Representation by Percentage of the Tunicae of the Large Arteries in Chinchillas

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Abstract

Chinchilla, a small sized rodent, is taxonomically placed in the *Mamalia* class, *Theria* subclass, *Eutheria* clade, *Rodentia* order, *Hystricomorpha* suborder, *Chinchilidae* family, *Chinchilla* species. In the wild, it occupies a territory covering the states of Chile, Peru and Argentina, as well as the south region of Bolivia. The biologic material for our study consisted of 5 Chinchilla specimens processed to obtain histological samples.

The staining protocol has very well underlined the trilamellar structure of the layers composing the arterial wall. The tunica intima comprises an endothelium, a basement membrane and a subendothelial layer. This tunic outlines the lumen of the arteries. The tunica media is formed by elastic fibers disposed on several circular layers and a certain number of smooth muscle cells in-between them. The external tunic or the tunica adventitia is made up of lax conjunctive tissue. The ratio between tunics of the arterial wall of the great arteries in Chinchillas changes according to the distance from the heart. While the aorta has a very poorly developed tunica adventitia, this layer represents 50% of the arterial wall in the subclavian and external iliac arteries.

Keywords: large arteries, representation by percentage, tunicae.

INTRODUCTION

Chinchilla, a small sized rodent, is taxonomically placed in the *Mamalia* class, *Theria* subclass, *Eutheria* clade, *Rodentia* order, *Hystricomorpha* suborder, *Chinchilidae* family, *Chinchilla* species. The arterial system of this species has few macroscopical descriptions and very few microscopical ones.

AIMS AND OBJECTIVES

The present study proposed a representation by percentage of the tunics composing the arterial wall in the large arteries of the chinchilla.

MATERIALS AND METHODS

The biological samples were harvested from 5 Chinchilla specimens, from a private husbandry, commercially slaughtered for fur. After the skinning, an anatomical dissection was performed, resulting in the identification of the arterial vessels and their harvesting. Immediately after the sampling, the arteries were fixed with a

10% formalin solution, paraffin embedded, cut at 5 μ and stained following the tricrom Goldner technique. The samples were harvested from the following arteries: the ascending aorta, the aortic arch, the left and right carotid arteries, the left subclavian artery, the descending thoracic aorta, the descending abdominal aorta, the left and right common iliac arteries and the left and right external arteries.

RESULTS AND DISCUSSION

The tunica intima is the most constant tunic, having a similar width in the studied arteries (approximately 5%). The aorta, considered by Raica *et al.* (2004) as the reference artery for large arteries, is the largest vessel in the body. Mahammad *et al.* (2001) places the aorta in the elastic arteries category. In the chinchilla, the tunica adventitia represents approximately 10-15%, while the tunica media represents 75-80% of the arterial wall. We have noticed that the rest or the aortic segments presented a similar structure

as that of the ascending aorta. The subclavian arteries are also called brachial trunks (Damian 2007). By comparison to the cuts through the aorta, we have noticed that in those performed in the subclavian arteries, the tunica media occupies approximately 75% of the arterial wall's width, while the tunica adventitia represents approximately 20%. The common carotid arteries (also called cephalic trunks) in the chinchilla originate in the brachiocephalic trunk. The left common carotid artery is the first branch emitted by the brachiocephalic trunk, at a short distance from the latter's detachment from the aortic arch. Keeping the same cranial path, the trunk also emits as terminals the right subclavian artery and the right common carotid artery (Özdemir V. *et al.*, 2008). Comparing the common carotid arteries to the segments of the aorta in the chinchilla, it is noticeable that the ratio between the tunica media and the tunica adventitia suffers certain variations. Thus, in the common carotid arteries, the tunica media represents approximately 65-70%, while the tunica adventitia represents approximately 25-30%. The common iliac arteries in the Chinchilla lanigera are the terminals of the descending abdominal aorta, at the level of the L5-L6 vertebrae (A Çevik-Demirkana *et al.*, 2010). Following the ratio between arterial tunics we notice that the external tunic of the common iliac arteries represents 40%, while the tunica media represents approximately 55% of the wall's width. The external iliac arteries in rabbits, horses and humans represent the direct continuation of the common iliac arteries (Barone, 1996; Stan *et al.*, 2006). In the chinchilla, the external iliac arteries have a dorso-caudal path, being the true continuation of the common iliac arteries (Eken *et al.*, 2005). Histologically, the external iliac arteries present structural differences comparable to the rest of the studied arteries. Thus, the tunica adventitia of these arteries represents approximately 50-55% of the arterial wall's width, while the tunica media represents only 40-45% of it.

CONCLUSION

The representation by percentage of the arterial tunics presents major differences according to the topographical positioning of the arteries relative to the heart.

In the aorta segments, the tunica media is the most developed, representing 85% of the width of the wall, while the tunica adventitia represents approximately 10%.

The width of the tunica media decreases progressively with the increase of the distance from the heart, while that of the tunica adventitia increases, so that the latter represents approximately 50% of the wall structure in the external iliac arteries.

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