

Angiomegaly and arterial aneurysms

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SUMMARY: Angiomegaly and arterial aneurysms.

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Angiomegaly is characterized by an alteration in the elastic component of arterial and venous vessels determining their elongation and tortuosity. This involves an increased risk of thromboembolism and aneurysmal degeneration in affected subjects, even if they have been asymptomatic for a long time.

The aim of this study is to demonstrate the correlation between angiomegaly and aneurysmal disease. A total of 163 patients suffering from a peripheral arterial aneurysm were included, 74 of these with an iliac aneurysm, 41 with a femoral aneurysm and 48 suffering from popliteal aneurysm. All patients were examined by color Doppler ultrasonography (CDU) and angio-CT with contrast medium. Eighteen cases of arteriomegaly were diagnosed, and the prevalence in the examined population was 11%.

This study demonstrates the close association existing between aneurysms in peripheral arteries and arteriomegaly. Peripheral arterial aneurysms in association with arteriomegaly involve an increased risk of complications like thrombosis, embolism and rupture. The showed familiarity in the arteriomegaly incidence leads to predisposition of screening programs, using CDU, among relatives of patients affected by arteriomegaly and/or peripheral arterial aneurysms.

RIASSUNTO: Angiomegalia e aneurismi arteriosi.

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L'angiomegalia è caratterizzata da un'alterazione della componente elastica dei vasi arteriosi e venosi che determina allungamento e tortuosità di questi. Ciò comporta un aumentato rischio di tromboembolie e di degenerazione aneurismatica nei soggetti affetti, anche se asintomatici per un lungo periodo di tempo.

Il presente studio ha voluto dimostrare la correlazione tra angiomegalia e patologia aneurismatica. Sono stati inclusi 163 pazienti affetti da aneurisma arterioso periferico, di cui 74 da aneurisma iliaco, 41 da aneurisma femorale e 48 da aneurisma popliteo. Tutti i pazienti sono stati studiati con ecocolor-Doppler e con angio-TC con mezzo di contrasto. Sono stati diagnosticati 18 casi di arteriomegalia con una prevalenza nella popolazione in esame dell'11%.

Il presente studio dimostra la stretta associazione tra aneurismi delle arterie periferiche ed arteriomegalia. Gli aneurismi arteriosi periferici in associazione con l'arteriomegalia comportano un rischio più elevato di complicanze quali la trombosi, l'embolia e la rottura. La dimostrazione della familiarità nell'incidenza dell'arteriomegalia conduce alla predisposizione di programmi di screening mediante eco-color-Doppler dei familiari dei pazienti affetti da arteriomegalia e/o aneurismi arteriosi periferici.

KEY WORDS: Arterial aneurysm - Angiomegaly - Arteriomegaly - Thrombosis - Embolism - Rupture.
Aneurismi arteriosi - Angiomegalia - Arteriomegalia - Trombosi - Embolia - Rottura.

Introduction

Many authors of scientific publications treating about arterial aneurysms believe that the causes of degenerating aneurysms in peripheral arteries are the same ones

of aortic aneurysms (1). On the contrary both clinical features and epidemiological studies about peripheral arterial aneurysms show that they are different pathologies.

Peripheral arterial aneurysms affects men almost exclusively (2, 3), they are often bilateral (4-7) and they involve thrombosis (8-11) or embolism (12) more than rupture (13-23). The peripheral arterial aneurysms in association with arteriomegaly involve an increased risk of complications like thrombosis, embolism and rupture (24). Patients affected by a peripheral arterial aneurysm have a synchronous peripheral aneurysm in 20-50% of cases (25, 26).

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Arteriomegaly is a term used to describe the increase in dimension of arterial vessels, both in length and in diameter (27). This condition was initially described by Lèriche (1942) (28) as extended and ectasic arteries, and later (1971) the word arteriomegaly was coined by Lea Thomas (29). In 1983 Callum et al. (27) carried out a study about the diameter in the arteries of the lower extremities measuring their circumference in fixed points on dead bodies, their diameter and their length using arteriography. The authors studied a group of patients with dilated and extended arteries and they gave a definition for the arteriographic condition known as arteriomegaly. The arterial length was expressed as a percentage of fixed bone points to eliminate the effect due to the different patients' statures. The fixed limit for the normality was, for the length and the diameter, the mean + 2 times the standard deviation (SD); as regards the length, the upper limit for common iliac arteries is 110% of the corresponded bone length, and it is 105% for aortic, femoral and popliteal regions. The authors found an incidence of about 6% for generalized or localized arteriomegaly (27).

To define arterial aneurysmal pathologies we give the criteria suggested by the Society for Vascular Surgery and the International Society for Cardiovascular Surgery: an aneurysm is classified as a permanent and localized dilatation of an artery, with an increase more than 50% of his diameter (30, 31). The arteriomegaly is defined as a diffused increase in the dimensions of the arterial vessels, involving many vascular segments (not focal) with an increase in diameter more than 50% compared to the respective healthy vascular segments (30).

About 36% of patients affected by arteriomegaly has first-degree relatives affected by the same pathology and arteriomegaly therefore is an important predictive factor for familiar aneurysms. A male relative of an affected patient has a 6,7% risk to develop a clinically meaningful aneurysm (30). In the study of Lawrence et al. (27) there were peripheral arterial aneurysms in 5% of male first-degree relatives, never in female relatives.

In one of our previous studies (32) we have demonstrated that arteriomegaly is the arterial form of a more complex pathology that we described as angiomegaly. In this research we have studied a population of patients affected by aneurysm in iliac, femoral and popliteal arteries and we have examined the prevalence of arteriomegaly in the same population, in order to demonstrate that angiomegaly, that includes arteriomegaly, is strictly related to the genesis of the peripheral aneurysm.

Patients and methods

In order to classify aneurysms we have used the criteria suggested by the Society for Vascular Surgery and by International Society for Cardiovascular Surgery: a permanent and localized dilatation of

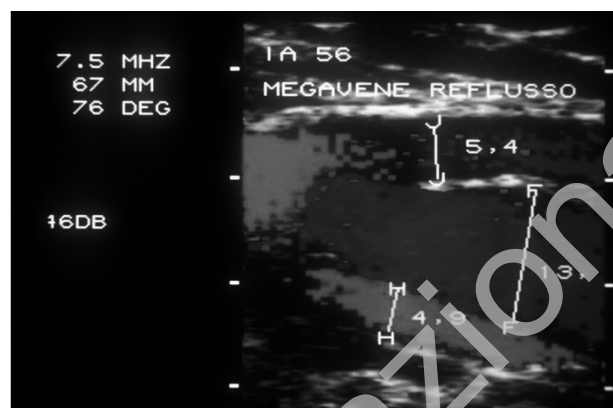


Fig. 1 - Color-Doppler ultrasonography. Angiomegaly.

an artery, with an increase > than 50% in his diameter was defined as aneurysm (30, 31). The diagnosis of aneurysm and arteriomegaly in every patient is based on the clinical features, the radiographic, ultrasonographic and arteriographic examinations.

A total of 163 consecutive patients were involved in the present study, 74 of them were affected by an iliac aneurysm, 41 by a femoral aneurysm and 48 by a popliteal aneurysm. All the patients were studied with color-Doppler ultrasonography (CDU) (Fig. 1) and angio-CT with contrast medium, with multislide technique and three-dimensional image reconstruction.

Results

Eighteen cases of arteriomegaly were diagnosed with a 11% frequency in the examined population.

The arteriomegaly was associated in 2 patients with iliac artery aneurysm, in 6 patients with femoral artery aneurysm and in 10 patients with popliteal artery aneurysm.

Discussion

The present study shows the close association between peripheral arterial aneurysms and arteriomegaly. The prevalence of arteriomegaly in the etiopathogenesis of peripheral arterial aneurysm was 11% in our study, an unexpected percentage.

The demonstration of familiarity for the incidence of arteriomegaly leads to predisposition of screening programs, using CDU, among relatives of patients affected by arteriomegaly and/or peripheral arterial aneurysms.

For histopathological features, angiomegaly can be considered as a pathology connected mainly to an alteration of the elastic matrix, which can involve arteries (megadolichoarteries) and veins (megaveins). The differences existing in arterial walls of patients with arteriosclerosis and arteriomegaly, leads us to understand that the wearing out in the wall where is an angiomegaly mu-

st be compared to dystrophic alterations in elastic tissue, probably of congenital nature. The different etiopathogenesis of the two pathologies can be seen also in their different clinical features.

From the point of view of the diagnosis, the demonstration of vessel dilatation, extension and tortuousness is fundamental and, in addition to other traditional analysis (angiography, Doppler, angio-CT), the duplex scanner and the color-Doppler are the most appropriated means and the most useful to underline eventual vascular pathologies in asymptomatic patients.

Surgical treatment must be considered when there is an acute symptomatology due to thromboembolism and aneurysms with a risk of rupture. Surgical treatments aims to rebuild extended segments hit from the pathology. Multiple surgical treatments are often requested, depending on the aneurysms localization and general conditions of the patient, in order to reduce surgical trauma because these patients often have an elevated cardiological risk. For this reason both the kind of surgical treatment and the indication to it can be different for different patients.

In our study we have demonstrated that there are deep differences between arteriomegaly and arteriosclerosis. In arteriosclerosis myocytes penetrate into the internal elastic membrane and the cytoplasm of myocytes in the tunica media shows clear signs of pathological process (lipid inclusion, vacuoles, elevated numbers of mitochondria), tunica media contains many inclusions of lipids and cholesterol with "fats cells". In endothelial cells a high grade of pinocytic activities was seen. Among myocytes of the tunica media it's possible to see an important accumulation of collagen microfibrils that replace the degenerated myocytes. In arteriomegaly, instead, the increase in the number of collagen microfibrils near the myocytes is less frequent (Figs. 2 and 3). Arteriomegaly therefore must not be confused with arteriosclerosis, as it is often happened in the past.

In a previous study we have demonstrated that angiomegaly is caused, pathogenetically, by a specific alteration in elastic fibre documented by the electronic microscope (angiomegaly) and that, contrary to what people believed in the past, it's not an anatomic variant but a proper pathology, that can evolve in complications (rupture of associated aneurysms, thrombosis and embolism) within the competence of emergency surgery. Moreover we have demonstrated that the incidence of this pathology is much greater than in the past and the rea-

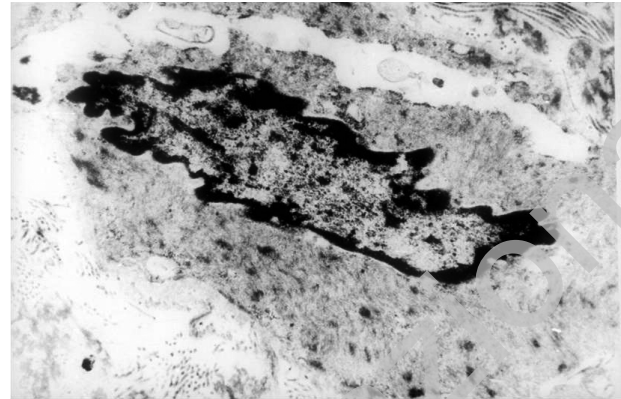


Fig. 2 - Transmission electronic microscopy. Tunica adventitia (magnification x25.500). Myocyte.

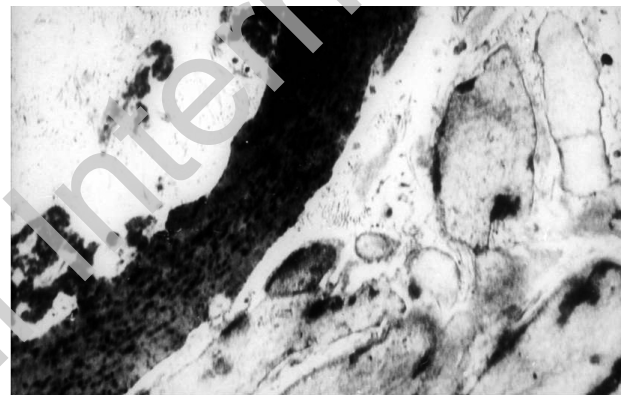


Fig. 3 - Transmission electronic microscopy. Inferior mesenteric megadolicoartery. Tunica adventitia (magnification x21.600). At center of the microphotography magnified elastic fiber, eosinophilic, with lateral thickening is observed. To right the myocytes ones are noticed, not altered.

son why it's considered rare is that it's not often recognised and it is mistaken for an arteriosclerosis with ectasia.

Conclusion

The association between arteriomegaly and peripheral arterial aneurysms is frequent. On 163 patients affected by a peripheral arterial aneurysm (iliac, femoral and popliteal), 18 had an associated arteriomegaly (11%). So a close relation between the arteriomegaly and the onset of peripheral arterial aneurysms was demonstrated.

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