

# A Comparative Study between Young Adults versus Older Patients Presenting to One Egyptian Heart Center with Acute Coronary Syndromes

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## Abstract

**Background:** Atherosclerosis is a fatal health problem, it is considered as the first cause of death worldwide. The number of young Egyptian patients who present to the emergency departments with acute coronary syndromes has increased over the last few years which make it worthy to search for the causes and risk factors for this disease.

**Aim of Study:** We did this study to compare between young patients and older patients presenting with acute coronary syndromes regarding the most common risk factors and the angiographic features.

**Patients and Methods:** In this study we selected 30 consecutive young patients aged  $\leq 40$  years who presented to our center with acute coronary syndromes (group A) then compared them to another Group of older patients aged  $\geq 60$  (group B) who also presented with the same disease. Risk factors for atherosclerosis and extent of coronary disease were compared in the two groups.

**Results:** Acute coronary syndromes in young adults were characterized by high prevalence of risk factors as hyperlipidemia, smoking and presence of a positive family history of premature coronary disease. Young patients with acute coronary syndromes mostly were males with normal major epicardial coronary vessels or single vessel disease.

**Conclusion:** Acute coronary syndromes in young adults occur mostly in males, smokers who have positive family history of premature coronary disease, younger patients with acute coronary syndromes have less coronary vessels affection compared to older patients.

**Key Words:** Acute coronary syndrome – Risk factors – Hyperlipidemia – Smoking – Diabetes – Young patients – Coronary artery disease.

## Introduction

**ATHEROSCLEROSIS** is fatal health problem, it is considered as the first cause of death worldwide. The number of young Egyptians presenting to the emergency departments with acute coronary syndromes has increased over the last few years

which makes it worthy to search for the causes and risk factors for this disease [1]. Some studies showed that nearly 90% of these young patients with acute coronary syndromes are predisposed to this disease as they are smokers with positive family history of premature coronary artery disease [2]. Smoking is a very important predisposing factor for atherosclerosis in young adults who present with acute coronary syndromes [3]. Diabetes mellitus is an important cause for atherosclerosis, frequently present in coronary disease patients below forty years of age. Diabetes is related to disease progression and complications [4].

## Aim of the study:

This study did this study to compare between young patients versus old patients presenting with acute coronary syndromes regarding gender, presence of the most common risk factors and the angiographic features.

## Patients and Methods

The study was done at the National Heart Institute, Cairo, Egypt between January 2022 and June 2022.

A written informed consent was obtained from all patients who were selected to participate in the study according to the hospital protocol. In this study we selected 30 consecutive young patients aged  $\leq 40$  years who presented with acute coronary syndromes (group A) then compared them to another Group of older patients aged  $\geq 60$  (group B) who also presented with the same disease, risk factors for atherosclerosis and extent of coronary disease were compared in the two groups.

All patients underwent the following, history taking with a special concern diseases that may lead to atherosclerosis and coronary insufficiency

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which are diabetes mellitus, hyperlipidemia, hypertension, history of premature coronary artery disease in parents or siblings and cigarette smoking, Examination stressing on the measurement of blood pressure. The blood pressure will be measured at three different occasions the average of the three reading define the blood pressure. The patient will be considered hypertensive if the blood pressure was more than 140/90mmHg or if he is already on medical treatment for hypertension. Auscultation for the presence of additional sounds, apical S3, apical S4, murmurs especially mitral regurgitation and auscultation of the back for the presence or absence of rales [5].

Twelve leads ECG and biochemical evaluation for hyperlipidemia (fasting total lipid profile). For diagnosis of diabetes all patients had (fasting then two hour post prandial blood glucose levels and Glycated Hemoglobin HBA1C) done.

Coronary Angiography was performed according to the standard protocol. Coronary arteries were viewed in multiple projections.

The studied patients were classified according to their coronary angiographic anatomy into 4 groups; 1<sup>st</sup> group with angiographically normal coronary arteries (no appreciable stenosis detected), 2<sup>nd</sup> group with a single vessel disease (even if it had more than one lesion), 3<sup>rd</sup> group with two vessel disease and 4<sup>th</sup> group with multi-vessel disease.

All results were tabulated and statistical analysis was performed using IBM compatible PC and the statistical software package namely (SPSS Inc., IBM, New York, USA). The results were analyzed by suitable statistical methods, which include mean, standard deviation, and Student's *t*-test. Data were considered significant at a *p*-value less than 0.05, highly significant at a *p*-value less than 0.001, and not significant at a *p*-value more than 0.05.

**Results**

The work was done at the National Heart Institute, Cairo, Egypt between January 2022 and June 2022. The study group consisted of 60 selected patients presenting with acute coronary syndromes. These patients were successively selected and divided into two groups. Group A with 30 patients aged 40 years or less and another subgroup B of 30 patients aged 60 years or more.

1- *Group A*: Included 30 patients with age less than or equal 40 years with a mean age of 35.5±4.5 years. Two patients are females, while 28 patients

were males. We found 50% (15/30 patients) hypertensives, 44.4% (16/30 patients) were diabetics, 86.5% (26/30 patients) were smokers, 66.5% (20/30 patients) were hyperlipidemics and 90% (27/30 patients) who gave history for the presence of premature coronary artery disease in their parents or siblings (Table 1).

2- *Group B*: Included 30 patients with age starting from 60 years or more with a mean age of 65.5±4.5 years, 14 patients were females. We found that 90% of the patients (27/30 patients) were hypertensives, 73% (26/30 patients) were diabetics, 26.5% (8/30 patients) were smokers, 76.5% (23/30 patients) were hyperlipidemics and 16.5% (5/30 patients) who gave history for the presence of premature coronary artery disease in their parents or siblings (Table 1).

Table (1): Showing the distribution of demographic data and risk factors among group A & B.

Item	Group A	Group B	<i>p</i> -value
Gender (female)	2	14	0.001
Gender(male)	28	16	0.033
Hypertension	15	27	0.031
Diabetes mellitus	16	26	0.039
Smokers	25	14	0.029
Hyperlipidemia	18	7	0.011
Positive family history of premature coronary disease	15	4	0.009

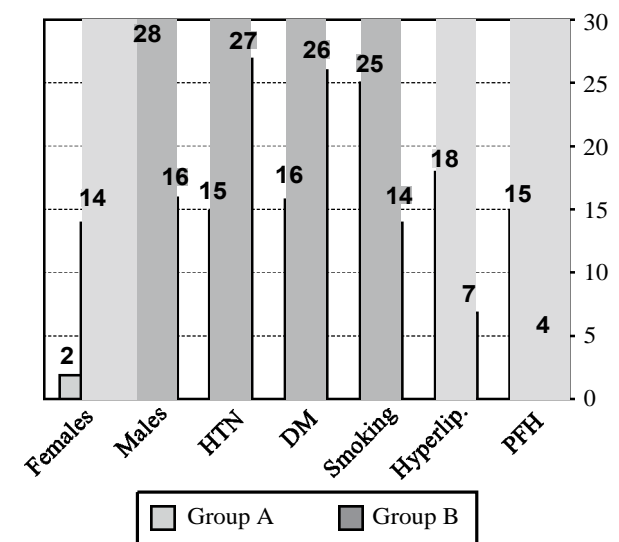


Fig. (1): Shows the distribution of demographic data and risk factors among group A & group B.

From the previous data shown in Table (1) & Fig. (1) on studying the risk factors of coronary artery diseases among patients in the study namely group A & group B, we found that there was a marked difference between the two group as regards

hypertension & diabetes mellitus & male gender with highly significant difference regarding female gender with tendency to the increased numbers of patients among the older group (group B). Also there was a marked difference between the two groups as regards smoking, hyperlipidemia & positive family history of coronary artery disease with tendency to the increased numbers of patients among the younger group (group A) which may indicate that cigarette smoking, hyperlipidemia & history for the presence of premature coronary artery disease in their parents or siblings, were the most important predisposing causes for coronary artery disease in the young adults.

*Angiographic characteristics among group A & B:*

*The patient's angiographic characteristics are summarized as follows:*

- 1- Group A: Among patients in group A we found, 9 (30%) are with normal coronary arteries, 15 (50%) patient with one vessel disease, 4 (13.5%) patients with two vessel disease & 2 (6.5%) patients with multi vessel disease (Table 2).
- 2- Group B: Among patients in group B we found, 1 patient (3.5%) with normal coronary arteries, 5 (16.5%) patients with one vessel disease, 11 (36.5%) patients with two vessel disease & 13 (43.5%) patients with multi vessel disease (Table 2).

Table (2): Showing angiographic characteristics among group A & B.

Item	Group A	Group B	p-value	Significance
Normal coronary arteries	9	1	0.001	Highly significant
One vessel disease	15	5	0.011	Significant
Two vessel disease	4	11	0.023	Significant
Multi vessel disease	2	13	0.001	Highly significant

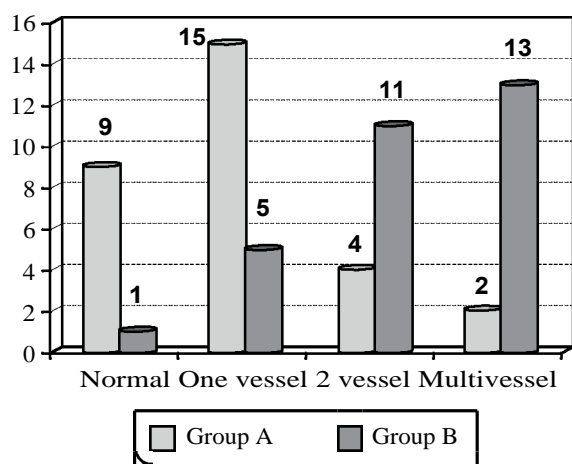


Fig. (2): Showing angiographic characteristics among group A & B.

From the previous data present in (Table 2 & Fig. 2) on studying the angiographic characteristics of the patients in the study we found that:

- 1- Regarding the presence of acute coronary syndromes with normal epicardial coronary vessels, there were more young patients in group A who had acute coronary syndromes with normal epicardial vessels compared to older patients in group B and the difference was statistically highly significant.
- 2- Regarding the presence of single vessel disease, there were more young patients in group A who had a single vessel disease compared to older patients from group B and the difference was statistically significant.
- 3- Regarding the presence of two vessel disease There were more old patients in group B who had two vessel disease compared to younger patients from group A, the difference was statistically significant.
- 4- Regarding the presence of multivessel disease, there were more old patients in group B who had three vessel disease compared to younger patients from group A and the difference was statistically highly significant.

The previous data analysis may indicate that, young patients presenting with acute coronary syndromes mostly had normal epicardial coronary vessels or just a single vessel disease whereas older patients had more incidence of two and three vessel coronary artery disease.

**Discussion**

Coronary artery disease, mainly acute coronary syndrome is a major health problem that faces not only patients but also physicians and health care systems. Acute coronary syndromes are major causes of mortality in many cases and in other cases. They may lead to heart failure that affects the quality of life of these young patients. There are many risk factors for atherosclerosis, most of these factors are modifiable either by controlling these factors or by completely stopping them. Diabetes, hypertension and hyperlipidemia are very important risk factors that can be controlled. Other risk factors can be stopped completely as smoking, which is a major predisposing factor for acute coronary syndromes in young adults [3].

Diabetes is a common predisposing factor for atherosclerosis and coronary insufficiency in young adults. Diabetes has powerful role in rapid atherosclerotic vascular disease progression [4].

*In our study, we found that:* Regarding predisposing causes of coronary artery diseases, diabetes and hypertension were more prevalent in older patients of group B. On the other hand smoking, hyperlipidemia and the presence of a family history of premature coronary disease in parents or siblings were more common in the relatively younger patients of group A.

*Regarding the pattern of coronary affection:* There were also a marked discrepancy between the two groups as regarding the number of affected coronary vessels where older patients of group B had significantly more patients with multi vessel & two vessel disease. On the other hand younger patients of group A had significantly more patients with normal epicardial coronary vessels and single vessel affection than older patients of group B.

#### *Hypertension:*

We found that there was a marked difference between group A & B regarding hypertension with more hypertensive patients in the older group (group B). This suggests that hypertension is a predisposing cause associated with late onset of coronary artery disease. Our findings are accordant with Wolfe MW [6] who studied the risk factors and angiographic features of young adults presenting with myocardial infarction. Another study by Uhl GS et al., [7]. Agreed with our findings.

Our results also were in concordance with Nitter-Hauge et al., [8] and Marcos RE et al., [9] who studied acute Coronary Syndrome in the Young.

#### *Diabetes mellitus:*

Our study found that there was a marked discrepancy between group A & B regarding the presence of Diabetes Mellitus with more diabetic patients among the older group (group B) this suggests that Diabetes Mellitus is a predisposing cause associated with late onset of coronary artery disease. These findings were in concordance with the findings presented by Wolfe et al., [6]. Also our findings were in concordance with the findings presented by Chouhan et al., [10]. Our results also were in concordance with Nitter-Hauge et al., [13] and Marcos RE et al., [9].

#### *Smoking:*

Our study showed that cigarette smoking was significantly more in younger patients of group A. This suggests that cigarette smoking is a predisposing cause associated with premature coronary artery disease. These findings were in concordance with the findings presented by Chouhan et al., [10]

and with the finding presented by Weinberger et al., [11] who studied the predisposing causes and clinical course of myocardial infarction in young adults under 30 years. Our results also were in concordance with Nitter-Hauge et al., [8] who studied the risk causes associated with early onset ischemic heart diseases and Marcos RE et al. [9].

#### *Hyperlipidemia:*

In our study, there was a markedly more number of patients with hyperlipidemia in young patients of group A compared to older patients in group B suggesting that hyperlipidemia is predisposing cause associated with early affection with coronary artery disease. Klein LW et al., [12], Nitter-Hauge S et al., [8], Uhl GS et al., [7] and Marcos RE et al., [9] showed similar results.

#### *Family history of premature coronary artery disease:*

Our study showed that the presence of a family history of premature coronary artery disease was significantly more in young acute coronary syndrome patients of group A than in older patients of group B suggesting that positive family history of coronary artery disease is a risk factor associated with early onset of coronary artery disease. These findings were in concordance with the findings presented by Chouhan et al., [10]. Our findings were similar to the findings presented by Uhl et al., [7], Nitter-Hauge et al., [8] and Marcos RE et al., [9].

#### *Angiographic characteristics:*

This study showed that there were significantly more patients with multivessel or with two vessel coronary disease in older patients of group B compared to young patients of group A. On the other hand, we found significantly more patients with normal coronary vessels and single vessel disease in younger patients of group A, these findings were in concordance with the findings presented by Nitter-Hauge et al., [8], Chouhan et al., [10], Nitter-Hauge et al., [8] and of Ragavarapu T et al., [13].

#### *Conclusion:*

- 1- Young patients with acute coronary syndromes were mostly males, smokers, with family history of early onset of coronary disease in their parents or siblings.
- 2- Young patients with acute coronary syndromes have less coronary affection (normal or single vessel coronary affection) than older patients who had more than one vessel affection.

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## مقارنة بين مرضى الشباب تحت سن الأربعين والمرضى الأكبر فوق سن الستين المصابين بأزمات الشريان التاجي الحادة

تمت هذه الدراسة في معهد القلب القومي في الفترة من يناير إلى يونيو سنة ٢٠٢٠ حيث تم اختيار مجموعة من ثلاثين مريضاً من فئة الشباب دون سن الأربعين وبين مجموعة أخرى من المرضى الأكبر سناً فوق سن الستين.

تم الكشف الإكلينيكي على جميع المرضى لبيان تواجد عوامل الخطورة مثل ارتفاع ضغط الدم ومرض السكر والتدخين وارتفاع الكوليسترول ووجود تاريخ مرضي وراثي للإصابة بمرض قصور الشرايين التاجية وتم إجراء قسطرة تشخيصية لجميع الحالات وتم عمل قسطرة علاجية مع تركيب دعائم دوائية لمن أثبت احتياجه لهذا الإجراء وتم تحويل بعض المرضى لجراحة القلب المفتوح.

تم مقارنة المجموعتين من حيث :

– تواجد عوامل الخطورة

– عدد الشرايين التاجية المتأثرة

وجد أن معظم المرضى الشباب من الذكور والمدخنين وأصحاب الكوليسترول المرتفع وكما وجد أن نسبة كبيرة منهم لهم تاريخ مرضي وراثي من قصور الشرايين التاجية.

من حيث عدد الشرايين المتأثرة وجد أن المرضى الأصغر سناً كانوا أقل تأثراً من حيث عدد الشرايين التاجية المصابة بعكس المرضى الأكبر سناً.