 2.5 - 43.2) and 7.5% with 1.4% (OR 5.7; CI 2.3-14.2) [10].

Research by Fournier J.A et al (2008) in 68 patients underwent bare stent implantation. They studied serum Troponin T and hs-CRP concentration before and after intervention at intervals of 8 hours, 24 hours and 30 days. The median follow-up was 16.6 months with major cardiac events including death, non-fatal myocardial infarction, and revascularization. The results showed the elevation of hs-CRP concentration is significant after PCI at 24 hours ($p=0.05$) and 30 days ($p<0.02$). The area under ROC curve after 30 days has 80% sensitivity and 72% specificity for the prediction of major cardiac events. The 12-month survival rate without any major cardiac events is higher in the group with hs-CRP $\leq$ 2,5 mg/L than those with hs-CRP > 2,5 mg/L ($p=0.04$). The authors concluded that measuring serum hs-CRP concentration 30 days after stenting could help predict late cardiovascular events [11].

IV. CONCLUSION

There is slight positive correlation between serum hs-CRP and hs-Troponin T concentration before PCI ($p=0.022 < 0.05$; $r = 0.232$) and 24-hour after PCI ($p=0.04 < 0.05$; $r = 0.205$).

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