Prevalence and pattern of coronary artery disease in young women as per Angiography: A Cross sectional study

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Abstract—*Coronary artery disease (CAD) is the most common cause of mortality in India. Deaths due to CAD occur 5–10 years earlier in the Indians than in Western countries. Coronary artery disease (CAD) in young women, who are previously considered as low risk group, is on rise now due to various reasons. This study is aimed to find out the prevellance of CAD in young women admitted for evaluation of chest pain. The data of women suspected to have CAD and underwent cardioangiography (CAG) over a period of 1 year was analyzed. The discharge summaries, coronary angiograms and angiogram reports were studied to get information about clinical and angiographic profiles of these women in the "young group" (age < 55 years). Study showed normal epicardial coronaries in 37.5 % of women, non-significant lesion in 19% women and intermediate lesion in 10% women and obstructive CAD in 33.5 % of women. There were 18 % women with SVD, 13 % women with DVD and 2.5% women with TVD. Study concludes that there is an alarming increase in the proportion of young women angiographically diagnosed to have significant coronary artery disease.*

Keywords: Coronary artery disease, Young women, Disease patterns.

I. INTRODUCTION

Coronary artery disease (CAD) is a major cause of death.[1] The incidence of CAD has drastically comedown in the developed nations, but it has increased substantially in developing countries.[2] CAD in our subcontinent is different from that of western countries i.e, it occurs at relatively younger age.[2] Major risk factors predispose to CAD in 2% of 15–19 years old and 20% of 30 - 34 years men and 8% of women in 30 – 34 years of age. It can be clearly understood that early atherosclerosis is modified by the risk factors for clinical CAD. Hence long term prevention must begin as early as 30-35 years of age[3] for risk factors like metabolic syndrome [4, 6] obesity[5] and Dyslipidemia.[7]

Prevalence and pattern of CAD in young women is not well studied in various studies. There is not enough data for angiographic prevalence as well as pattern of CAD in young women. It is a well known fact that the prevalence of CAD is more in men compared to women. Some earlier data showed that among women who undergo coronary angiogram (CAG) the angiographically determined prevalence of "single vessel disease" (SVD) is 5.77%, "double vessel disease" (DVD) is 3.15%, and "triple vessel disease" (TVD) is 2.8 % respectively.[8, 9] With more than two risk factors, significant CAD is seen in 21% of women[10] study done by Dave et al among Indian women undergoing coronary angiography showed greater proportion of TVD (39.6%) than DVD (12.9%) or SVD (15.8%).

This present study is intended to know about the angiographic prevalence and pattern of CAD in young women admitted for coronary angiogram in a tertiary care hospital.

II. METHODOLOGY

This cross sectional type of observational study was done at Department of Cardiology, SMS Medical College, Jaipur (Rajasthan) India in year 2018.

The data of women suspected to have CAD and underwent CART over a period of 1 year attended at Department of Cardiology, SMS Medical College, Jaipur (Rajasthan) India were included in the study.

The discharge summaries, coronary angiograms and angiogram reports were studied to get information about clinical and angiographic profiles of these women in the "young group" (age < 55 years). In this study, obstructive CAD was defined as at least 50% stenosis of luminal diameter of LMCA or at least 70% stenosis of luminal diameter of at least one of the major epicardial coronary arteries. Non-significant lesion was defined as less than 30% stenosis of luminal diameter whereas Intermediate lesion was defined as 30–50% stenosis of luminal diameter of LMCA, or 30–70% stenosis of luminal diameter of one of the major epicardial arteries.

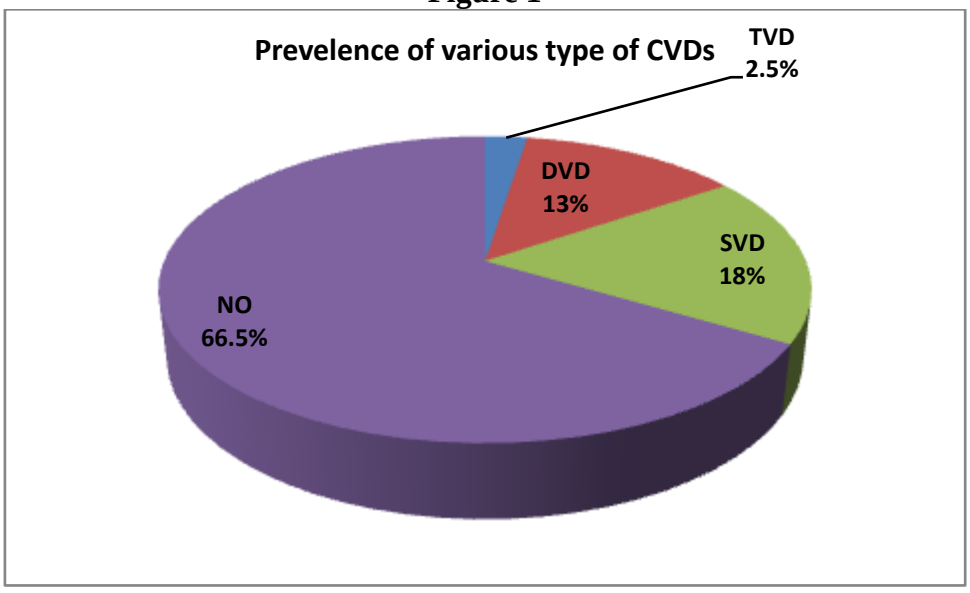
Depending on the number of major epicardial arteries involved, they are classified as single vessel disease (SVD), double vessel disease (DVD) and Triple vessel disease (TVD). The prevalence and pattern of CAD in these women were analyzed. All statistical analyses were performed using SPSS17 software (Trial version). A p-value <0.05 was considered statistically significant.

III. RESULTS

In present study, details of all 200 women who underwent CART during the study period were taken. The mean age was 49.4 ± 4.5 years.

Out of these 200, 133 (66.5%) were not having any significant observation while 36 (18%) were having Single Vessel Disease (SVD), 26 (13%) were having doboul vessel disease (DVD) and 5 (2.5%) were having Triple Vessel Disease (TVD). (Figure 1)

Figure 1



Out of these 200 subjects, 101 (50.5 %) were with hypertension (HTN), 72((36%) were with diabetes mellitus (DM) and 21 (10.5%) were with Dyslipidemia (DLP). Out of these 101 hypertensive, 42 were with DM, 13 were with DLP and 7 were with both DM and DLP. Diabetes mellitus with DLP was found in 11 cases. (Figure 2 &3)

Figure 2

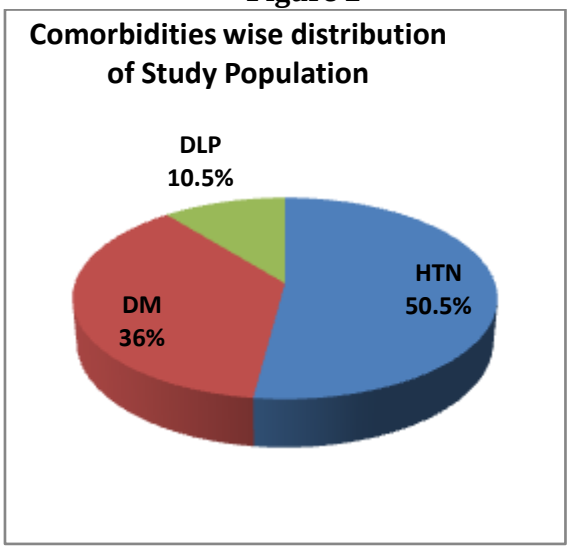
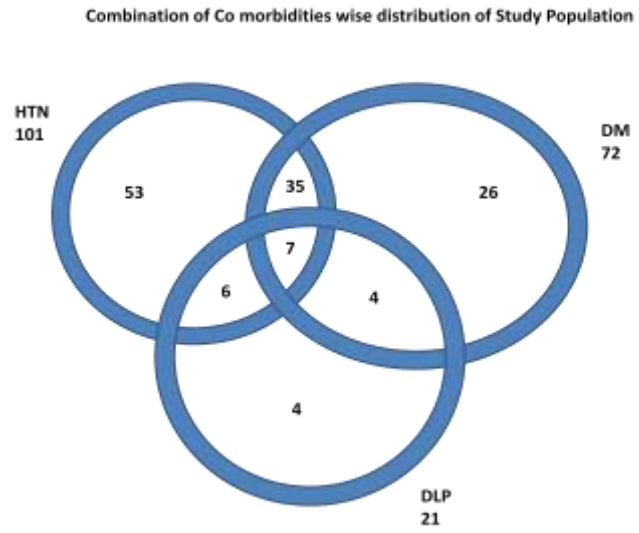


Figure 3



Left ventricle (LV) dysfunction was present in 27 (13.5 %) of patients. Out of that in 18 (9%) it was mild, in 7 (3.5%) it was moderate and in 2(1%) it was sever. (Figure 4)

Figure 4

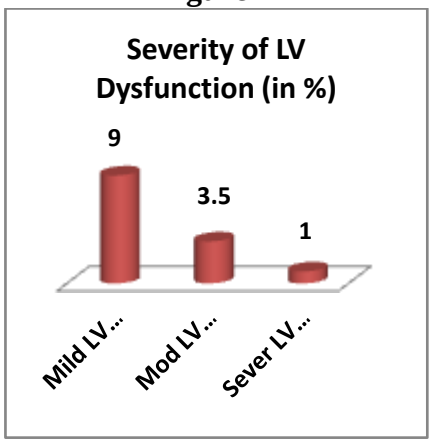
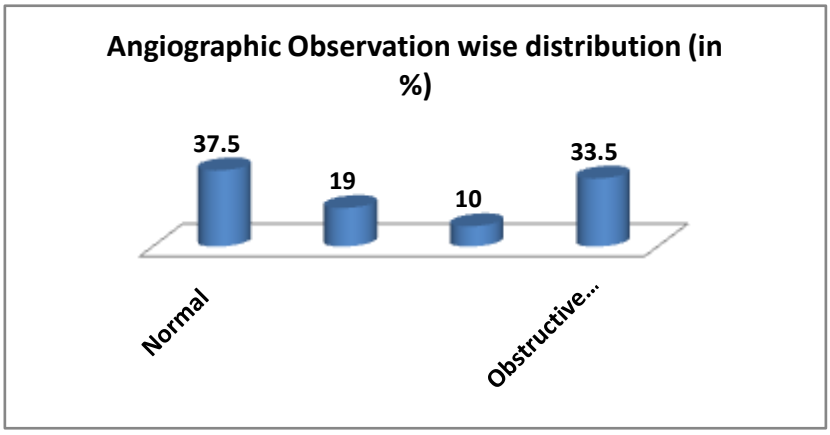


Figure 5



The angiographic profile of these women, overall, showed normal epicardial coronaries in 75 (37.5 %) women, non-significant lesion in 38 (19%) women, and intermediate lesion in 20 (10%) women and obstructive CAD in 67 (33.5%) women. (Figure 5)

The mean age of patients having TVD was 51.2 $\pm$ 5.15 yrs, DVD was 51.42$\pm$ 1.9 yrs, SVD was 50.58 $\pm$ 2.9 yrs and in patients with non obstructive CAD was 48.62 $\pm$ 4.96 yrs. This difference in mean ages was found with significant variation on ANOVA test. It was found on further analysis mean age of cases with Double Vessel Disease (DVD) had significantly higher age than non obstructive group. (Table 1)

Table 1
Association of age with various type of CVDs

S. No.	Type of CVD	Total Number	Age (Mean±SD) in Years
1	Triple Vessel Disease (TVD)	5	51.20 $\pm$ 5.15
2	Double Vessel Disease (DVD)	26	51.42 $\pm$ 1.90
3	Single Vessel Disease (SVD)	36	50.58 $\pm$ 2.90
4	Non Obstructive	133	48.62 $\pm$ 4.96

On ANOVA and post hoc Dunnett test assuming mean age of non obstructive as control (4).

ANOVA - Analysis of Variance ---

Source of Variation SS DF Variance Est (MS)
Between Groups 253.3 3 84.44
Within Groups 3738 196 19.07
Total 3991 199
s2_bet MSbet 84.44
F = ------ = ----- = ----- = 4.43 P = 0.005
s2_wit MSwit 19.07

--- Multiple Comparisons - Dunnett ---
Comparison Difference of means SE p q' P<.05
3 vs 4: 50.58 - 48.62 = 1.96 Do not test
1 vs 4: 51.2 - 48.62 = 2.58 1.989 4 1.297 No
2 vs 4: 51.42 - 48.62 = 2.8 0.9364 4 2.990 Yes
Degrees of freedom: 196

When risk factors of various co morbidities with cadiovascular diseases were anlysed, it was found that CVDs were not found to be associated (p>0.05) with various type of co morbidities. (Table 2)

Table 2
Association of various co morbidities with CVD status

S. No.	Risk Factors of various co morbidities	CVD Status		*Total
		Yes	No	No (%)
1	Hypertension (HTN)	35	66	101 (50.5)
2	Diabetes (DM)	24	48	72 (36)
3	Dyslipidemia (DLP)	9	12	21 (10.5)
4	HTN and DM	13	29	42 (21)
5	HTN and DLP	6	7	13 (6.5)
6	DM and DLP	7	4	11 (5.5)
7	HTN, DM and DLP	4	3	7 (3.5)
	Total	67	133	200

multiple response Chi-square = 6.668 with 6 degrees of freedom; P = 0.353 LS=NS

When risk factors of various co morbidities with various type of cadiovascular diseases were anlysed, it was found that CVDs were not found to be associated (p>0.05) with various type of co morbidities except in cases with DM and DLP where SVD was found significantly more than their counterparts. (Table 3)

Table 3
Association of various co morbidities with various type of CVD

Risk Factors	Type of CVD				P Value LS
	TVD (n=5)	DVD (n=26)	SVD (n= 36)	Non Obs (n=133)	
Hypertension (HTN) (N=101)	3	13	19	66	0.299 NS
Diabetes (DM) (N=72)	2	10	12	48	0.215 NS
Dyslipidemia (DLP) (N=21)	1	1	7	12	0.275 NS
HTN and DM (N=42)	2	5	6	29	0.904 NS
HTN and DLP (N=13)	1	1	4	7	0.452 NS
DM and DLP (N=11)	1	1	5	4	**0.045 S**
HTN, DM and DLP (N=7)	1	1	2	3	0.212 NS
P Value LS	0.721 NS	0.941 NS	0.191 NS	0.353 NS	

IV. DISCUSSION

The average age of menopause is 52 years in western world, although it is slightly lesser in Indian women. In order to extrapolate data of present study to various ethnic populations, the subjects in this study were classified as young women with age <55years. There has been a changing trend in the number of young women undergoing CAG and the reason for this is the onset of risk factors for CVD.

With regard to LV Function as assessed by Echocardiography, 13.5% had RWMA. Out of which 1% had severe LV dysfunction, 3.5 % had moderate LV dysfunction, 9 % had mild LV dysfunction and other's (86.5%) had Good LV function.

The prevalence of obstructive CAD is 33.5 % in present study. Interestingly Sukhija R[13] reported near equal distribution of both non-significant lesions and intermediate lesions. On the contrary to the observations of Dave et al study[14], there was not much variation in the proportion of SVD (15.77), and TVD (2.8 %) among young women as it in present study. DVD was more prevalent in present study (13.5 %) as compared to Dave et al (3.15%).[14]

An ICMR[15] study reported that CADs are on increase trend so and so that overall, cardiovascular diseases contributed 28·1% of the total deaths in India in 2016 whereas it was 15·2% in 1990.

This suggests that, with regard to clinical presentation and onset of risk factors for CAD at young age, there is a change. But the load of atherosclerotic plaque burden in the coronary arteries and type of involvement of coronary arteries has not changed in women.

V. LIMITATION

Intravascular ultrasound, optical coherence tomography or fractional flow reserve was not used in this study. Hence further comment on intermediate lesions could not made.

VI. CONCLUSION

This present study concluded that the major modifiable risk factors in our young adults are Hypertension, diabetes and Dyslipidemia. The clustering of risk factors particularly two or more risk factors in an individual predispose to CAD at relatively younger age. There is an alarming increase in the proportion of young women angiographically diagnosed to have significant coronary artery disease. There has been a change with regard to clinical presentation and onset of risk factors for coronary artery disease at young age, but the load of atherosclerotic plaque burden and type of involvement of coronary arteries have not changed in women

CONFLICT OF INTEREST

None declared till now.

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