



# Study of atherosclerosis in abdominal aortic aneurysms of autopsied patients



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## KEYWORDS

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**Abstract** *Background:* Any kind of change in the arterial wall as atherosclerosis, may be the etiologic agent of the formation of aneurysm in an artery. The aim of this study was to describe the morphological and morphometric characteristics of the aorta with aneurysm in autopsied patients in relation to age, gender, white and non-white patients and the aortic segment.

*Methods:* 22 samples of aorta were evaluated, from patients autopsied, grouped in 11 patients with aneurysm and 11 patients without aneurysm. Macroscopic evaluation of the intensity of atherosclerosis has been described quantitatively in centimeters. Staining were made by Picrosirius for quantification of collagen fibers. The analysis of captured images was performed by software Leica QWin Plus<sup>®</sup>. For statistical, the data were analyzed with the software GraphPad Prism<sup>®</sup>.

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**Results:** There was a positive and non significant correlation between the intensity of atherosclerosis and age of the total group ( $r_s = 0.352$ ;  $p = 0.29$ ). There was a greater intensity of atherosclerosis in relation to age in the group with aortic aneurysm (PA) ( $U = 26.50$ ;  $p = 0.03$ ) and higher percentage of collagen fibers ( $U = 31,950$ ;  $p < 0.0001$ ) when compared to the NA group. A negative correlation was observed between the percentage of collagen fibers and the intensity of atherosclerosis ( $r_s = -0.109$ ;  $p = 0.02$ ) (PA).

**Conclusions:** The intensity of atherosclerosis presented a relation with age, feminine gender, white patients and abdominal aortic segment. The aging process is the cause of atherosclerosis, causing alterations in the arterial walls as an increase of the collagen fibers, thus favoring the appearance of vascular aneurysms.

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## Introduction

Abdominal aortic aneurysm (AAA) is a permanent localized dilatation of abdominal aorta that exceeds normal diameter by 50% accompanied by inflammatory response in the wall of abdominal aorta.<sup>1</sup> The risk factors include male gender, age, prior vascular disease, hypertension, cigarette smoking, family history, hypercholesterolemia.<sup>2</sup> Atherosclerosis is the most common causative factor.<sup>3</sup>

Atherosclerosis is a chronic inflammatory disease that occurs affecting of medium and large-caliber arteries.<sup>1,4,5</sup> Any kind of change in the arterial wall, either congenital or acquired, which causes weakening or compromises arterial wall resistance, as in atherosclerosis, may be the etiologic agent of the formation of aneurysm in an artery.<sup>6–8</sup>

Thus, this study suggests there is a relation of age with the intensity of atherosclerosis and that there is an increase in the percentage of collagen in the media and adventitia layers of the aorta with aneurysm. The aim of this study was to describe the morphological and morphometric characteristics of the aorta with aneurysm in autopsied patients in relation to age, gender, white and non-white patients and the aortic segment.

## Material and methods

This study was approved by the Ethics Committee of the Federal University of Triangulo Mineiro, under number 1265.

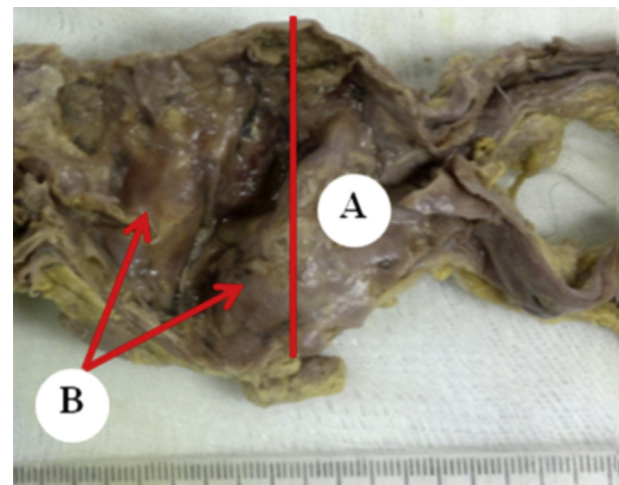
From the files of the Discipline of General Pathology of the UFTM, 141 segments of aortas were analyzed, in the 1976–2004 period. We found 11 segments with aortic aneurysm, which constituted the group PA (Fig. 1). Selection for the PA group was performed regardless of age, gender, patients were white or non-white and or segment of the affected aorta. For paired with the PA group, another 11 segments were collected and formed the group without aneurysm (NA).

The inclusion criterion for the PA group was the macroscopic view of the aneurysm, and the segment being at least 15 cm long. For the NA group was the absence of aneurysm, a segment with at least 15 cm, and being paired

with the PA group in age, white and non-white patients and gender.

For the assessment subjective of the intensity of atherosclerosis, the macroscopic view of the extension of the atheromatous plaques, lipid striae and calcification were considered.<sup>6</sup> The intensity of the macroscopic atherosclerosis was semi-quantitatively classified into mild (predominance of lipid striae), moderate (predominance of atheromas) or severe (predominance of calcifications).

From a criterion already described in the literature<sup>9,10</sup> the atherosclerosis was quantitatively categorized. With a non-millimetric standardized scale of 0.0 cm–12.0 cm, the examiner has subjectively determined the intensity of the degree of atherosclerosis in this scale, registering a point on it. With a millimetric ruler, the distance of 0.0 cm to the point recorded for each of the segments was measured. We observed varying degrees of atherosclerosis and accurate values for the classifications mild, moderate and severe. The intervals 0.1–4.0 cm were adopted as mild, 4.1 to 7.0 as moderate and 7.1 to 12.0 as severe degree.



**Figure 1** Segment Abdominal aortic aneurysm patient with autopsied at HC-UFTM in 1976–2004. (A) aneurysmal dilatation (50% or more). (B) Are observed fibroadenomatous plates with calcifications (severe atherosclerosis).

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