

## The Correlation between High Sensitive Troponin Level and SYNTAX Score in Type II Diabetic Patients with Chronic Stable Angina

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### Abstract

The point of this work was to assess the job of high-affectability troponin T (hsTnT) as an indicator of seriousness of constant stable angina (CSA) in type II diabetic patients. The examination was completed on 70 diabetic patients with likelihood of coronary vein infection and another 30 patients with ordinary coronary angiography will be incorporated as a benchmark group got ready for coronary angiography and (hsTnT) was estimated in all patients. There was solid factually huge positive connection in the middle of troponin level and (number of ailing vessels rs 0.639, number of sores rs 0.650 and SYNTAX score rs 0.970).The cutoff estimation of hs-cTnT acquired by the ROC bend investigation was 8.6 ng/L for the expectation of higher SYNTAX score. Concerning connection among troponin and various boundaries in cases gathering, there was a measurably noteworthy connection in the middle of troponin and (hypertension, smoking and SYNTAX score), anyway there was factually non huge connection in the middle of troponin and (sex, age and hostile to diabetic medications). In spite of low coursing convergences of hs-cTnT Serum level, it was freely connected with coronary vein malady seriousness. There is a measurably huge connection in the middle of hs-cTnT and (hypertension, smoking and SYNTAX score).

**Keywords:** High sensitive troponin, SYNTAX, Diabetes; chronic stable angina.

### 1. Introduction

Coronary course malady was the absolute most regular reason for death in American people. Computer aided design is evaluated to influence 16.8 million individuals in the United States; of these, 9.8 million have angina pectoris, and about 8 million have had a myocardial dead tissue (MI). Around the world, cardiovascular malady is getting pandemic as creating nations experience the epidemiologic progress. Coronary supply route illness (counting intense MI) is answerable for about portion of cardiovascular passings. Mortality from cardiovascular malady is anticipated to arrive at 23.4 million of every 2030 [1,2].

Incessant stable angina, the underlying sign of CAD in around half everything being equal, is normally brought about by the deterrent of in any event 1 huge epicardial coronary supply route by atheromatous plaque. Angina is because of the crisscross between myocardial oxygen request and flexibly, bringing about myocardial ischemia. Angina pectoris is described by substernal distress, greatness, or a weight like inclination, which may transmit to the jaw, shoulder, back, or arm and which normally keeps going a few minutes. These manifestations are generally welcomed on by effort, passionate pressure, cold, or an overwhelming dinner and are eased by rest or nitroglycerin in no time [3].

The predominance of realized hazard factors for CAD in everyone is enhanced in diabetes. Diabetics have more diffuse, multi vessel and distal CAD, littler reference vessels, less fortunate coronary security dissemination, and more incessant left fundamental illness [4,5].

High-affectability (hs) cTnT examine was brought into routine clinical practice. This test, as others, called exceptionally touchy, licenses estimation of cTn fixations in huge quantities of obviously sickness free people. These tests can gauge cTn in the single digit

scope of nanograms per liter (which is equal to pictograms per milliliter) and some exploration examines even permit identification of fixations <1 ng/L. Along these lines, they give a more exact computation of the 99th percentile of cTn fixation in reference subjects (the suggested upper reference limit [URL]). These tests measure the URL with a coefficient of variety (CV)<10%. The high accuracy of hs-cTn measures expands their capacity to decide little contrasts in cTn after some time [6,7].

The SYNTAX score is determined by a PC program comprising of successive and intuitive independently directed inquiries. The calculation comprises of twelve fundamental inquiries. They can be isolated in two gatherings:

The initial three decide the strength, the all out number of injuries and the vessel portions included per sore and they show up once. The greatest number of injuries permitted is twelve and every sore is described by a number, 1 to 12. The sores will be scored in the numerical request embedded being referred to 3. Every injury can include at least one portions. For this situation every vessel portion included adds to the sore scoring. There is no restriction in the quantity of fragments included per injury.

The last nine inquiries allude to antagonistic sore qualities and are reshaped for every sore. The inquiry alluding to an all out impediment is the first. On the off chance that an absolute impediment is scored, answers must be given to nitty gritty sub-questions.

The remainder of these sub-questions alludes to the nearness or nonappearance of side branches and their size. On the off chance that there are no side branches or in the event that their distance across is <1.5 mm, at that point the inquiries identified with the trifurcation and bifurcation injuries will be consequently skipped since vessels <1.5 mm are not viewed as enormous enough for treatment either with PCI or CABG. On the

off chance that side branches with distance across 1.5 mm are included, at that point the injury is considered as both absolute impediment and bifurcation sore and the calculation will proceed with all the inquiries. The equivalent is the situation for non-occlusive sores. Except for the determination of the sort in the event of a bifurcation or a trifurcation sore the various inquiries of the calculation can be replied by choosing "yes" or "no" [8,9].

## 2. Aim of the work

The aim of this work was to evaluate the role of high- sensitivity troponin T (hsTnT) as a predictor of severity of chronic stable angina (CSA) in type II diabetic patients.

## Study design and population

The study was carried out on 70 consecutive diabetic patients with probability of coronary artery disease and another 30 patients with normal coronary angiography will be included as a control group planned for coronary angiography in Shark Elmadina Hospital Catheter Laboratory.

Exclusion criteria for the study group as follows:

- Acute coronary syndrome (MI, NSTEMI, UA).
- Previous history of coronary revascularization.
- Atrial fibrillation.
- Uncontrolled hypertension (BL P> 180/100).
- Left ventricular dysfunction (EF< 50%).
- Hyperthyroidism.
- Chronic kidney disease.
- Recent surgery.
- Degenerative musculoskeletal disease.
- D. V. T.
- Pulmonary embolism.
- Malignancy or chemotherapy.
- After taking consent from the patient, relatives or parents all of the following steps was done.

## The patients group A and B will be subjected to

- Complete history taking (name, age, sex, occupation, personal history of medical diseases, history of previous operations, history of DVT or PE, family history of coronary artery disease)
- Other risk factors for CAD (Smoking, hypertension, dyslipidemia).
- Full clinical examination local and general
- Laboratory investigations (CBC, PT, INR, liver function tests, renal function tests, electrolytes, FBS, PPBS, HBA<sub>1C</sub>, Lipid profile).

- 12 leads resting electrocardiogram was done for all of these patients.
- High-sensitivity serum troponin level was measured for all of these patients.
- Echocardiography to evaluate the ejection fraction by modified simpson.
- Coronary angiographic study for assessment of severity of coronary artery disease by:
  - Number of involved vessels.
  - Number of lesions.
  - SYNTAX score.

## 2.1 Statistical analysis

### Statistical analysis of the data [10,11]

Data were fed to the computer and analyzed using IBM SPSS software package version 20.0. (Armonk, NY: IBM Corp) Qualitative data were described using number and percent. The Kolmogorov-Smirnov test was used to verify the normality of distribution Quantitative data were described using range (minimum and maximum), mean, standard deviation, median and interquartile range (IQR). Significance of the obtained results was judged at the 5% level.

### The used tests were

#### 1 - Mann Whitney test

For abnormally distributed quantitative variables, to compare between two studied groups

#### 2 - Pearson coefficient

To correlate between two normally distributed quantitative variables

#### 3 - Spearman coefficient

To correlate between two distributed abnormally quantitative variables

#### 4 – Kruskal Wallis test

For abnormally distributed quantitative variables, to compare between more than two studied groups, and Post Hoc (Dunn's multiple comparisons test) for pairwise comparisons

#### 5 - F-test (ANOVA)

For normally distributed quantitative variables, to compare between more than two groups, and Post Hoc test (Tukey) (LSD) for pairwise comparisons.

## 3. Results

The studied cases were 48 males (68.6%) and 22 females (31.4%) and in the control group there were 15 males (50%) and 15 females (50%). Their age ranged between (38-87) with a mean of  $54.40 \pm 13.24$  in cases and a mean of  $53.83 \pm 8.74$  in control group. No statistical significance according to demographic data between the two groups.

**Table (1)** Comparison between the two studied groups according to demographic data.

	Cases (n=70)		Control (n=30)		Test of sig.	p
	No.	%	No.	%		
Sex						
Male	48	68.6	15	50.0	$\chi^2=$	0.113

<b>Female</b>	22	31.4	15	50.0	3.107	
<b>Table (1) Continue</b>						
<b>Age (years)</b>						
≤ 65	52	74.3	27	90.0	$\chi^2=3.126$	0.077
>65	18	25.7	3	10.0		
<b>Min. – Max.</b>	38.0 – 87.0		41.0 – 75.0		t=0.252	0.802
<b>Mean ± SD.</b>	54.40 ± 13.24		53.83 ± 8.74			
<b>Median</b>	58.0		53.50			

$\chi^2$ , p:  $\chi^2$  and p values for Chi square test for comparing between the two groups  
 t, p: t and p values for Student t-test for comparing between the two groups \*: Statistically significant at  $p \leq 0.05$

Regarding the antidiabetic medication in the studied cases, there were 31 cases on insulin therapy (44.3%) and 39 cases on oral antidiabetic therapy (55.7%), while in the control group there were 10 on insulin (33.3%)

and 20 on oral therapy (66.7%). there was no statistically significant difference in between the two groups ( $p=0.308$ ).

**Table (2)** Comparison between the two studied groups according to antidiabetic medication.

Antidiabetic medication	Cases (n=70)		Control (n=30)		$\chi^2$	p
	No.	%	No.	%		
Insulin	31	44.3	10	33.3	1.041	0.308
Oral drugs	39	55.7	20	66.7		

$\chi^2$ , p:  $\chi^2$  and p values for Chi square test for comparing between the two groups

Regarding the stress test and symptoms in the studied cases, there were 43 cases with positive stress test (61.4%) and 27 cases with symptoms (38.6%), while in the control group there were 14 patient with

positive stress test (46.7%) and 16 patients with symptoms (38.6%). there was no statistically significant difference in between the two groups ( $p=0.172$ ).

**Table (3)** Comparison between the two studied groups according to indication of coronary angiography.

Indication of coronary angiography	Cases (n=70)		Control (n=30)		$\chi^2$	p
	No.	%	No.	%		
+veStress test	43	61.4	14	46.7	1.041	0.172
Symptomatic	27	38.6	16	53.3		

$\chi^2$ , p:  $\chi^2$  and p values for Chi square test for comparing between the two groups.

Regarding hypertension, smoking and positive family history in the studied cases, there were 41 cases with hypertension (58.6%),34 cases were smokers (48.6%) and 42 cases with positive family history (60%), while in the control group there were 13 patient

with hypertension (43.3%), 12 patients were smokers (40%) and 21 patients with positive family history (70%). There was no statistically significant difference in between the two groups.

**Table (4)** Comparison between the two studied groups according to risk factors.

Risk factors	Cases (n=70)		Control (n=30)		$\chi^2$	p
	No.	%	No.	%		
HTN	41	58.6	13	43.3	1.963	0.161
Smoking	34	48.6	12	40.0	0.621	0.431
+ve family history	42	60.0	21	70.0	0.901	0.343

$\chi^2$ , p:  $\chi^2$  and p values for Chi square test for comparing between the two groups

Regarding lipid profile There was no statistically significant difference in between the two groups. **Table (5)** Comparison between the two studied groups according to lipid profile .

Lipid profile	Cases (n=70)	Control (n=30)	t	P
<b>Total cholesterol</b>				
<b>Min. – Max.</b>	111.0 – 316.0	173.0 – 276.0		
<b>Mean ± SD.</b>	214.54 ± 40.98	209.30 ± 33.02	0.619	0.537
<b>Median</b>	215.0	202.0		
<b>Triglycerides</b>				
<b>Min. – Max.</b>	122.0 – 264.0	117.0 – 221.0		
<b>Mean ± SD.</b>	157.34 ± 33.18	148.77 ± 25.9	1.265	0.209
<b>Median</b>	148.0	145.0		
<b>HDL</b>				
<b>Min. – Max.</b>	32.0 – 65.0	37.0 – 54.0		
<b>Mean ± SD.</b>	45.14 ± 7.26	44.77 ± 5.18	0.257	0.798
<b>Median</b>	44.50	45.0		
<b>LDL</b>				
<b>Min. – Max.</b>	73.0 – 216.0	125.0 - 210.0		
<b>Mean ± SD.</b>	154.70 ± 27.25	148.33 ± 18.47	1.358	0.178
<b>Median</b>	161.0	146.0		

t, p: t and p values for Student t-test for comparing between the two groups \* : Statistically significant at  $p \leq 0.05$

Regarding renal function, the median of urea in the studied cases was 38.0 while it was 42.50 in the control group. There was no statistically significant difference in between the two groups ( $p=0.063$ ), the median of creatinine in the studies cases was 0.90 while it was 0.80 in the control group. There was no statistically

significant difference in between the two groups ( $p=0.166$ ), while regarding HbA1c in the studied cases, the median was 7.80 and 7.45 in the control group, There was no statistically significant difference in between the two groups ( $p=0.314$ ).

**Table (6)** Comparison between the two studied groups according to renal function and HbA1c .

Renal function and HbA1c	Cases (n=70)	Control (n=30)	t	p
<b>Urea</b>				
<b>Min. – Max.</b>	17.0 – 72.0	19.0 – 85.0		
<b>Mean ± SD.</b>	38.17 ± 12.56	44.10 ± 18.17	1.880	0.063
<b>Median</b>	38.0	42.50		
<b>Creatinine</b>				
<b>Min. – Max.</b>	0.60 – 1.30	0.50 – 1.20		
<b>Mean ± SD.</b>	0.91 ± 0.17	0.85 ± 0.21	1.395	0.166
<b>Median</b>	0.90	0.80		
<b>HbA1c</b>				
<b>Controlled (<math>\leq 7.5</math>)</b>	33 47.1	16 53.3		
<b>Uncontrolled (<math>&gt;7.5</math>)</b>	37 52.9	14 46.7	$\chi^2=0.322$	0.570
<b>Min. – Max.</b>	6.10 – 9.10	5.70 – 8.90		
<b>Mean ± SD.</b>	7.70 ± 0.82	7.51 ± 0.87	t=1.017	0.314
<b>Median</b>	7.80	7.45		

t, p: t and p values for Student t-test for comparing between the two groups.

Regarding the EF in the studied cases, the median was 61.50 which was the same as in the control group,

There was no statistically significant difference in between the two groups ( $p=0.254$ ).

**Table (7)** Comparison between the two studied groups according to EF% .

EF %	Cases (n=70)	Control (n=30)	Test of sig.	P
<b>Min. – Max.</b>	50.0 – 75.0	50.0 – 68.0		
<b>Mean ± SD.</b>	62.44 ± 5.08	61.23 ± 4.17	t=1.147	0.254
<b>Median</b>	61.50	61.50		

t, p: t and p values for Student t-test for comparing between the two groups U, p: U and p values for Mann Whitney test for comparing between the two groups \*: Statistically significant at  $p \leq 0.05$

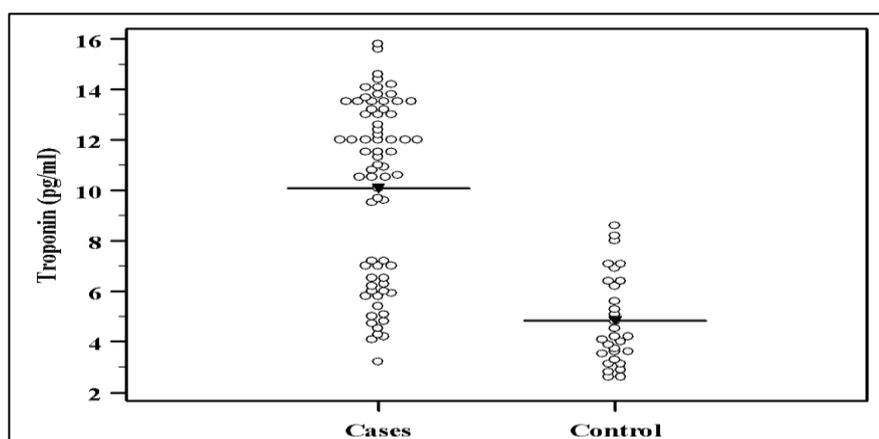
Regarding troponin level in the studied cases, the median was 11.15, while in the control group it was 4.20, There was no statistically significant difference in

between the two groups ( $p < 0.001$ ). The normal value of high sensitivity cardiac troponin T is less than 100, so the median of both groups was normal.

**Table (8)** Comparison between the two studied groups according to high sensitivity cardiac troponin T.

Troponin (pg/ml)	Cases (n=70)	Control (n=30)	U	P
Min. – Max.	3.20 – 15.80	2.60 – 8.60		
Mean ± SD.	10.10 ± 3.53	4.85 ± 1.79	236.500*	<0.001*
Median	11.15	4.20		

U, p: U and p values for Mann Whitney test for comparing between the two groups \*: Statistically significant at  $p \leq 0.05$



**Fig (1)** Comparison between the two studied groups according to troponin

Regarding the coronary angiography (number of diseased vessels and number of lesions) in the studied cases, the median was 2.0 which was the same as in the

control group, There was no statistically significant difference in between the two groups.

**Table (9)** Descriptive of the studied cases according to coronary angiography (n=70).

Coronary angiography	Min. – Max.	Mean ± SD.	Median
Number of diseased vessels	1.0 – 6.0	2.01 ± 1.12	2.0
Number of lesion	1.0 – 7.0	2.43 ± 1.52	2.0

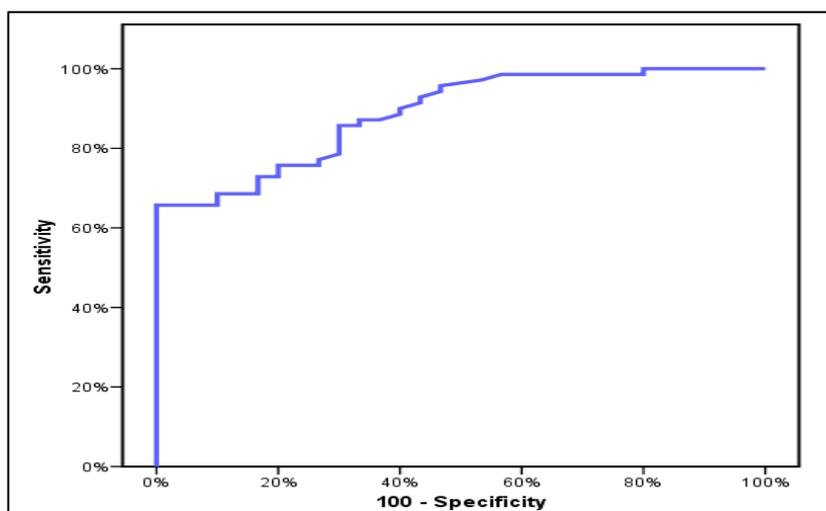
Regarding the SYNTAX score in the studied cases, there were 52 cases with score less than 22 (74.30 %), 12 cases with score in between 23-32

(17.1%) and only 6 cases with score  $\geq 33$  (8.6%), the median of SYNTAX score in the studied cases was 14.75.

**Table (10)** Distribution of the studied cases according to SYNTAX (n=70).

SYNTAX	No.	%
$\leq 22$	52	74.3
23 – 32	12	17.1
+ 33	6	8.6
Min. – Max.	2.0 – 47.50	
Mean ± SD.	16.60 ± 10.37	
Median	14.75	
<b>Troponin</b>		
AUC	0.887*	

<b>p</b>	<0.001*
<b>95% C.I</b>	0.825 – 0.950



**Fig (2)** ROC curve for Troponin to predict cases (vs control)

The cutoff value of high sensitive cardiac troponin T obtained by the ROC curve analysis was > 8.6 ng/l for the prediction of higher SYNTAX score (sensitivity

65.71%, specificity 100%, figure 15), the area under the curve (AUC) was 0.887 (95% C.I 0.825 - 0.950. P< 0.001)

**Table (12)** Agreement (sensitivity, specificity) for Troponin to predict cases (vs control).

	<b>Cut off</b>	<b>Sensitivity</b>	<b>Specificity</b>	<b>PPV</b>	<b>NPV</b>
<b>Troponin</b>	>8.6	65.71	100.0	100.0	55.6

AUC: Area Under a Curve, p value: Probability value, CI: Confidence Intervals, PPV: positive predictive value, NPV: Negative predictive value

\*: Statistically significant at  $p \leq 0.05$

Regarding multivariate analysis, high sensitive cardiac troponin T was a strong statistically significant parameter that affect cases.

**Table (13)** Multivariate analysis logistic regression for the parameters that affect cases.

	<b>B</b>	<b>SE</b>	<b>Sig.</b>	<b>OR</b>	<b>95% CI</b>	
					<b>LL</b>	<b>UL</b>
<b>Sex</b>	0.484	0.640	0.450	1.622	0.462	5.690
<b>Age</b>	0.202	0.865	0.815	1.224	0.225	6.671
<b>Stress test and symptoms</b>	-0.620	0.669	0.354	0.538	0.145	1.996
<b>HTN</b>	-0.643	0.735	0.382	0.526	0.125	2.220
<b>LDL</b>	0.007	0.013	0.597	1.007	0.982	1.032
<b>Urea</b>	-0.061	0.032	0.060	0.941	0.883	1.002
<b>Creatinine</b>	3.075	2.141	0.151	21.660	0.326	1439.090
<b>Troponin</b>	0.599	0.149	<0.001*	1.820*	1.360	2.435

B: Unstandardized Coefficients, OR: Odds ratio, CI: Confidence interval, LL: Lower limit, UL: Upper Limit, \*: Statistically significant at  $p \leq 0.05$

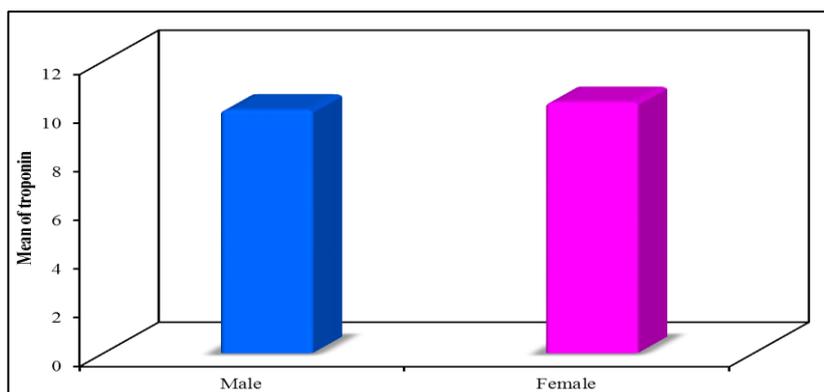
Regarding the relation between troponin and different parameters in cases group, there was a statistically significant relation in between troponin and

(hypertension, smoking and SYNTAX score), however there was statistically non significant relation in between troponin and (sex, age and antidiabetic drugs).

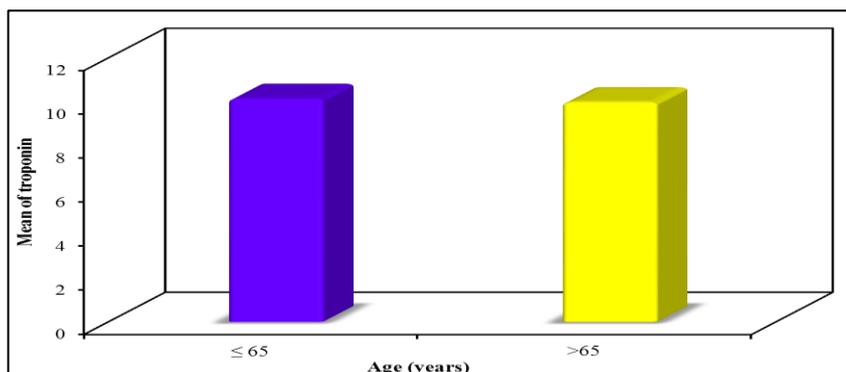
**Table (14)** Relation between troponin and different parameters in cases group (n=70).

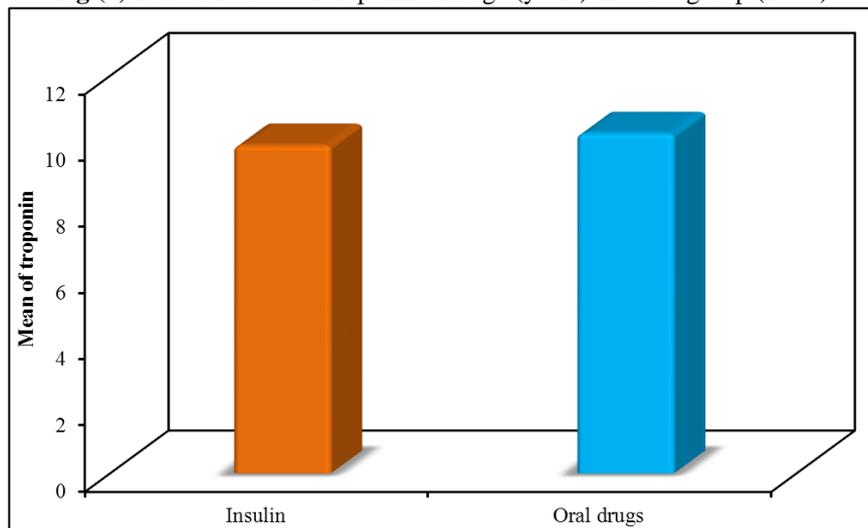
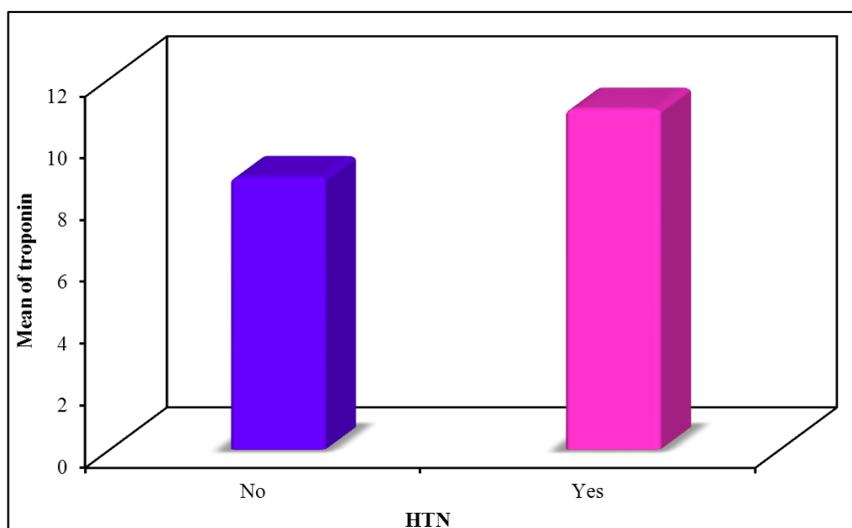
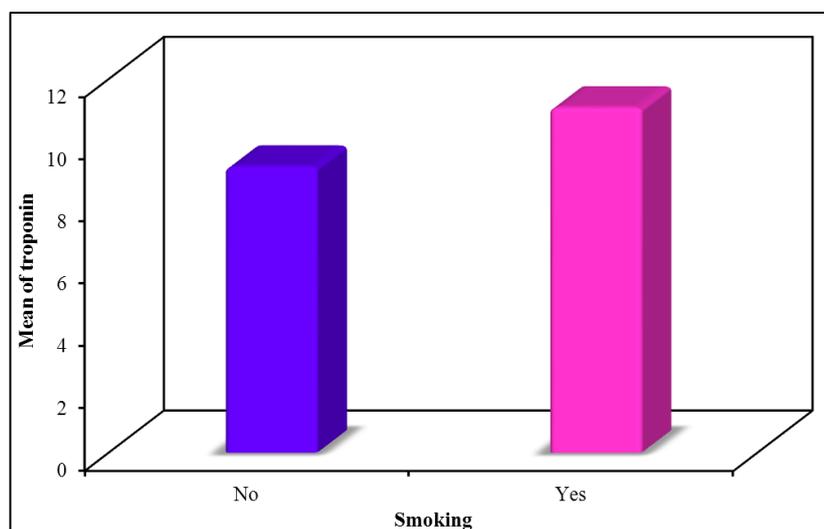
	N	Troponin			Test of sig.	P
		Min. – Max.	Mean ± SD.	Median		
<b>Sex</b>						
Male	48	3.20 – 14.60	10.0 ± 3.36	11.15	U=481.500	0.556
Female	22	4.30 – 15.80	10.31 ± 3.95	11.15		
<b>Age (years)</b>						
≤ 65	52	4.10 – 15.80	10.14 ± 3.58	11.40	U=481.500	0.877
>65	18	3.20 – 14.20	9.98 ± 3.49	10.85		
<b>Antidiabetic medication</b>						
Insulin	31	3.20 – 14.60	9.90 ± 3.64	11.50	U=588.500	0.850
Oral drugs	39	4.10 – 15.80	10.26 ± 3.48	10.90		
<b>HTN</b>						
No	29	3.20 – 13.50	8.80 ± 3.63	10.50	U=366.5*	0.007*
Yes	41	5.10 – 15.80	11.01 ± 3.19	12.0		
<b>Smoking</b>						
No	36	4.10 – 13.80	9.18 ± 9.33	10.50	U=407.5*	0.016*
Yes	34	3.20 – 15.80	11.08 ± 3.52	12.0		
<b>SYNTAX</b>						
≤ 22	52	3.20 – 13.50	8.78 ± 3.12	9.65	H=38.566*	<0.001*
23 – 32	12	12.40 – 14.10	13.46 ± 0.44	13.50		
+ 33	6	14.10 – 15.80	14.78 ± 0.73	14.50		

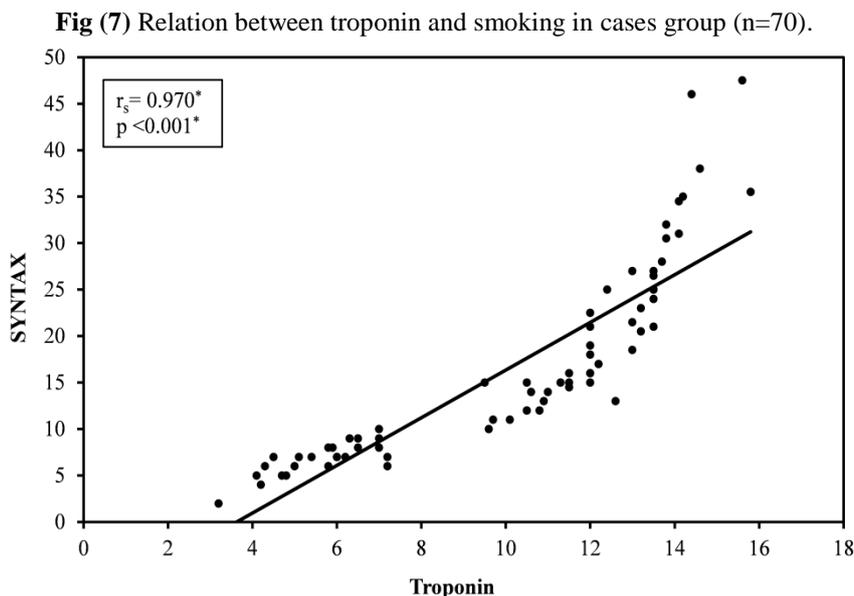
U, p: U and p values for Mann Whitney test for comparing between the two groups  
 H,p: H and p values for Kruskal Wallis test  
 \*: Statistically significant at p ≤ 0.05



**Fig (3)** Relation between troponin and sex in cases group (n=70).



**Fig (4)** Relation between troponin and age (years) in cases group (n=70).**Fig (5)** Relation between troponin and antidiabetic medication in cases group (n=70).**Fig (6)** Relation between troponin and HTN in cases group (n=70).



**Fig (8)** Relation between troponin and SYNTAX in cases group (n=70).

Regarding the relation between troponin level and different parameters in cases group there was strong statistically significant positive relation in between

(number of diseased vessels rs 0.639, number of lesions rs 0.650 and SYNTAX score rs 0.970).

**Table (15)** Correlation between troponin and different parameters in cases group (n=70).

	Troponin	
	rs	p
Age (years)	0.193	0.109
Number of diseased vessels	0.639*	<0.001*
Number of lesion	0.650*	<0.001*
SYNTAX	0.970*	<0.001*
EF%	-0.144	0.234

rs: Spearman coefficient

\*: Statistically significant at p ≤ 0.05

**4. Discussion**

This examination researched the job of hs-cTnT as an indicator of stable CAD in type 2 diabetic patients.

Ongoing investigations have shown that hs-cTnT tests increment the exactness of finding in the early time of intense myocardial localized necrosis and hs-cTnT considers the discovery of even minor myocardial rot with high accuracy [12]. The raised degrees of hs-cTnT in patients with steady or insecure angina giving imperceptible ordinary cardiovascular troponin T are essentially connected with diminished endurance [13].

Present examination indicated that hs-cTnT levels were autonomously connected with degree and multifaceted nature of CAD surveyed with SYNTAX score in patients with stable CAD.

The age of our investigation populace (mean period of studies cases was guys 54.4, females 53.8) related to the normal time of patients who experience coronarography assessments for intense coronary condition. The extent of guys and females in this investigation gathering (guys 68.6%, females 31.4%) additionally related to that of the CZECH 2 Register

(guys 70% ,females 30%) [14]. The prevalences of hazard factors among the observed patients related to those of a populace of comparable age (58.6% of considered cases were hypertensive and 48.6% were smokers). Notwithstanding, all cases in our examination were type 2 diabetic [15].

Somewhat raised serum troponin T levels in patients with stable angina pectoris are normal and happened in our examination gathering. We exhibited a noteworthy connection between high-affectability serum troponin T level and the seriousness of stable coronary conduit sickness. One of the avoidance measures for this examination was progressing or ongoing intense coronary condition. Therefore, cardiomyocyte corruption is probably not going to have been the fundamental driver of these raised levels. Nonetheless, it is absurd to expect to preclude that in patients with stable angina pectoris, the myocardium experiences repetitive ischaemia, which causes reversible ischaemic changes in cardiomyocytes, bringing about the arrival of a cytosolic solvent portion

of TnT into the fringe flow through the arrangement of cytoplasmic "blebs" and the resulting arrival of blebosomes into the fringe dissemination. The pool of dissolvable troponins is constrained; cytoplasmic "blebs" are additionally fit for shipping a predetermined number of macromolecules to the extracellular compartment [16].

We noticed a measurably critical increment in serum hsTcT levels in connection with (number of infected vessels rs 0.639, number of injuries rs 0.650, SYNTAX score rs 0.970).

Yamazaki et al. come to a comparative end result in an investigation of 408 patients experiencing demonstrative CT coronary angiography. Prior to assessment, the degrees of hs TnT were resolved, and the degree of atherosclerotic harm to the coronary conduits was communicated utilizing the SYNTAX score (SX score). An altogether higher hs TnT level was found in patients with high or medium SX scores than in patients with low SX scores (0.044 \_ 0.055 versus 0.018 \_ 0.058 mg/l;  $p = 0.03$ ) [17]. These qualities are in concurrence with the consequences of our investigation, (0.0032 \_ 0.013 at SYNTAX $\leq$ 22, 0.012 \_ 0.014 at SYNTAX in the middle of 23 - 32 and 0.014 \_ 0.015 at SYNTAX >33).

Intriguing knowledge in regards to the heights of heart troponins in patients with stable angina pectoris was offered by the investigation of Korosoglou et al., distributed in 2011 [18]. The investigation included 124 patients with stable angina pectoris experiencing demonstrative CT coronary angiography. The TnT level decided before CT assessment was contrasted and the calcium score, the general volume of delicate non-calcified plaques, and the morphology of the coronary supply routes as for the territory of atherosclerotic harm. The creators found a connection between's the calcium score and troponin T level, however a more noteworthy relationship was found between the all out volume of delicate plaques and the TnT level ( $r = 0.45$ ,  $p < 0.001$ , separately,  $r = 0.79$ ,  $p < 0.001$ ). As to supply route morphology concerning the region of atherosclerotic harm, the creators portrayed the rebuilding of the coronary veins. The most huge heights of troponin T were enrolled in patients with huge redesigning. The creators ascribed the raised troponin T levels to the shakiness of atherosclerotic plaques and the potential emboli-sation of microthrombi to the fringe course. The writing depicts less fortunate long haul visualizations among patients with stable coronary illness and raised cardiovascular troponins (higher rate of unexpected cardiovascular passing and prior advancement of cardiovascular breakdown) [19].

Laufer et al. announced that coronary atherosclerosis evaluated with multi-cut processed tomography in indicative patients without intense coronary condition was related with quantifiable flowing degrees of hs-cTnT, even in mellow CAD. Be that as it may, SYNTAX score, which mirrors the degree and unpredictability of CAD, was not utilized and coronary angiography was not applied in the

investigation of Laufer et al. Past one investigation detailed that patients with non-calcified and with rebuilt plaque indicated higher hsTnT levels than those with ordinary vessels or with just calcified plaque. This outcome bolsters that hs-cTnT levels would increment with intricacy of coronary atherosclerosis as higher SYNTAX score [20].

Ndrepepa et al. researched to distinguish factors that were related with expanded degrees of high-affectability troponin T in patients with stable (for the most part) or precarious angina experiencing revascularization. They found that patients with upper tertile of hs-cTnT have higher occurrence of multivessel illness contrasted patients and low tertile. They likewise revealed that the raised degree of hs-cTnT in patients with steady or unsteady angina was altogether connected with diminished endurance [13]. In the investigation, Ndrepepa et al. didn't utilize SYNTAX score. In our examination, we utilized SYNTAX score for surveying the degree and unpredictability of CAD and found that hs-cTnT was an autonomous indicator of higher SYNTAX score.

The pathophysiological systems hidden the relationship between hs-cTnT with degree and multifaceted nature of CAD are as yet indistinct. Generally, it was believed that arrival of cTn is proportionate to myocardial rot. Be that as it may, in past examinations, even gentle stable CAD was related with quantifiable coursing levels of hs-cTnT in patients without intense coronary condition [13, 20].

Sabatine et al [21] indicated that transient pressure test-initiated ischemia is related with increment of cTnI as identified with a ultrasensitive cTnI examine. The degree of cTnI increment was relatively identified with the degree of ischemia as surveyed by atomic perfusion imaging. Hickman et al. [16] detailed that heart troponin might be delivered by ischemia alone, without corruption. In that audit, creators have recommended that the nearness of membranous blebs in cardiovascular myocytes is empowering troponin to be delivered from heart cells because of ischemia alone, without putrefaction. Besides, some creature examines have recommended that short scenes of ischemia may bring about the arrival of cTnT, without show of cell passing. Since the more intricate and serious injuries may expand extent of ischemia, this could clarify the more elevated levels of circling troponin in these patients. Be that as it may, in present examination, the relationship between quantitative ischemia estimation and hs-cTnT level was not researched.

Late examinations show that diabetes may incline to heights in the heart troponin level through various components: expanded ventricular mass, inclination to quiet ischemia, microvascular obstacle, more unpredictable and extreme coronary injuries and poisonous impacts of metabolites at unusual focuses [21].

## 5. Conclusion

The benefit of the present study for clinical practice is the finding that;

- 1- Despite very low circulating concentrations of hs-cTnT Serum level, it was independently associated with coronary artery disease.
- 2- The cutoff value of hs-cTnT obtained by the ROC curve analysis was 8.6 ng/L for the prediction of higher SYNTAX score.
- 3- There is a statistically significant relation in between hs-cTnT and (hypertension, smoking and SYNTAX score).

### Limitations

Small sample size- Limited duration of the study

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