RESEARCH PAPER

Acute coronary syndrome below 50 years

Hamid A. Abdulsada [1*], **Saad Shaheen Hamadi** [2]

1 *FICMS(Med), FICMS (card), Consultant cardiologist, Basra Cardiac center.
2 FICMS (med), Prof of medicine, College of Medicine, University of Basrah

Abstract

Coronary artery disease is a catastrophic diseased, despite the recent decline in mortality, with improving facilities, more distressing if occurs in young, clearly because an otherwise healthy adult may die or become disabled without caution, besides the tragic consequences for the family, friends, and the job might be unexpected. The study aims to focus on these physically active groups and to get an idea about how to prevent them.

Methods: In a prospective study 365 patients with an acute coronary syndrome, of them, 117 adults age less than 50 years and 248 patients were above 50 yrs., underwent coronary angiography. were assessed comparatively for the contribution of many risk factors with the clinical and angiographic variable.

Results: about one-third of cases who present with the acute coronary syndrome were more young, male, and smoker, with a family history of ischemic heart disease, more likely to had a myocardial infarction, rather than angina, usually single-vessel disease, with low high-density lipoprotein.

Conclusion: In our study, we found a strong association with smoking, family history and low HDL with early ischemic heart disease. Abstinence from smoking with diet and exercise might help to improve these major risks. Screening for CHD in the young population may help to improve prognosis in young patients by detecting subclinical disease.

Keywords: Acute coronary syndrome in young, Early coronary artery disease, premature atherosclerosis

Corresponding to:

Hamid A. Abdulsada, FICMS(Med), FICMS (card), Consultant cardiologist, Basra Cardiac center.

✉ drheart7h@yahoo.com

Introduction

The prevalence of the ischemic heart disease in young disease has been grossly underestimated, Indeed, an investigation was undertaken in a cohort of recently transplanted hearts (mean donor age 33.4 ± 13.2 years) by Tuzcu et al., and assessment with intravascular ultrasound found that one in six teenagers manifesting coronary lesions. Other Indian study showed The incidence of CAD in the young reported to be 12%–16% in Indians. Half of the CVD-related deaths (52% of CVDs) in India occur below the age of 50 years, and about 25% of acute myocardial infarction (MI) in India occurs under the age of 40 years [1,2] It is well recognized that these patients are mainly male and have several coronary risk factors, but this is a fact easily made of many older CAD patients as well, However Cigarette smoking has been the single factor most strongly associated with CAD in the young adult. Kennel et al. found in patients included in the Framingham Heart Study, the relative risk for CAD was about three times higher in smokers age 35 to 44, compared to non-smokers[3] Few studies have systematically

analyzed the lipid panels of this population of patients. Isser et al. found significant elevation of triglycerides and lipoprotein (a) (Lp[a]) levels and depression of high-density lipoprotein (HDL) cholesterol in young patients presenting with their first MI, compared with age- and gender-matched controls[4]. The investigators found diabetes and smoking to be predictive of mortality, along with prior MI and heart failure. The latter two variables are not surprising, but the independent impact on the outcome of these two risk factors surely has a deeper pathogenic meaning [5]. A growing body of evidence, for example, shows that specific lipid abnormalities may be genetically transmitted to the offspring of patients with severe CAD. Uiterwaal et al. found lower levels of HDL cholesterol and apolipoprotein A2 in male children of CAD patients. Similar but more modest trends were also identified in the female children of these patients [6] .Presentation with symptomatic CAD but without an acute infarction is uncommon, perhaps not surprisingly given the likelihood of overlooking the diagnosis in young patients with chest pain Patients who undergo coronary angiography soon after acute MI typically have less extensive CAD and higher ejection fractions than older MI patients [7] The more common subgroup is characterized by single-vessel, and often single-stenosis, disease, presumably related to acute plaque rupture, with an excellent three-year outcome. The favorable prognosis was believed to be related to preserved left ventricular function without multivessel involvement as authorized by Klein et al. [8] In young patients with a single culprit lesion, and among most women (especially those with dissection or coronary spasm), a plaque rupture on a previously nonsignificant vulnerable plaque is usually the

mechanism of acute presentation. Such cases are likely related to acute physical and/or emotional stress, resulting in enhanced coronary shear forces [9]. If these patients do not alter their lifestyles, CAD progression at an earlier age than usual will result, but it may be avoided by following established preventive measures. This group has a substantial vasospastic component superimposed on a genetic predisposition to vulnerable plaque production. Conversely, a second group is comprised of those with diabetes and others who present with established multivessel disease (including those related to lipid abnormalities). These patients are most likely to have a rapid progression of a more typical form of CAD. They will experience only short-term benefit from revascularization unless very aggressive control over risk factors is strictly adhered to the interaction between a genetic propensity to form vulnerable plaque combined with acute stress and/or an active infectious/inflammatory process needs further study

Methods
Patient characteristics: The study was performed in Basra cardiac center, where 365 patients were subjected to coronary angiography because of acute coronary syndrome from April 2016 till December 2019, Each patient had a full history and clinical examination including assessment of coronary risk factors. Fasting blood sugar, total cholesterol, and triglyceride. Full cardiological assessment including ECG, Echocardiography, cardiac enzyme, and angiography. All these tests were performed using the standard method. Exclusion criteria: Patients with previously known primary valvular heart disease, valvular replacement, congenital heart disease, non-

ischemic cardiomyopathy, and those who had chronic stable angina. ANGIOGRAPHIC ASSESSMENT Coronary arteriography was performed by Judkin's technique and coronary angiograms were visually analyzed by two experienced cardiologists. The degree of luminal narrowing was given in percentage from the prestenotic diameter. The left anterior descending, circumflex, and left main stem coronary arteries were considered to be normal i.e. (0%), stenosis or obstructed (25%, 50%, 75%, 90%, 99%, 100%) according to maximum obstruction observed in any projection. DEFINITION OF CLINICAL VARIABLES Nine variables have been studied with their relation to angiographic severity of CAD, the type of intervention · Age (in Years): We divided the population into two groups according to age, those less than 50 years, and those above 50 yrs. · Hypertension: Patients were classified as hypertensive if they have a history of hypertension under treatment[10] · Diabetes Mellitus: Diabetes has been classified by simply history, by the use of insulin or other hypoglycemic agents or by fasting blood sugar more than 126mg/dl [12]. · Hyperlipidemia once considered being present if total cholesterol greater than 200mg/dl or serum triglyceride greater than 250mg/dl or both [13]. · Smoking: Was considered present if the patient currently smokes 10 cigarettes per day or more [14]. · Family History of CAD: This variable should be defined as having a cardiac event (infarction, angioplasty, bypass, sudden in a first degree relative under the age of 55 years for men and 65 years for women[12]. · Ejection Fraction: A value of less than 50% is considered to be abnormal [15] · history of MI as documented by E.C.G. and previous admission to CCU.

Results

Description of the Study Sample: Total number of patient sample were 365 patients underwent coronary presented with acute coronary syndrome. We divide the patient sample in two groups, above and below the age of 50 yrs. A third of cases were below the age of 50 yrs. Although the majority were male in both groups the female percentage were double the number in elderly. as shown in Fig (1).
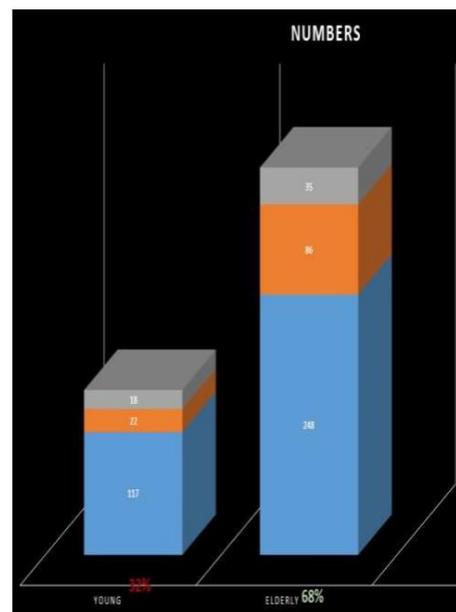

Fig (1) distribution of study sample into two groups, above and below 50,femal constitute 18 of the young and 35% of elderly

As shown in Fig (2), the majority of below 50 yrs. group were smokers, with positive family history of ischemic heart disease. while those above 50 yrs. are hypertensive, diabetic. The majority of the young age group was with a normal body built, while the elderly age group body built were equally distributed.

In all age groups, low HDL is found in the majority of cases however high cholesterol more clear in the elderly group. Fig (3).
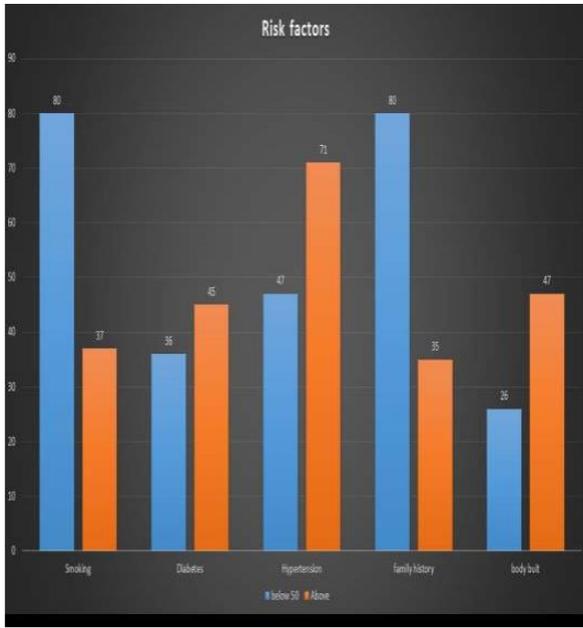
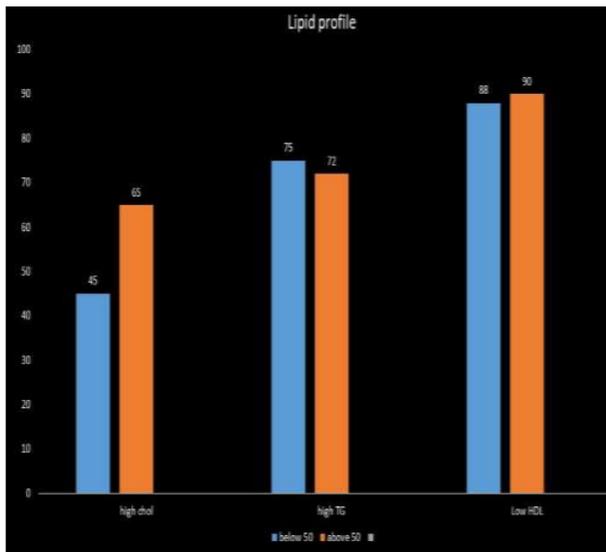Fig 2 the distribution of risk factors between the two groups

Fig (3) lipid profile distribution

Myocardial infarction with ST-elevation or NSTEMI in the young age group, while in the elderly age group those usually presented with unstable angina and NSDTEMI, those young present with STEMI more than elderly age group this is shown in the Fig (4). Regarding ECG changes in acute coronary syndrome in

these two age groups, in both groups, ECG was normal in fifth cases, but Q wave changes seen more than elderly while ST changes and T wave changes are seen more in the elderly. As shown in the Fig (5).
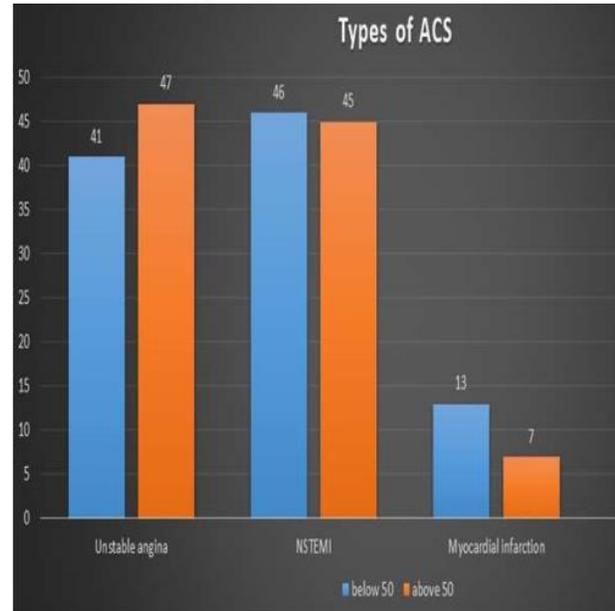

Fig (4) the pattern of Acute coronary syndrome in a patient sample
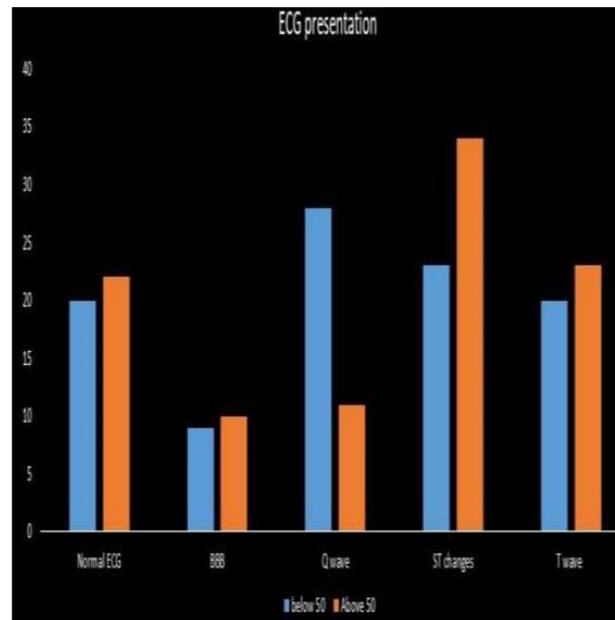

Fig (5) the patent of ECG finding in acute coronary syndrome.

Single vessel disease presents the majority in the young age group while those elders are more likely to have the two-vessel disease as shown in the Fig (6).
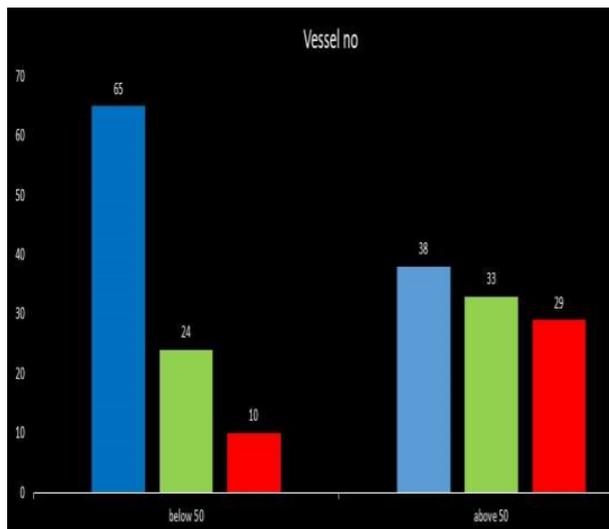

Fig (6) The distribution of the range of coronary vessel involved.

The left anterior descending coronary artery was the predominant vessel at the young age group, but this is also the dominant vessel in the elderly besides the high percentage of involvement of the right coronary artery and left circumflex were more involved in the elderly group as shown in the Fig (7).
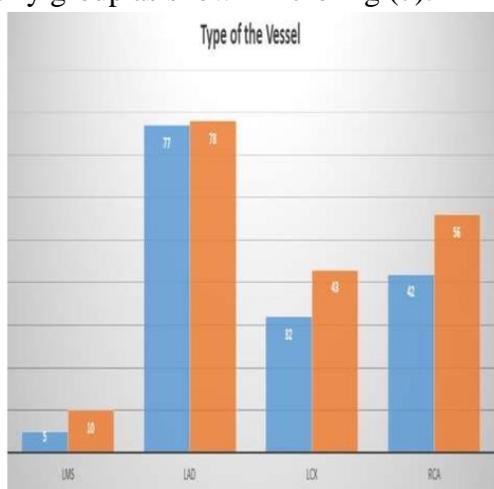

Fig (7) shows the percentage of the involved vessel.

Bifurcation lesion seen in both groups but more total cut due to thrombus containing lesion was more evident in the young age group as seen in the Fig (8) The percutaneous coronary intervention was the dominant intervention tool for both group, but more surgery was seen in the elderly age group about 25% of them referred for surgery, while only 11% of young referred to surgery.
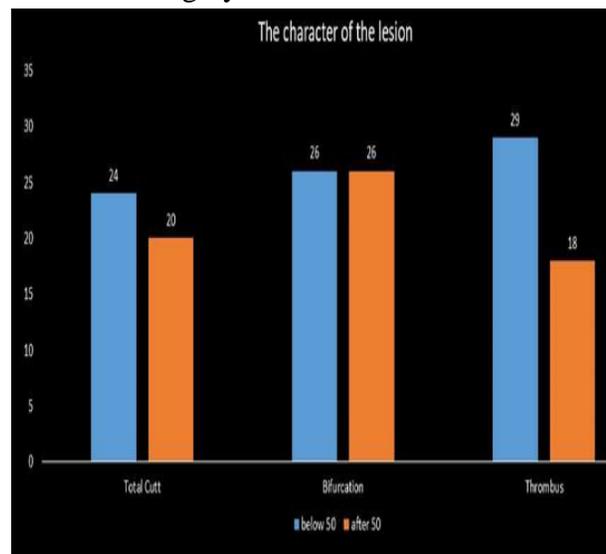

Fig (8) shows the pattern of the involved vessel.

Discussion

This angiographic comparative study focused on the character of two groups, below and above 50 years, with analysis of the risk factor, comorbidity, and other clinical variables like ECG and cardiac echocardiography analysis of Left ventricle ejection fraction, this study gives special attention for the Acute coronary syndrome in below 50 years. Smoking was the strongest risk factor that correlates with IHD in the young group, the smoker was present in 80% of cases of acute coronary syndrome in young. Another risk factor although not uncommon but when present usually correlated with double and triple vessel disease, this is in agreement with Kannel et al. [3] found in patients included in the

Framingham Heart Study, the relative risk for CAD was about three times higher in smokers age 35 to 44, compared to nonsmokers Single vessel diseases present in the majority of ischemic heart disease, usually thrombus contacting lesions. An elderly group where most likely to had unstable angina and NSTEMI, this is mostly related to the presence of collateral, which develops from previous ischemia Dyslipidemia, diabetes and especially low HDL although correlated with ischemic heart disease but in all age group this is an agreement with most studies [16] The other risk factor that also closely correlated with IHD in young is a positive family history of ischemic heart disease this is in agreement with Uiterwaal et al. [17]found lower levels of HDL cholesterol in male children of CAD patients The left anterior descending coronary artery was the most commonly affected vessels, although in elderly since mostly had more than one vessels, the right coronary artery and left circumflex also involved in less degree this is in agreement with a study from Klein who showed that Patients who undergo coronary angiography soon after acute MI typically have less extensive CAD and higher ejection fractions than older MI patients [5]. They have fewer comorbidities, are less disabled by recurrent angina and heart failure, and are more likely to return to work. Presentation with symptomatic CAD but without an acute infarction is uncommon, perhaps not surprisingly given the likelihood of overlooking the diagnosis in young patients with chest pain, this is explained by the fact that the elderly was more likely to had collateral blood supply as shown by cloin et al[18]. In a series of 403 patients with stable angina who underwent elective PCI and were then followed-up (mean follow-up period of 94 weeks) for

clinical events, those with poorly developed collaterals experienced a higher incidence of MI (4.1%), compared with the incidence of MI (0%; P ¼ 0.02) in patients with a well-developed collateral supply This remarkable finding may explain why STEMI is less in those with more age group who exposed to previous attacks that encourage coo; lateral. The most common modality of treatment was a percutaneous coronary intervention, although in the minority of cases 11% was referred to CABG, and although these mostly affected the more aging group

Conclusion

The acute coronary syndrome is not uncommon below age 50 years, and it is considered an important challenge for the patient and family. The fact that smoking is the most significant risk factor besides a family history of ischemic heart disease, low HDL, all these contribute to the early ischemia in these groups which might be explained by sudden exposure to social or physical stress. Risk factor identification and control is very crucial in primary and secondary prevention in young patients with CAD. The most likely angiography finding was a single-vessel disease, mainly the left anterior descending coronary artery, still, the best way was the percutaneous coronary intervention. In the majority, the prognosis was good, if medical help is done in an early time.

References

1. Tuzcu E.M., Kapadia S.R., Tutar E., et al. (2001) High prevalence of coronary atherosclerosis in asymptomatic teenagers and young adults: evidence

from intravascular ultrasound. Circulation 103:2705–2710.

2. Meenakshi S and Nirmal K. Premature Coronary Artery Disease in Indians and its Associated Risk Factors. Vasc Health Risk Manag 2005; 1(3): 217–225.

3. Kannel W., McGee D., Castelli W. (1984) Latest perspectives on cigarette smoking and cardiovascular disease: The Framingham Study. J Card Rehabil 4:267–277.

4. Isser H.S., Puri V.K., Narain V.S., Saran R.K., Dwivedi S.K., Singh S. (2001) Lipoprotein (a) and lipid levels in young patients with myocardial infarction and their first-degree relatives. Indian Heart J 53:463–466

5. Cole J.H., Miller J.I. III., Sperling L.S., Weintraub W.S. (2003) Long-term follow-up of coronary artery disease presenting in young adults. J Am Coll Cardiol 41:521–528

6. Iribarren C., Sidney S., Bild D.E., et al. (2000) Association of hostility with coronary artery calci

7. Klein L.W., Agarwal J.B., Herlich M.B., Leary T.M., Helfant R.H. (1987) Prognosis of symptomatic coronary artery disease in young adults aged 40 years or less. Am J Cardiol 60:1269–1272

8. . Klein L.W., Agarwal J.B., Herlich M.B., Leary T.M., Helfant R.H. (1987) Prognosis of symptomatic coronary artery disease in young adults aged 40 years or less. Am J Cardiol 60:1269–1272.

9. Chen L., Chester M., Kaski J.C. (1995) Clinical factors and angiographic patterns associated with premature coronary artery disease. Chest 108:364–369.

10. Lloyd W Klein and Sandeep Nathan. (2003) Coronary artery disease in young adults .J Am Coll Cardiol 41:4

11. Andrew P.Selwyn. Ischemic heart disease. In: Fauci, Braunwald, Issabacher K. 9eds). Harrison's principles of internal medicine.18thed, New York; McGraw Hill,2012:1345

12. Bemis CE, Gorlin R, Kemp HG, Herman MV. Progression of coronary artery disease: a clinical arteriographic study; Circulation. 1973;47:455-464

13. Bemis CE, Gorlin R, Kemp HG, Herman MV. Progression of coronary artery disease: a clinical arteriographic study; Circulation. 1973;47:455-464.

14. Bickell NA, Pieper KS, Lee KL. Referral patterns for coronary artery disease treatment: gender bias or good clinical judgment?, Ann Intern Med.1999;116:791-797

15. Yamada H, Dat.Morise.Multivariable analysis of clinical and exercise test data to predict angiographic coronary artery disease; The journal of non-invasive cardiology.1997; January/February:17.

16. Krolewski A.S., Kosinski E.J., Warram J.H., et al. (1987) Magnitude and determinants of coronary artery disease in juvenile-onset, insulin-dependent diabetes mellitus. *Am J Cardiol* 59:750–755

17. Iribarren C., Sidney S., Bild D.E., et al. (2000) Association of hostility with coronary artery calcium

18. Colin Berry, Kanarath P. Balachandran, Philippe importance of collateral circulation in coronary heart disease European Heart Journal (2007) 28, 278–291