

To study incidence of various conventional parameters in TMT (Chiefly ST depression)**Ashok Thakur¹, Puneet Goyal^{2*}**¹*Associate Professor, Department of Medicine, M.G.M Medical College and M.Y. Hospital, Indore, Madhya Pradesh, India*²*Assistant Professor Cardiology, Department of Medicine, M.G.M Medical College and M.Y. Hospital, Indore, Madhya Pradesh,, India***Received: 06-09-2021 / Revised: 16-11-2021 / Accepted: 10-12-2021****Abstract**

Background&Method: The study was done on 50 adult patients with evidence of ischaemic heart disease presenting with stable angina or with angina of effort. A preliminary consultation and a clinical evaluation were done to select the cases with special attention to drug therapy. The patient was briefed about the procedure. They were given specific instructions and asked to come on the appointment date patients were called in a fasting state (light snacks about 3 hours before the test) and without consumption of any drug. **Result:** Taking the ate offset as 8 mts post exercise the number of cases with early onset late offset ST segment depression was 54 per cent. In the analysis of the post exercise phase 56 per cent cases had ST segment depression persisting to beyond 8 minutes in the post exercise phase of which 16 per cent went beyond 15 minutes and 8 per cent beyond 20 minutes. The offset time varied from 1 minute post exercise to 24 minutes (mean 9.14mts±5.49 mts). The ST segment depression disappeared within 8 minutes in 28 per cent cases while the offset was 8 minutes in 16 per cent cases. In 90 per cent cases, the offset time was more than 3 mts while in 42 per cent cases the offset time was more than 9 minutes. **Conclusion:** Magnitude of ST segment depression more than 2 mm 80 msec after J point has a high degree of sensitivity for detecting CAD but could not classify a patient as one having severe CAD. Onset time of ST segment depression can be influenced by many factors and is thus not a useful parameter. Offset time of ST segment depression with cut off limits at 3 mts and 6 mts is a good parameter for diagnosing MVD. ST index and ST integral are very good parameters for the detection of CAD, absolute values do not correlate with severity of CAD.

Keywords: incidence, conventional& TMT**Study Designed:** Observational Study.

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Introduction

Stress testing was first recognized as an investigative tool by Bonsfield[1], when he recorded ST segment depression during spontaneous angina. Feiand Siegel[2] also demonstrated ST segment depression with angina. They performed their tests with sit ups. The importance of electrocardiogram before and after exercise was well demonstrated by Braunwald[3]. Exercise is currently the most convenient means of stimulating the myocardium to demand maximal blood flow and is the only way to stimulate such a rigorous demand for oxygen delivery that even moderate impairment of coronary blood flow capacity becomes detectable. As an adult exercises, his stroke volume and cardiac output increase in response to increased energy demands for perfusion of the muscles. There is an increase in arterial pressure and vasodilatation and resultant decrease in arteriolar resistance occurs. The regulation of vasodilatation is brought about largely by accumulation of local metabolites and hypoxia[4]. The vasoconstrictor influence of sympathetic activation in the resistance vessels of working muscles is over ridden by the local metabolites and vasodilatation.

The sympathetic vasoconstriction facilitates venous return while the arterial and venous constriction forces blood into the mainstream by diminishing blood in non-exercising muscles.

Other circulatory adjustments include selective vasodilatation of skin blood vessels. Blood flow to the splanchnic organs decreases. Besides direct sympathetic stimulation of the heart, there is a rise in catecholamine levels which enhances the myocardial contractility. Maximum energy production can be gauged by noting the point at which there is a balance between arterial and venous oxygen saturation difference and this occurs when oxygen extracted from inspired air is at its maximum[5].

Material & Method

This study was selected from hypertension clinic outpatients, Department of medicine and cardiology indoor ward of M.G.M. Medical College &M.Y.Hospital, Indore from Aug 2020 to Jan 2021. The study was done on 50 adult patients with evidence of ischaemic heart disease presenting with stable angina or with angina of effort.

Inclusion criteria

- Patients with history of typical chest pain. (Angina class I, II, III).
- Patients who had myocardial infarction (MI) in the past with stable angina were also subject of study provided the MI was not recent less than 6 weeks earlier).

Exclusion criteria

- Patients with class IV angina.
- Congestive cardiac failure,
- Left ventricular hypertrophy/dilation
- Unstable angina
- Uncontrolled diabetes mellitus,

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- Moderate to severe hypertension,
- Respiratory insufficiency,
- Aortic stenosis, active ischaemia,

Method

The procedure adopted in the study was as follows-

Results

Table 01: Showing the age distribution of patients

Age in years	31-40	41-50	51-60	61-70	71-80
No. of patients	1	16	20	11	2
Percentage	2	32	40	22	4

Table 02: Showing the Treadmill Time In The Study Group

Treadmill Time (mts)	Upto 3 mts.	>6 mts .	>9 mts	Upto 15 mts
No. of patients	50	41	28	7
Percentage	100	82	56	14

Table 03: Showing onset time of ST segment depression

Onset time of ST (mts)	<3	3.1-6	6.1-9	9.1-12	12.1-15
No. of patients	30	12	5	2	1
Percentage	60	24	10	4	2

Taking the ate offset as 8 mts post exercise the number of cases with early onset late offset ST segment depression was 54 per cent. In the analysis of the post exercise phase 56 per cent cases had ST segment depression persisting to beyond 8 minutes in the post exercise phase of which 16 per cent went beyond 15 minutes and 8 per cent beyond 20 minutes. The offset time varied from 1 minute post exercise to 24 minutes (mean 9.14mts±5.49 mts). The ST segment depression disappeared within 8 minutes in 28 per cent cases while the offset was 8 minutes in 16 per cent cases. In 90 per cent cases, the offset time was more was more 3 mts while in 42 per cent cases the offset time was more than 9 minutes.

Discussion

Of the 7 patient with TVD, 3 patient ha type Ia ST segment depression, 4 had types Ib St segment depression of whom one had type Ia ST segment depression in the post exercise phase only. A sensitivity of 42.8 per cent of type Ia and 57.1 per cent for type Ib ST segment could be calculated for our cases of TVD.

Sensitivity of 44 per cent for type Ib ST segment depression for prediction of TVD while our figure is 57 per cent. The high sensitivity reported by Mannering et al may be due to his case material of patients with previous myocardial infarctions in whom the ischaemic changes are dependent on the degree of scarring (which limits ischaemic), and cardiac dilation (which increase ischaemic) and number of peripherally diseased coronaries[6]. The cardiac enlargement is also related to scarring. type I, ST segment depression could predict TVD in cent per cent cases. Predictive values of type Ia ST segment depression was 75 per cent which is higher than the figure of 40 per cent. the reason for this incongruity is that in this series, there were some patient who had a ST segment depression of a morphology not typically fitting into any one category.

Type Ia response was seen in 10 per cent cases. Type Ib in 56 per cent and type II 22 per cent cases compared to the figures of higher incidence of type Ia ST segment depression. The possible explanations have been mentioned above and also the likely effect of drugs on the type of ST segment depression.

The explanation for worsening of the type of ST segment depression in the post exercise phase could be due to increased concentration of local metabolites that are product of anerobic respiration occurring at peak exercise added to decrease subendocardial myocardial perfusion due to sudden drop of blood pressure and cardiac output in the post exercise phase. This accompanied by a decrease in sympathetic drive relative to that at peak exercise thus causing a decrease in peripheral vascular resistance and pooling of blood. All these manifest as cardiac ischaemiaand ST segment depression. This phenomenon was observed in 13 out of 50 patients. No specific relations of significance

A preliminary consultation and a clinical evaluation were done to select the cases with special attention to drug therapy. The patient was briefed about the procedure. They were given specific instructions and asked to come on the appointment date patients were called in a fasting state (light snacks about 3 hours before the test) and without consumption of any drug.

couldbe drawn on the 10 patient who had type II ST segment depression[7].

The magnitude of ST segment depression varied widely in our series. In both the cases of SVD, the maximal ST segment depression was > 3 mm while in all except 2 patients of TVD, the ST segment depression was more than 3 mm. So a ST segment depression more than 3 mm 80 msec after the J point had a sensitivity of 75 per cent and a predictive value of 75 per cent for MVD but low specificity[8]. All except 6 of the 50 patients had more than 2 mm. ST segment depression thus confirming Berman's observation of a high predictive value for CAD. The increase in the magnitude of ST segment depression in patients in the post exercise phase can be explained on the same lines as for that of increasing severity of ST segment depression morphologically.

Mannering et al reported ST segment depression as a poor parameter for detection of CAD. Where ST segment changes lasted more than 9 mts in the post exercise phase and where the changes appeared only during post exercise phase or they had up sloping ST segment depression of < 1.5 mm which after exercise become down sloping with bifid T waves persisting for a long time. He, along with Mchenry termed it a physiological response. The amount of exercise nor the achieved heart rate was related to the types onset of duration of post exercise ischaemic changes in this study of 76 patients who had such type of ST segment change. This was true in 13 cased in our study too[9].

Conclusion

Magnitude of ST segment depression more than 2 mm 80 msec after J point has a high degree of sensitivity for detecting CAD but could not classify a patient as one having severe CAD. Onset time of ST segment depression can be influenced by many factors and is thus not a useful parameter. Offset time of st segment depression with cut off limits at 3 mts. And 6 mts is a good parameter for diagnosing MVD. ST index and ST integral are very good parameters for the detection of CAD absolute values do not correlate with severity of CAD.

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