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Distribution of Isolated Coronary Artery Ectasy According to Age Groups

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Objective: Coronary artery ectasy (CAE) is focal or diffuse dilation of coronary arteries. Age is a strong risk factor for coronary artery disease (CAD). We aimed to whether age is important for isolated CAE development and compare the patients with CAE and CAD in respect to age, sex and other cardiovascular risk factors.
Methods: The study was carried out on 32 patients with isolated CAE and 100 patients with CAD. The patients were divided into 4 groups according to their age. The groups were classified as Group I:<50 years, Group II: 50-59 years, Group III: 60-69 years, Group IV: >70 years.
Results: Mean ages of the patients with isolated CAE and CAD were 60.6±9.9 years and 61.4±9.5 years, respectively. There was no statistically significant difference between two groups in respect to age, sex and age distribution (p>0.05). Presence of hypertension, DM, smoking and other risk factors were also compared between two groups. DM and previous MI were more frequent in patients with CAD (p<0.05). The other risk factors were not different between CAD and CAE groups (p >0.05).
Conclusions: We have shown that age is not a major determinant for isolated CAE development. Risk factors other than DM were found to be similar to patients with CAD.
Key words: Coronary Artery Disease, Coronary Arter Ectasia, Age

İzole Koroner Arter Ektazisinin Yaş Gruplarına Göre Dağılımı

Amaç: Koroner arter ektazisi (KAE) koroner arterlerin fokal ya da diffüz dilatasyonudur. Yaş koroner arter hastalığı (KAH) için güçlü bir risk faktörüdür. Biz yaşın izole KAE gelişiminde önemli olup olmadığını ve izole KAE olguları ile KAH olgularının yaş, cinsiyet ve diğer kardiyovasküler risk faktörleri yönünden karşılaştırılmasını amaçladık.
Yöntemler: Çalışma izole koroner arter ektazili 32 hasta ve koroner arter hastalığı olan 100 hasta üzerinde yapıldı. Hastalar yaş gruplarına göre 4' e bölündü. Gruplar, Grup I: < 50 yaş, Grup II: 50-59 yaş, Grup III: 60-69 yaş, Grup IV: > 70 olarak ayrıldı.
Bulgular: İzole KAE'li hastaların ortalama yaşları 60.6±9.9, KAH grubunun ortalama yaşları 61.4±9.5 olarak bulundu. İki grup arasında yaş, cinsiyet ve yaş grupları açısından istatistiki anlamlı fark saptanmadı (p>0.05). Her iki grup hipertansiyon, sigara, diabet ve diğer risk faktörleri yönünden de kıyaslandı. DM ve MI öyküsü KAH'lı hasta grubunda daha yüksek bulundu (p<0.05). Diğer risk faktörleri KAE ve KAH gruplarında farklı değildi (p>0.05).
Sonuç: Biz yaşın KAE gelişiminde ön planda olmadığını gösterdik. DM dışında diğer risk faktörlerinin koroner arter hastalığı bulunan hastalarla benzer olduğu bulundu.
Anahtar kelimeler: Koroner Arter Hastalığı, Koroner Arter Ektazisi, Yaş

Introduction

Coronary artery ectasia (CAE) has been defined as focal or diffuse dilatation of coronary arteries. Although presence of CAE has been known for a long time, the etiology and pathogenesis of this disease is not exactly recognized. Besides, potential risk factors that causes the dilatation has not yet been explained thoroughly. Isolated CAE describes the cases in which there are no coronary artery disease (CAD), valvular heart disease and other cardiac diseases and constitutes a small portion of total CAE. The incidence of CAE is 0.3% to 4.9% in subjects whom coronary angiography was performed with a suspicion of CAD.[1-4] CAE occurs in males more commonly than females.[4-6]

There are some responsible constituents for the development of CAE which are atherosclerosis (50%), and congenital (20-30%) and inflammation and collagen tissue disease (10-20%).[2,7,8] In some studies carried out previously, while hypertension (HT)[2,9]and familial hypercholesterolemia[5] were noted as important risk factors in the development of CAE, the risk factors that play a role in the development of CAE are obscure.

In the previous studies, age was not considered to be an important risk factor in the development of CAE.[2,5,10,11] Age is strong risk factor for CAD. The occurrence of atherosclerosis continuously increases until the age of 65 not depending on the sex and ethnical factors.[12,13] Besides, mortality of CAD continuously increases depending on the age. This condition prolongs the exposure duration to atherosclerosis risk factors depending on age. In terms of CAD many risk factors increases depending on age. On the other hand, when

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other risk factors are equalized, vascular mortality each decade increases 3 folds depending on the further ages [14]

In this study, it is aimed to obtain case related factors with isolated CAE and CAD and to make comparisons of them from the point of cardiovascular risk factors.

Materials and methods

89 patients diagnosed with CAE out of 5287 patients whom coronary angiography were performed between July 2001 to January 2004 at Turgut Özal Medical Centre included into the study. The control groups was constituted with 100 patients with documented CAD who subjected to coronary angiography in the same center between the dates September 2003 to December 2003. As clinical information related to 9 patients with CAE couldn't not be obtained and 48 of 89 patients with CAE have coronary artery disease in terms of angiography, they were not included into the study. As a result, 32 patients who were found to have isolated CAE and 100 patients who were found to have CAD were included into the study.

CAE is determined to according to the angiographic description made by Hartnell and his colleagues.[1] Briefly, in this description, angiographic identification of the CAEs were accepted as characterized lesions that occurs in form of 1.5 fold lumen enlargement of the epicardial coronary arteries according to normal segment in the same artery or other epicardial coronary artery. The angiographic description of the CAD was accepted as had more than 50% plugging lesion at least in the large coronary artery.

The patients were classified into 4 groups in turns of their age groups. The groups were classified as Group I: < 50 years, Group II: 50-59 years, Group III: 60-69 years, Group IV: > 70 years.

The following clinical and demographic parameters were recorded: Age, sex, hypertension (known hypertension treated with antihypertensive drugs, two or more blood pressure recordings greater than 140/90 mmHg), diabetes mellitus (known diabetes treated with diet or drugs or both; or a fasting serum glucose of more than 126 mg/dl) and hypercholesterolemia (known, treated hypercholesterolemia or fasting or non-fasting serum cholesterol concentrations higher than 200 mg/dl).

Statistical analysis

Results are presented as mean±SD for continuous variables and as percentage for categorical variables. Continuous variables were compared using unpaired t-test and categorical variables were compared by X^2 test and Fisher's exact test. Statistical significance was described as P-value less than 0.05

Results

The mean age was 60.6±9.9 in the isolated CAE group and 61.4±9.5 in CAD group. The male number of patients with isolated CAE was 21/32 (65.6%) and 76/100 (76%) in CAD group. There was not statistically important diversity between the two groups in terms of age and sex (p >0.05).

Two groups were compared in terms of hypertension, smoking, years of cigarette, total cholesterol, low density lipoprotein (LDL), high density lipoprotein (HDL), triglyceride and MI history (Table 1). There was not statistically significant difference between the two groups (p>0.05) except for DM and MI history. DM and MI history was found to be higher in control group with CAD than patient group with CAE (p<0.05).
The percent of patients in each age subgroups were compared between CAE and CAD groups. There was not a statistically significant difference between the

Table 1. Demographic features of the patients.

	Isolated CAE	CAD	
Age	60.6±9.9	61.4±9.5	p >0.05
Sex	21/32 (%65.6)	76/100 (%76)	p >0.05
HT	14/32 (%43.8)	43/100 (%43)	p >0.05
Smoking	15/32 (%46.9)	56/100 (%56)	p >0.05
Cigaratte year	31.8±13.3	26.9±11.9	p >0.05
DM	3/32(%9.4)	27/100 (%24)	p<0.05
TK	193.9±43.7	192.9±39.6	p >0.05
LDL	129.1±33.5	120.2±31.7	p >0.05
HDL	39.1±4.6	37.1.9±6.6	p >0.05
TG	143±63.5	171.5±84.9	p >0.05
MI history	4/32 (%12.5)	50/100 (%50)	p<0.05

Abbreviations and notes: HT: Hipertension, DM: Diabetes mellitus, TK: Total cholesterol, LDL: Low density lipoprotein, HDL:High density lipoprotein, TG: Triglyceride, MI: Myocardial infarction, CAE: Coronary artery ectasy, CAD: Coronary artery disease.

patients with CAE and CAD during one to one comparison of age groups (group I, II, III, IV) ($p>0.05$). However, the patients younger than 50 years (group I) were compared in their own groups (group II, III, IV), there was not a statistically significant difference in patients with CAE ($p>0.05$). But, the patients younger than 50 years were compared in their own groups (group II, III, IV), there was statistically significant difference in patient with CAD ($p<0.05$). The distribution of the patients with isolated CAE and control patients with CAD who were included into the study was indicated on Table 2.

When the coronary angiographic properties of patients with CAE are taken into consideration, ectasy was found in the right coronary artery (RCA) in 28 patients (87%), in left anterior descending (LAD) coronary artery in 17 patients (53%) and in left circumflex artery (Cx) in 10 patients (31%). In addition, CAE was found in one artery of 16 patients (50%) in two arteries of 9 patients (28%) and in three arteries of 7 patients (22%). The angiographic properties of patients with CAE was indicated on Table 3.

Discussion

CAE is abnormal dilatation of coronary arteries. When accompanying CAD is taken into consideration, CAE incidence was found between 0.3% to 4.9%[1,2,4] Angiographic incidence of isolated CAE has been reported to be between 0.1% to 0.32% [1,4.] The locations of CAE are 40-87% RCA, 25-50% LAD, 24-50% Cx, and 7% LM, respectively [1,4,8,9] CAE is seen more common in males.[4,5,6]

In this study, incidence of CAE has been found as 1.7% and incidence of isolated CAE has been found as 0.6%. The most frequent location of it has been found as 87% RCA, 53% LAD and 31% Cx, respectively. Lesion has not been found in LM. Besides, it has been found that CAE occurs in males more often (65.6%). All these results were compatible with the results of previous studies.

In the previous studies, age was not regarded as an important risk factor in the development of CAE. [2,5,10,11] In some studies, HT was regarded as an important risk factor in the development of CAE. [2,9]
In our study, the age of patients with CAE was found to be 60.6 ± 9.9 years and of the ones with CAD was found to be 61.4 ± 9.5 years. There was not significant difference between two groups in terms of age ($p> 0.05$). When the patients in each age subgroups were compared during one to one comparison of age groups, there was not a statistically significant difference between the patients with CAE and CAD ($p>0.05$). However, the number of the patients younger than 50 year samong the patients with CAD was smaller than of the patients with CAD in other groups and this case constituted a statistically significant difference ($p<0.05$).

Besides, both groups were compared in terms of HT, DM, smoking, cholesterol panel, MI history and family history. While DM and MI history of control group with CAD was higher than patients with CAE, there was not a statistical significant to be found between both groups in terms of other parameters.

DM is an important risk factor for CAD. The

Table 2. The distribution of the patients with isolated CAE and control patients with CAD according to their age groups.

		Isolated CAE	CAD	
Group I	< 50	5 (%15.6) *****	15 (%15) **#**	p> 0.05
Group II	50-59	8 (%25)	24 (%24)	p> 0.05
Group III	60-69	10 (%31.3)	37 (%37)	p> 0.05
Group IV	> 70	9 (%28.1)	24 (%24)	p> 0.05

Abbreviations and notes: CAE: Coronary artery ectasy , CAD: Coronary artery disease
*** :** when compared with Groups II, III, IV, it is p> 0.05
 # : when compared with Groups II, III, IV, it is p< 0.05

Table 3. Angiographic properties of patients with CAE.

Localization of coronary artery ectasies	
Left main coronary artery	0/32 (%0)
Left anterior descending coronary artery	17/32 (%53)
Left circumflex artery	10/32 (%31)
Right coronary artery	28/32 (%87)
Number of artery with coronary artery ectasy	
One artery	16/32 (%50)
Two artery	9/32 (%28)
Three artery	7/32 (%22)

mechanisms that inflict atherosclerosis of DM contains low HDL, high triglyceride/increased lipoprotein remnant particles, increased low intense LDL, increased lipoprotein oxidation, increased fibrinogen, increased trombosit aggregation, increased PAI-1, destroyed fibrinolysis, hyperinsulinemia, and endothelial dysfunctions. While media damage plays an important role in the development of CAE, the important impacts of diabetes are especially on intima. Also, there is a significant decrease in the effects of nitric oxide and other potential agents in the patients with DM. Thus, we can say that the effect of coronary arteries of DM is in the form of contraction rather than enlargement.

Even if the existence of CAEs has been known for ages, its pathogenesis has not been identified completely. Since CAE accompanied commonly with CAD and time to time existance of atherosclerotic ulcerations in ecstatic segments lead us to think that atherosclerosis is the most prominent cause of CAEs[15] Recently, the imbalance between coronary dilatation constructive positive effect of nitric oxide and chronic stimulation negative effect caused by endothelium-derived relaxation factor in the development of CAE has been proved to be of importance [16]

In association with age, function loss occurs in many organs and systems gradually. Large arteries become dilated in healthy people in association with aging. In addition, elasticity and compliance of aorta and large arteries is reduced.[17] The reason of changes is not known exactly. Besides, these changes occurs in males more than in females.[18]

In the previous studies, it was proven that CAE and abdominal aorta aneurysms (AAA) features the same pathogeneses and histological characteristics. [19,20] AAA is described as abnormal dilatation of abdominal aorta. The location it is viewed most frequently is infra-renal artery region. The reason why infra-renal region is most affected is inefficiency of vasa vasorum in this region and thus inefficient nourishment of media layer. The most frequent reason is atherosclerosis. Age is an important risk factor in the development of AAA. [21,22] Other risk factors are male sex, hypertension and cigarette.

Even though CAE and AAA, posses the similar pathogeneses and histological properties, age is a strong risk factor for AAA while it is not so effective in the development of CAE. The reason of it can be explained through different effects of age on arterial system. The regions that age dominantly effects in arterial system are the locations where there is an abundant elastic substance such as aorta. In contrast, the effects of age can occur less in muscular arteries such as coronary arteries.[23-25] In the studies where there was a comparison regarding the effects of age on central and peripheral artery stiffness, it could be viewed that central stiffness such as aorta could develop 2-3 times more than peripheral artery stiffness.[26] Therefore, we can say that age is important for AAA, but not so important for the development of CAE.

Conclusion

Age is not a major determinant for isolated CAE development. Risk factors other than DM were found to be similar to patients with CAD. These results should be supported by studies containing larger group of patients.

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