

Comparative Study of Premature and Older Adult Onset Coronary Artery Disease among Bangladesh Air Force Members

Al-Mamun AKM¹, Mohsin M², Ali MS³

DOI: <https://doi.org/10.3329/jafmc.v20i2.80403>

Abstract

Background: Coronary artery disease (CAD) or ischemic heart disease is a major cause of morbidity and mortality around the world. This disease is usually diagnosed in old age. Nowadays, however, its often encountered by young adults. Recently, it was discovered that a number of young armed forces members reported to the Combined Military Hospital (CMH) Dhaka with the features of CAD and some of them presented in a very critical condition. Therefore, this study was conducted to evaluate the pattern, various predisposing factors of early or premature and mature CAD models.

Objective: To evaluate the pattern, various predisposing factors of CAD among the BAF officers as well as other members.

Methods: This is a cross-sectional analytical study with patient data collected during the period from May 2022 to May 2023. A total of 67 serving male CAD patient's data were studied. Data were analyzed for the evaluation of early or premature as well as mature coronary artery disease (MCAD). Early or premature coronary artery disease (PCAD) was considered when age below 45 years and MCAD when age more than 45 years. Predisposing factors for CAD were also analyzed separately for PCAD and MCAD.

Results: Out of total 67 CAD patients, 28 had premature onset coronary artery disease and 39 had mature onset coronary artery disease. Smoking habit and history of CAD among other family members were observed as common associated risk factors for most of the PCAD cases but hypertension and dyslipidemia were commonly associated as risk factors for MCAD cases.

Conclusion: The pattern of PCAD was higher in comparison to other studies. However appropriate early preventive measures targeting modifiable risk factors for CAD can protect against premature - onset CAD as well as MCAD.

Keywords: Premature coronary artery disease, Pattern, Risk factor, Bangladesh Air Force.

Introduction

Coronary artery disease (CAD) or Ischemic heart disease is the most common type of heart disease and remains the main cause of death worldwide, accounting for over 3,50,000 death each year.¹ Nowadays this disease is epidemic in both rural and urban areas due to swift epidemiological changeover, improved life span, living standard, food habits, stressful life and genetic susceptibility.² Early or premature-onset coronary artery disease (PCAD) occurs men develop CAD before the age of 45 years and women develop CAD before the age of 55 years.³

PCAD has been reported to present differently, with different risk factors in contrast to mature-onset coronary artery disease (MCAD).⁴ Premature-onset ischemic heart disease carries a poor long-term prognosis. It is of the utmost importance to better understand traditional and unique risk factors to prevent CAD events in this age group. As in other countries as well as civilian counterpart in Bangladesh, CAD was common among old aged Armed Forces personnel. However, it was recently discovered that a large number of young (age below 45 years) military members were diagnosed as CAD and sometimes they presented in a very critical condition.

Patients with PACD belong to a particular subgroup that warrants much more attention, since its impact on individuals, families and the society is devastating. This study was aimed at investigating the pattern, clinical presentations and associated predisposing factors of all study cases and to make a comparison between PCAD and MCAD cases.

Materials and Methods

This is an observational cross-sectional study which was conducted by the collected patient data from combined military hospital, Dhaka during the period from May 2022 to May 2023. Total 67 serving male CAD patient's data were studied. Among those 14 were officers and 53 were in other ranks. CAD included diagnosis of angina pectoris or stable angina, crescendo or unstable angina, non-ST elevation myocardial infarction and ST elevation myocardial infarction.

1. Col A K M Al-Mamun, MBBS, D In Avn Med, Senior Staff Officer, Dte MS (Air), Air Headquarters, Dhaka Cantonment (E-mail: almamun19715@gmail.com) 2. Brig Gen Mohammad Mohsin, MBBS, MPhil, MPH, DMS (Air), Air Headquarters, Dhaka 3. Maj Md Shiah Ali, MBBS, Med Dte, Air Headquarters, Dhaka Cantonment.

Standard definition was used for the diagnosis. Patients with recent or ongoing fever or infection, chronic inflammatory disorders and undiagnosed CAD were excluded. Patients were divided into groups of PCAD (Age=45 years) and MCAD (Age>45 years). All were serving male patients. Mean age was analyzed separately for officers and other ranks. Associated risk factors for CAD, like hypertension, diabetes mellitus, smoking habit, dyslipidemia and history of CAD among other family members were separately analyzed for PCAD and MCAD.

Results

Total 67 CAD patients of different military organizations were studied. Among them, 28 patients were diagnosed as early-onset coronary artery disease (PCAD) and 39 patients were found as mature onset coronary artery disease (MCAD). Among 14 officers, 08 patients had PCAD and 06 had MCAD. The mean age of officers and other ranks those developed PCAD were 40.03 and 40.20,

and those developed MCAD were 51.66 and 48.61 years respectively (Table-I). Pattern of total PCAD among officers and others was 41.79%.

Among total 67 CAD patients, highest number (30, 44.77%) of patients presented with the features of STEMI and out of 28 PCAD cases, 14 patients also presented with the features of STEMI (Table-III). Associated risk factors were Hypertension, Diabetes mellitus, smoking habit, dyslipidemia, over weight and history of CAD among other family members (Table-II).

Analysis revealed that, most of the cases were associated with one or more above CAD risk factors. Significantly higher rate of smoking habit (18, 26.86%) and significant family history (14, 20.89%) were observed among the patients with PCAD but comparatively higher rate of hypertension (18, 26.86%) and dyslipidemia (14, 20.89%) were observed among the patients with MCAD (Table-IV).

Table-I: Mean age of early-onset and mature-onset CAD (n=67)

Patient Characteristics	Mean age of PCAD (year)	Mean age of MCAD (year)
Officer	40.03	51.66
Others	40.20	48.61

Table-II: Comparison between patients with premature-onset and mature-onset CAD (n=67)

Patient Characteristics	PCAD	MCAD
Officer	8 (11.94%)	6 (8.9%)
Others	20 (29.85%)	33 (49.25%)

Table-III: Comparison between PCAD and MCAD basing on clinical presentation (n=67)

Clinical Presentation	PCAD	MCAD
Stable angina	10 (14.92%)	10 (14.92%)
Unstable Angina/NSTEMI	4 (5.97%)	13 (19.40%)
STEMI	14 (20.89%)	16 (23.88%)

Table-IV: Comparison between PCAD and MCAD basing on risk factors (n=67)

Risk Factors	PCAD	MCAD
HTN	10 (14.92%)	18 (26.86%)
DM	5 (7.4%)	06 (8.95%)
Smoking	18 (26.86%)	12 (17.91%)
Obesity	12 (17.91%)	15 (22.38%)
Dyslipidemia	4 (5.97%)	14 (20.89%)
Family H/O PCAD	14 (20.89%)	11 (16.41%)

Discussion

CAD is defined as decreased blood flow to the heart muscle due to the build-up of atherosclerotic plaque in the coronary arteries of the heart. Globally, PCAD represents a significant burden and an important community health problem resulting in years of productive lives lost and an increased burden on the health system. More than four-fifths of PCAD presenters have at least one modifiable risk factor.^{5,6} Modifiable ischemic heart disease risk factors include smoking, high blood pressure, diabetes mellitus, physical inactivity, obesity, dyslipidemia, and psychosocial stress⁷ and non-modifiable ischemic heart disease risk factors are, gender, ethnicity, family history of heart disease and homocystinuria.⁸ Traditional CAD risk factors are; smoking, history of CAD among other family members, opium use and dyslipidemia are considered to be dominant in PCAD as compared to risk factors such as; hypertension, obesity, sedentary lifestyle and diabetes mellitus which are more prevalent among those who experience late-onset disease.⁹ Different pattern PCAD risk factors compared to healthy individuals having normal coronary arteries have been identified by a systematic review and a large-scaled survey done in Iran which revealed that risk factors such as; Strong

history of CAD among family members (90%), Cigarette smoking (66%) and dyslipidemia (52%) individually accounted for increased risk of PCAD as compared to controls.¹⁰ Current study showed a high prevalence of PCAD (41.97%) compared to most reports and studies conducted worldwide. These rates are higher than those reported by Muhammed et al from Iraq, Prasanth et al from Oman and Al-Noha et al from Saudi Arabia.¹¹ At the same time, reported rates of PCAD are much higher than those documented among the young people in the United State, India, China and Japan.¹² Although, this is lower only than the rate reported exclusively by Eahrni et al who found 55% of CAD in Malaysia is of premature onset.¹³ Various studies have reported smoking habit as a risk factor for CAD in young population.¹⁴ This study also identified smoking as a predisposing factor for CAD in young military members (26.86%).

Approximately 50% of the cases had a family history of early- onset of CAD which is also consistent with other studies worldwide. In this study, obesity, dyslipidemia and hypertension were more prevalent in mature onset CAD cases. Prevention and control of CAD risk factors can reduce the rate of CAD. This requires change at the level of the individual as well as the community.

Modifying precipitating risk factors like smoking habit, consuming too much fat and salt and a sedentary lifestyle together with the use of accessible and affordable preventive medicines, can lower the risk of CAD. Promotion of healthy lifestyle and regular exercise can also prevent CAD.

Conclusion

Pattern of PCAD is high in comparison to most of the studies around the world. Current smoker and history of CAD among family members were found to be significantly associated with the existence of CAD in patients aged ≤ 45 years. Screening the susceptible population at risk and controlling the cardiovascular risk factors will lead to reduce the epidemic and consequence of PCAD. It is important to focus efforts on primary prevention and effective control of all CAD related risk factors.

Acknowledgments

The authors are thankful to all the staffs of medical directorate, Bangladesh Air Force headquarters for their munificent cooperation.

References

1. Benjamin EJ, Muntner P, Alonso A et al. Heart disease and stroke Statistics-2019 update a report from the American Heart Association. *Circulation*. 2019; 139:e56–e528.
2. Sriharibabu M, Himabindu Y, Kabir Z. Prevalence and associated risk factors of coronary artery disease in a rural south Indian population on a governmental health insurance scheme. *J Ind Coll Cardiol*. 2012; 2(4):150–155.
3. Mendis S, Puska P, Norrving B et al. Global atlas on cardiovascular disease prevention and control: World Health. Organization. 2011.
4. Khot UN, Khot MB, Bajzer CT et al. Prevalence of conventional risk factors in patients with coronary heart disease. *JAMA*. 2003; 290(7):898–904.
5. Reibis R, Treszl A, Wegscheider K et al. Disparity in risk factor pattern in premature versus late-onset coronary artery disease: A survey of 15,381 patients. *Vasc Health Risk Manag*. 2012; 8:473.
6. Pillay A, Naidoo D: Atherosclerotic disease is the predominant aetiology of acute coronary syndrome in young adults. *Cardiovasc J Afr*. 2018; 29(1):36–42.
7. Malakar AK, Choudhury D, Halder B et al. A review on coronary artery disease, its risk factors and therapeutics. *J Cell Physiol*. 2019; 234(10):16812–123.
8. Poorzand H, Tsarouhas K, Hozhabrossadati SA et al. Risk factors of premature coronary artery disease in Iran: A systematic review and meta-analysis. *Eur J Clin Invest*. 2019; 49(7): e13124.
9. Khot UN, Khot MB, Bajzer CT et al. Prevalence of conventional risk factors in patients with coronary heart disease. *JAMA*. 2003; 290(7):898–904.
10. Chesebro J, Fuster V, Elveback L et al. Strong family history and cigarette smoking as risk factors of coronary artery disease in young adults. *Heart*. 1982; 47(1):78–83.
11. Tabei SMB, Senemar S, Saffari B et al. Non-modifiable factors of coronary artery stenosis in late onset patients with coronary artery disease in Southern Iranian population. *Journal of Cardiovascular and Thoracic Research*. 2014; 6(1):51–5.
12. Chandra NC, Ziegelstein RC, Rogers WJ et al. Observations of the treatment of women in the United States with myocardial infarction: A report from the National Registry of Myocardial Infarction-I. *Arch. Intern Med*. 1998; 158(9):981–8.
13. Morovatdar N, Bondarsahebi Y, Khorrampazhouh N, et al. Risk Factor Patterns for Premature Versus Late-Onset Coronary Artery Disease in Iran. A Systematic Review and Meta-Analysis. *Open Cardiovasc Med J*. 2019; 13(1):5–12.
14. Vikulova DN, Grubisic M, Zhao Y et al. Premature atherosclerotic cardiovascular disease: Trends in incidence, risk factors and sex-related differences, 2000 to 2016. *J Am Heart Assoc*. 2019; 8(14): e012178.