

Incidence, Clinical Presentation and Angiographic Findings among Patients with Coronary Artery Ectasia in Gaza

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Abstract

Background: Coronary artery ectasia (CAE) is a rare form of aneurysmal coronary heart disease. This condition increases risk of ischemia that led to stable angina pectoris and also acute coronary syndrome. **Objective:** To evaluate the incidence of CAE and to analyze clinical and angiographic characteristics among patients with symptomatic coronary artery disease. **Methods:** Retrospective trial of diagnostic coronary angiography which was performed at Alshifa hospital in Gaza, included all patients with coronary heart disease and underwent diagnostic coronary angiography from March 2014 to March 2023. We evaluate the incidence, clinical presentation and angiographic findings of patients with symptomatic coronary ectasia. **Results:** Of the 12,534 angiograms analyzed, CAE was found in 539 patients, an incidence of 4.3%. The mean age was 59.2 ± 11.7 years, and male gender predominated 81.8%. A 285 (52.9%) of patients found to have single ectatic vessel at their angiographic results. In two vessels 120 patients (22.3%), in three vessels 95 patients (17.6%) and in three vessel plus left main in 39 patients (7.2%). 70.9% angiograms showed pure ectasia without associated significant stenotic lesions in the same vessel. The right coronary artery (RCA) was the commonest affected vessel by ectasia. The most common presentation of patients is non ST segment elevation acute coronary syndrome. **Conclusion:** The incidence of coronary ectasia was 4.3%. Non ST segment elevation acute coronary syndrome was the most common clinical presenting. Only 30% of patients have additionally significant coronary artery stenosis. The majority of patients had single vessel involvement and right coronary artery was the most common involved vessel. Despite a deeper understanding of CAE in last years, there are still come critical issues about optimal treatment. Large multicenter randomized control trials are recommended to guide the clinician in the management of this complex sitting of patients.

Keywords

CAE, STEMI, Non-STE-ACS, Stable Angina Pectoris

1. Introduction

Coronary artery ectasia (CAE) is a rare cardiovascular anomaly or disease and it's defined a dilation of the coronary artery diameter 1.5 times greater than that of an adjacent normal diameter. The term "ectasia" refers to diffuse dilation of a coronary artery, while focal coronary dilation is called a "coronary aneurysm" [1]. It is may be congenital but usually acquired diseased associated with atherosclerosis and accompanies with coronary artery disease (CAD). The clinical presentation of CAE is not well defined in previous studies and conflicting results have been reported of the disease [2] [3].

The etiology of CAE is rare congenital causes associated with other cardiac abnormalities such as Kawasaki disease, bicuspid aortic valve, aortic root dilatation, ventricular septal defect or pulmonary stenosis. But the most acquired cause is Atherosclerosis, other causes associated with inflammatory and connective tissue diseases such as vasculitis, syphilis, and bacterial infections. Atherosclerosis lays claim to the principal etiologic cause responsible for greater than 50% of cases in adults, while Kawasaki disease is the most common cause in children and young adults [3]. The histology of atherosclerosis and ectasia is comparable [4].

Coronary angiography is the gold standard in diagnosing coronary artery ectasia. Distortions of flow and washout are common in CAE and are related to the severity of ectasia. Signs of stagnant flow include delayed antegrade contrast filling, segmental backflow, and stasis in the ectatic coronary segment [5].

The aim of this trail was to examine the incidence, clinical presentation, coronary arteries effected percentage in patients presents with symptomatic coronary heart disease.

2. Methods

2.1. Study Patients

We retrospectively reviewed the coronary angiograms of patients with coronary artery disease between March 2015 and March 2023 in Al-Shifa Hospital, Cardiology Department, Gaza, Palestine.

2.2. Study Protocol

2.2.1. Definitions

Clinical presentation: Patients was divided according to coronary artery disease for acute coronary syndrome (ST elevation myocardial infarction, non ST elevation acute coronary syndrome) or stable angina pectoris.

Coronary artery ectasia: Defined as a dilatation exceeding more than one-third of the coronary artery length with the diameter of the dilated segment measuring

more than 1.5 times the diameter of a normal adjacent segment.

Significant coronary artery stenosis: defined as >70% for all coronary arteries but left main coronary artery > 50% stenosis is considered significant.

2.2.2. Inclusion Criteria

- Patient with acute coronary syndrome.
- Patients with stable angina pectoris documentation by noninvasive test such as treadmill test, coronary angiography CT or dobutamin echocardiography.

2.2.3. Exclusion Criteria

Patient underwent coronary angiography because of preoperative valvular heart disease or non-coronary cardiac surgery.

2.3. Study End Points

- Incidence of CAE in the patients with coronary heart disease referred to our cardiac catheterization laboratory for diagnostic coronary angiography.
- Describe clinical presentations.
- Evaluate Angiographic characteristics.

2.4. Statistical Analysis

Data were analyzed with the SPSS V.21.0 (SPSS Inc., Chicago, Illinois, USA) for Windows statistical package. Parametric variables were expressed as mean (SD) and categorical variables were expressed as percentages.

3. Result

We analyzed 12534 diagnostic coronary angiograms for patients with coronary artery disease. Coronary artery ectasia was confirmed in 538 (4.3%) patients, (102 patients with STEMI, 281 patients Non STE-ACS, and 156 patients' stable angina pectoris). Mean age was 59.2 ± 11.7 years. Male patients was 441 (81.8%), the most common presentation of patients is non ST segment elevation acute coronary syndrome. **Table 1** baseline characteristics in study patients.

Table 1. Characteristics of patients.

Characteristic	Number: 539
Median age, years	59.2 ± 11.7
Gender, No. (%)	
Male	441 (81.8)
Female	98 (18.2)
Clinical Presentation, No. (%)	
STEMI	102 (18.9)
Non STE-ACS	281 (52.1)
Stable angina	156 (29.0)

STEMI: ST elevation myocardial infarction, Non STE-ACS: Non ST elevation acute coronary syndrome.

Table 2. Coronary angiography findings.

Results	No. (%)
LCX	241 (44.7)
LAD	213 (39.6)
RCA	372 (46.9)
Left main	73(13.6)
Ectatic vessels	
With stenosis	157 (29.1)
Without stenosis	382 (70.9)

RCA: right coronary artery. LCX: left circumflex coronary artery. LAD: left anterior descending artery.

3.1. Coronary Angiography Findings

The incidence of coronary ectasia was 4.3% (539 patients). A 382 patients (70.9%) angiograms showed pure ectasia without associated stenotic lesions in the same vessel. The right coronary artery (RCA) was the commonest affected vessel by ectasia 372 (46.9%) followed by the left circumflex coronary artery (LCX) 241 (44.7%) and then left anterior descending artery (LAD) 213 (39.6%) and then left main artery 73 (13.6%). In our series, 70.9% of patients with CAE did not present significant coronary artery stenosis. 29.1% of the patients with angiographically significant lesions presented ischemic heart disease (**Table 2**).

3.2. Number and Percentage of Ectatic Vessel

A 285 (52.9%) of patients found to have single ectatic vessel at their angiographic results. In two vessels 120 patients (22.3%), in three vessels 95 patients (17.6%) and in three vessel plus left main in 39 patients (7.2%).

Recommendation of Treatment

In our trial, the most patient treated by optimal medical treatment alone included high intensity statin (40 - 80 mg atorvastatin or 20 - 40 mg rosuvastatin), selective beta blocker (mostly bisoprolol 5 - 10 mg daily), ACE inhibitors (Ramipril 2.5 - 6 mg daily) and combination of antiplatelet and anticoagulation

For PCI patients; dual antiplatelet aspirin 100 mg plus clopidogrel 75 mg daily and warfarin according to INR 2-2 or rivaroxaban 2.5 mg twice daily for one month then single antiplatelet (aspirin 100 mg or clopidogrel 75 mg) plus warfarin according to INR 2-2 or rivaroxaban 2.5 mg twice daily for one year then anticoagulation alone lifelong

For patients without PCI; single antiplatelet (aspirin 100 mg or clopidogrel 75 mg) plus warfarin according to INR 2-2 or rivaroxaban 2.5 mg twice daily for one year then anticoagulation alone lifelong.

Besides the optimal medical management of CAE, there are other invasive revascularization options such as percutaneous coronary intervention and coronary artery bypass graft. Only 6.1% of patient underwent coronary artery by-pass grafting and about 35.2 % of patients underwent percutaneous coronary intervention (**Table 3**).

Table 3. Recommendation of treatment.

Treatment Recommendation	
OMT	316 (58.7)
PCI	190 (35.2)
CABG	33 (6.1)

OMT: Optimal medical treatment. PCI: percutaneous coronary intervention. CABG: coronary artery by-pass grafting.

4. Discussion

Coronary artery ectasia prevalence ranges from varies between 0.3% and 5.3% depending on series, but appears to have increased in recent years [6] [7] [8]. The ratio of male to female ratio was 3:1 [6]. According to our results CAE occurs predominantly in men and the incidence was 4.3%. Male to female ratio was 4:1. In some previous studies, the RCA was reported to be the most commonly involved vessel.

In our trial about 70.9% of patients have CAE without significant coronary artery stenosis. Only 30% of patients has significant coronary narrowing. Ectatic vessel may be an origin of thrombus formation with distal embolization, vasospasm or vessel rupture. Acute coronary syndrome (ACS) can also be caused by distal embolization or the development of an occlusive thrombus. Complications such as rupture and the formation of shunts are possible [9]. So that patients with CAE but without significant coronary stenosis may still present with angina pectoris, positive stress tests, or acute coronary syndromes [10] [11] [12]. In patients with isolated CAE, the degree of ectasia and backflow phenomenon in an ectatic left anterior descending artery were reported to be the most important angiographic markers of ischemia on exercise testing [13]. In our trial the clinical spectrum of CAE is variable, including stable angina pectoris, acute coronary syndrome, and myocardial infarction. The most common presentation in this study is non ST elevation acute coronary syndrome.

The recent study demonstrated a high risk of cardiovascular events at long term in patients with ACS and CAE duo to high complexity of the lesions and large thrombus burden. Bogana *et al.* showed that STEMI patients when compare to non STEMI patients had a higher long term cardiovascular events practically recurrent myocardial infarction, unstable angina pectoris and need for surgical revascularization [14]. Conversely, in recent met analysis included 6 observational trials of patients with STEMI treated by primary PCI, no difference of mortality between CAE and non CAE were reported [15].

A recent study from Japan showed increased prevalence of death and myocardial infarction in the CAE group among patients with acute MI [16]. Concluding that the presence of CAE predicted future cardiac events in patients with acute MI. The authors also suggested patients with CAE might benefit from anticoagulation treatment.

In our trial, the most patient treated by optimal medical treatment alone, only 6% of patient underwent coronary artery by-pass grafting and about 30% of pa-

tients underwent percutaneous coronary intervention. Despite of the identification of CAE since 50 years, the management is still a subject of debate due to insufficient evidence in the world, and there are no uniform guidelines yet. The available management options are pharmacologic therapy, percutaneous intervention, and surgery [17].

5. Conclusions

4.3% of the patients who underwent diagnostic coronary angiography in Alshifa hospital have coronary artery ectasia. About 70% of the patients have CAE without significant stenosis in coronary arteries. Slow blood flow in the coronary arteries can cause ischemia even when there is no associated coronary artery stenosis. Almost half of patients present with Non ST segment elevation acute coronary syndrome and right coronary artery (RCA) was the commonest affected vessel by ectasia.

The treatment of these patients is challenging, and treatment options included antiplatelet and coagulation therapy, PCI and CABG. Despite a dapper understanding of CAE in last years, there are still come critical issues about optimal treatment. Large multicenter trials are recommended to guide the clinician in the management of this complex sitting of patients.

6. Deterrence and Patient Education

Patients need to understand that until now there is no specific treatment for coronary ectasia and that the best course of action is diligent adherence to coronary artery medication regimens included of antiplatelet and anticoagulation. In the rare instances where PCI or surgery becomes necessary, they will need to understand the nature of the procedure and the requirements for postoperative recovery [18].

Ethics Statement

Because of our study is retrospective trial it's approved by the local Ethics Committee of Alshifahospital was in accord with (2017 - 2023). Informed consent was not obtained from all the study participants because it was a retrospective research and no extra medical interventions were introduced for all subjects.

Conflicts of Interest

The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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