

Abnormal value and repeated request for troponin T analysis: An overview from King Chulalongkorn Memorial Hospital laboratory

Penprapa Jaiwang*

Prapawadee Ekawong* Viroj Wiwanitkit*

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Background : *Troponin T is an important biomarker for acute coronary syndrome. This test is indicated in emergency. Here, the authors summarize the abnormal value and repeated requests for troponin T analysis at our laboratory.*

Method : *Medical records of emergency request for troponin T for suspected cases of acute coronary syndrome at the Division of Laboratory Medicine, King Chulalongkorn Memorial Hospital, Bangkok Thailand from August 2004 to March 2005 were reviewed from Laboratory Information System (LIS) , without personal data of the patient.*

Results : *There were 1,076 medical records reviewed in this study. From the total medical records, there were 191 abnormal cases (17.8 %); 97 cases were repeated requests (9.0 %) and 5 opposite value (5.15%).*

Discussion : *Only a few cases requested for Troponin T analysis were the actual disease. We should carefully determine before request the troponin T level, because it would increase the diagnostic cost. Repeated analysis for suspicious cases is recommended.*

Keywords : *Abnormal, Repeat, Troponin T.*

Reprint request: Jaiwang P. Department of Laboratory Medicine, Faculty of Medicine,
Chulalongkorn University, Bangkok 10330, Thailand.

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อัตราการส่งตรวจซ้ำของโทรโปนิน ที่ ภาพรวมจากห้องปฏิบัติการ โรงพยาบาลจุฬาลงกรณ์.
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- ความเดิม** : โทรโปนิน ที่ เป็นการตรวจทางห้องปฏิบัติการที่มีประโยชน์สำหรับการวินิจฉัย
โรคหลอดเลือดหัวใจแบบเฉียบพลัน จัดเป็นการตรวจวินิจฉัยทางอายุรกรรม
ห้องปฏิบัติการฉุกเฉินที่ใช้กันอย่างกว้างขวางในปัจจุบัน ผู้นิพนธ์ได้ทำการศึกษา
อัตราการคำผิดปกติจากการตรวจและอัตราการส่งตรวจซ้ำของโทรโปนิน ที่
จากห้องปฏิบัติการโรงพยาบาลจุฬาลงกรณ์
- วิธีการ** : ได้ทำการทบทวนผลการตรวจโทรโปนิน ที่ ในผู้ที่สงสัยเป็นโรคหลอดเลือดหัวใจ
แบบเฉียบพลัน จากระบบคอมพิวเตอร์เครือข่ายบริการ ฝ่ายเวชศาสตร์ชั้นสูงตร
โรงพยาบาลจุฬาลงกรณ์ ระหว่าง สิงหาคม 2547 ถึง มีนาคม 2548 โดยมีได้เก็บ
ข้อมูลส่วนตัวของผู้ป่วย
- ผลการศึกษา** : ได้ทำการทบทวนรายงานการตรวจจำนวน 1,076 ราย พบผลผิดปกติ 191 ราย
(17.8 %) และมีการส่งตรวจซ้ำ 97 ราย (9.0 %) และพบว่าได้ผลตรงข้ามใน
วันเดียวกันและหลังจากวันนั้น 5 ราย (5.15 %)
- อภิปราย** : มีผู้ป่วยส่วนน้อยเท่านั้นที่เมื่อได้รับการตรวจระดับโทรโปนิน ที่ แล้ววินิจฉัยผิด
ปกติจริง นอกจากนี้การตรวจยืนยันในกรณีที่ไม่แน่ใจยังเป็นสิ่งที่ควรกระทำ
- คำสำคัญ** : ผิดปกติ, ซ้ำ, โทรโปนิน ที่

Acute coronary syndromes (ACS) represent a pathological, diagnostic and risk continuum from unstable angina (UA) through myocardial infarction (MI) with or without ST segment elevation.⁽¹⁾ Troponins comprise a group of three proteins (C, I and T) that interact with tropomyosin to form a troponin-tropomyosin complex.⁽¹⁾ Troponin-T is a structural component of troponin complex and it is known to exist in three isoforms.⁽¹⁾ In addition, troponin assays may detect specific posttranslational modifications of troponins that may increase the analytic sensitivity for myocardial damage and offer insight into the timing and mechanism of myocardial injury.⁽²⁾

At King Chulalongkorn Memorial Hospital, the largest Red Cross Hospital of Thailand, Troponin T is the latest available test for general physicians. This test is indicated as emergency.⁽³⁻⁴⁾ Here, the authors summarize the number of abnormal values and repeated requests for troponin T analysis at our laboratory.

Materials and Method

Medical records of the emergency request for troponin T for suspected cases of acute coronary syndrome at the Division of Laboratory Medicine, King Chulalongkorn Memorial Hospital, Bangkok Thailand from August 2004 to March 2005 were reviewed from Laboratory Information System (LIS), without personal data of patient. The laboratory setting is the largest laboratory of the Thai Red Cross Society with accredited for ISO 15189 standards. Records that had no complete data were excluded. Descriptive statistic was carried out on the data where it was appropriate.

Results

1,076 medical records were reviewed in this study. From total medical records, 191 were abnormal cases (17.8 %). Of the 885 normal cases, 72 cases (8.1 %) met the critical value that the laboratory notified back to the users; 97 cases (9.0 %) were repeated requests.

Table 1. Number of requested tests for troponin T at King Chulalongkorn Memorial Hospital laboratory.

Period	Troponin T value		
	Normal		Abnormal (> 0.1)
	0 – 0.049	0.050 – 0.1	
August 04	101	10	20
September 04	100	3	29
October 04	135	6	18
November 04	70	13	18
December 04	98	16	27
January 05	100	7	31
February 05	100	11	26
March 05	109	6	22

* Troponin equal to 0.05 is the critical value for notification back.

Table 2. Number of repeated requested tests for troponin T at King Chulalongkorn Memorial Hospital laboratory.

Period	Number of repeat requested test for troponin T (number of all requested test)			
	Normal result		Abnormal result	
	Within that day	After that day	Within that day	After that day
August 04	3 (111)	3 (111)	0 (20)	0 (20)
September 04	4 (103)	5 (103)	4 (29)	0 (29)
October 04	13 (141)	6 (141)	1 (18)	0 (18)
November 04	4 (83)	1 (83)	0 (18)	0 (18)
December 04	2 (114)	5 (114)	2 (27)	0 (27)
January 05	9 (107)	1 (107)	3 (31)	0 (31)
February 05	2 (111)	6 (111)	1 (26)	1 (26)
March 05	9 (115)	10 (115)	1 (22)	1 (22)

Table 3. Opposite value of troponin T.

Test	Troponin T value of first request	Troponin T value of repeated request
Same day	0.051	0.266
Same day	0.010	0.502
The day after	0.010	0.173
The day after	0.019	0.221
The day after	0.010	0.513

Majority of the repeated requests were usually performed within the same day (58/97 = 59.8 %); most of them resulted in normal limits (83/97 = 85.6 %). There were 5 opposite value from 97 repeated cases (5.15 %).

Discussion

Patients presenting to the emergency department with chest pain are common and perplexing problems.⁽³⁾ Because of limitations of the initial evaluation, most patients are admitted, although

many are found to have noncardiac causes of their symptoms.⁽³⁾ Recognition of these limitations has driven the investigation of newer evaluation techniques and protocols in an attempt to improve diagnostic sensitivity without increasing overall costs.⁽³⁾ These have included modifications of the standard electrocardiogram and use of newer myocardial markers of necrosis, such as mass assays for CK-MB as well as troponin T and troponin I.⁽³⁾ Here, the authors assessed the abnormal values and repeated requests for troponin T analysis at our laboratory.

According to this study, the rate of abnormal result (positivity) is only about 20 %. This implies that there is a high rate of tests that provided negative results. According to the study of Domanovits *et al.*, patients who presented with acute chest pain, manifesting as acute coronary syndrome had coronary origin less than non-coronary origin.⁽⁵⁾ Indeed, after history taking and physical examination, clinical judgment (step I), governed the need for further evaluation of the patient: baseline 12-lead electrocardiogram (ECG) and laboratory examinations (step II), serial 12-lead ECG and laboratory examinations after 4 h (step III), and 4 h troponin T measurement (step IV) to exclude or to confirm a coronary origin of the chest pain.⁽⁵⁾

The rate of requested test was about 10 % as detected by the study. The finding implies that some physicians rechecked their diagnosis, to ensure their first request by a second request. Indeed, Huggon *et al.* found that the negative predictive accuracy of biochemical markers was too low for a single sample to be useful to exclude myocardial infarction in the first six hours after the onset of the symptoms.⁽⁶⁾

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