

CORONARY ARTERY ANEURYSMS IN TWO BLACK RHINOCEROSES (*DICEROS BICORNIS*) IN ZIMBABWE

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Abstract: Rupture of a coronary artery aneurysm caused fatal cardiac tamponade in one black rhinoceros (*Diceros bicornis*) in Zimbabwe, and a second rhinoceros had aneurysms, extensive thrombosis, osseous metaplasia, and mineralization in both coronary arteries. Arteritis was likely the underlying lesion responsible for the changes in both cases, although the cause could not be determined.

Key words: Black rhinoceros, *Diceros bicornis*, aneurysm, coronary artery.

INTRODUCTION

True aneurysms, resulting from weakening and thinning of vessel walls, are uncommon in all animals except turkeys.⁵ False aneurysms, which are hematomas that arise secondary to arterial rupture, are more common.³ These false aneurysms may result from a variety of causes including rupture of true aneurysms.⁴ In humans, aortic aneurysms are often associated with arteriosclerosis, advanced syphilis, or cystic medial necrosis; however, weakening of vessel walls may also occur after trauma or with infections.⁴ Atherosclerosis is the most common precedent to aneurysm in humans, and related fatalities are often the result of rupture of the affected vessels.⁴ Atherosclerosis is not prevalent in other animals and is usually an incidental finding.⁵ Spirocerosis in dogs¹ and verminous arteritis in horses have resulted in false aneurysm formation and rupture.⁶ The purpose of this paper is to describe coronary artery aneurysms associated with coronary arteritis in two female black rhinoceroses (*Diceros bicornis*) from Zimbabwe.

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CASE REPORTS

Case 1

During relocation of black rhinoceroses in Zimbabwe, one 6-yr-old female was found dead in sternal recumbency <1 wk after capture, with no previous signs of illness. At necropsy, 2–3 L of clotted blood and serum were present in the pericardial sac, and there was extensive hemorrhage into the pericardial fat. An 8-cm-diameter sacular aneurysm with a 5-cm-long rupture was found in the left coronary artery along the coronary groove. The arterial wall varied in thickness and was only 1–2 mm thick near the area of the rupture. The intimal surface was irregular, roughened, and often covered with adherent clotted blood. Firm spherical 4–5-cm-diameter masses containing caseous material were seen adjacent to both coronary arteries in the coronary groove. Sections of heart, great vessels, and other visceral organs were fixed in 10% phosphate-buffered formalin and submitted to the University of Zimbabwe, Faculty of Veterinary Science, for examination.

Histologically, the wall of the aneurysm was markedly distorted by inflammation in some areas, and the intimal surfaces were often ulcerated and covered with maturing granulation tissue and layers of clotted blood (Fig. 1). Clefts, filled with neutrophils, lymphocytes, plasma cells, and eosinophils, extended from the denuded intimal surface into the tunica media, and similar inflammatory foci were scattered in the medial and

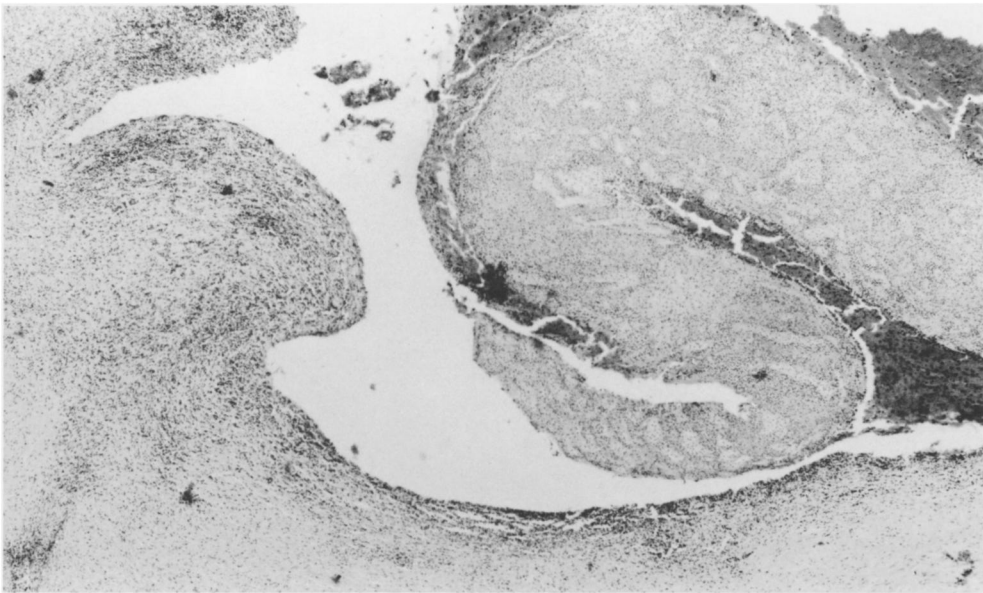


Figure 1. Coronary artery from a black rhinoceros (case 1) shows ulcerated intimal surface, prominent infiltration of inflammatory cells into the media, and thrombus in the lumen. H&E, $\times 100$.

external tunics. Special stains on these vasculitic coronary vessels did not disclose bacterial or fungal organisms. The spherical masses noted grossly as adjacent to the coronary arteries consisted of organizing clotted blood, probably representing false aneurysms from previous arterial leakage. Other than small neutrophilic inflammatory foci scattered throughout the myocardium, no changes were seen in other tissues.

Case 2

A translocated adult female black rhinoceros was anorexic, lethargic, and declining in condition for several weeks before death. At necropsy, the pericardium was thickened and excessive fluid was noted in the pericardial sac. The entire heart was fixed in formalin and submitted to the Zimbabwe Veterinary Research Laboratory for examination. The left ventricle was thickened and the chamber volume was decreased. Both coronary arteries were prominent and tortuous and had increased diameters along their entire lengths. Aneurysms were present in both vessels; the left was $12 \times 6 \times 5$ cm (Fig. 2), and the right was 3 cm in

diameter. Organizing thrombi were found in the aneurysms in both arteries, partially occluding the lumina. The intimal surfaces were folded and irregular, and the walls were greatly attenuated in the areas of dilatation. The arterial wall in the area of the aneurysm on the left side was 2 mm thick at its thinnest point and had a firm oval bony plaque on the intimal surface.

Histologically, superficial ulceration and mild inflammation were present in the tunica intima of the aneurysm walls, and fibrin often adhered to the luminal surfaces. Smooth muscle degeneration, mineralized foci, and osseous metaplasia were seen within the tunica media (Fig. 3). Lymphocytic inflammatory foci were present in the outer tunica media and tunica adventitia, especially around vasa vasorum, some of which were thrombosed. No lesions were seen elsewhere in the heart.

DISCUSSION

The histopathologic changes in the arteries of these two animals may reflect different stages of a similar process. Osseous metaplasia and mineralization attest to chronic-



Figure 2. Aneurysm ($12 \times 6 \times 5$ cm) of the left coronary artery of a black rhinoceros (case 2) with thrombus removed from the lumen.

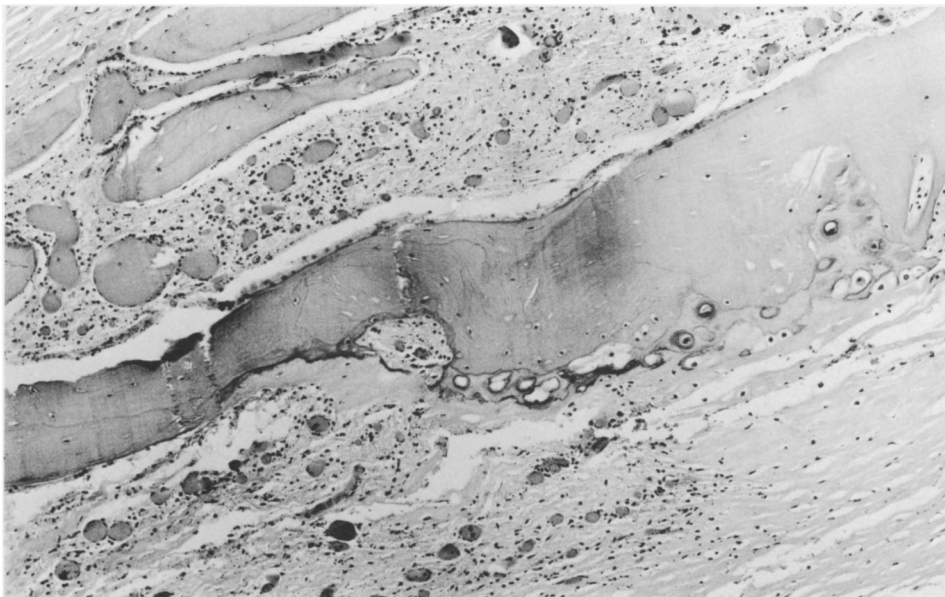


Figure 3. Osseous metaplasia in the medial tunic of a coronary artery aneurysm from a black rhinoceros (case 2). H&E, $\times 100$.

ity in case 2, whereas the arteritis in case 1 denotes a more active process. Case 2 may represent a healing version of case 1. The cause for the arterial lesions in these rhinoceroses could not be determined, but the degree of inflammation in case 1 is far more than what would be expected with a purely degenerative condition. Although parasites were not seen, the presence of eosinophils in the lesions suggests the possibility of parasitic infection. Fatal aneurysmal hemorrhage secondary to verminous arteritis has been reported in horses,⁶ and medial mineralization in the mesenteric arteries of horses is thought to represent healed lesions of *Strongylus vulgaris* infections.⁵ Although the rhinoceros is taxonomically close to the horse,² *Strongylus* sp. are not known to infect the black rhinoceros.

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