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SPONTANEOUS AORTIC LESIONS IN CAPTIVE WILD HERBIVORES

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SUMMARY

Spontaneous aortic lesions in 68 captive wild herbivores were studied and lesions were detected in 39 (57.4%) animals. The lesions recorded were fatty streaks, fibrous plaque, calcification, aneurysm, parasitic infection, intimal thickening, fibrous nodule and metaplastic change. In addition to the histopathological study of the lesions some were also studied by SEM and EDAX. On SEM the *Onchocerca* affected endothelium showed marked disruption and distortion of the cells. The compositon of the metaplastic area of the heart on analysis by EDAX, was found to be of calcium (63.3%), sulphur (26.0%) and phosphorus (8.7%).

Key World : Aortic lesions, Captive wild herbivores

Introduction

Informations on spontaneous aortic lesions in Indian domestic animals have been reported[5,7,11] but no such attempt seems to have been made in captive wild animals. However, few such reports in wildlife have been documented from abroad[4,9,10,13]. Considering the paucity of information, the present investigation was taken up in some of the captive wild herbivores.

Materials and methods

Aortae of 68 captive wild herbivores of both sexes were collected at necropsy. After removal of the adventitial fat, the aortas were cut open longitudinally, fixed in 10% neutral formaline for 24-48 hrs. and stained with sudan IV[8]. The lesions were graded according to criteria recommenede by WHO study group on atherosclerosis[14].

For hsitopathological study, longitudinal pieces of tissue were taken from the sudanophilic lesions and unstained areas. When warrented special stainings were adopted. For scanning electron microscopic (SEM) study, tissue samples were fixed in 2.5 per cent gluteraldehyde in 0.1M sodium cacodylate buffer for 4-6 hrs at 4°C, washed in cacodylate buffer overnight, post fixed in 1 per cent osmium tetraoxide for 1 hr and were dehydrated through increasing concentration of acetone. Samples were prepared as per the method of Dey *et al*[2] and examined in a scanning electron microscope (Joel).

Results and discussion

The spontaneous lesions in the aortae were detected in 39 (57.4%) animals (Table 1).

1. Atherosclerosis :

(a) Fatty streaks : Fatty streaks became visible only after staining with Sudan IV, and was observed in 29 animals. It was

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Table 1 : Spontaneous aortic lesions

	Lesions recorded aorta examined	Atherosclerosis Fatty streaks	Fibrous plaque	Aneurysm	Parasitic	Calcification	Miscellaneous Intimal thickening	Fibrous nodule	Metaplastic change
Spotted deer	10/14	7	1	2	3	2	-	1	-
Barking deer	4/9	3	1	-	-	-	-	-	-
Sambar	7/13	6	2	1	1	2		-	1
Mouse deer	2/4	1	1	-	-	-	-	-	-
Nalgai	1.3	1	1	1	1	1		-	-
Blackbuck	2./4	1	1	2	1	1		-	-
Serow	2/4	2	-	-	-	-		-	-
Mithun	1*/1	1	1	1	1	1		-	-
Buffalo	1/1	1	-	-	-	-	-	-	-
Giraffe	3/4	1	2	2		1	1		1
Zebra	1/3	1	1	-1		-	-	-	-
Rhinoceros	4/6	3	1	-	-	-	-	-	-
Elephant	1/2	1	-	-	-	-	-	-	-
	39/68 (57.4%)	29 (42.4%)	12 (17.6%)	10 (14.7%)	7 (10.3)	8 (11.8%)	1 (1.5%)	1 (1.5%)	2 (2.9%)

* At the base of aorta a lump of lipid was deposited.

observed in as young as a 3 months old rhinoceros. Grossly, the lesions were smooth, unelevated and diffuse in nature, which mostly appeared as longitudinal sudanophilic streaks, parallel to the long axis of the aorta, in and around the aortic arch, in brachiocephalic trunk and at other sites, including the areas adjoining the orifices of intercostal arteries (Fig. 1). Histologically,

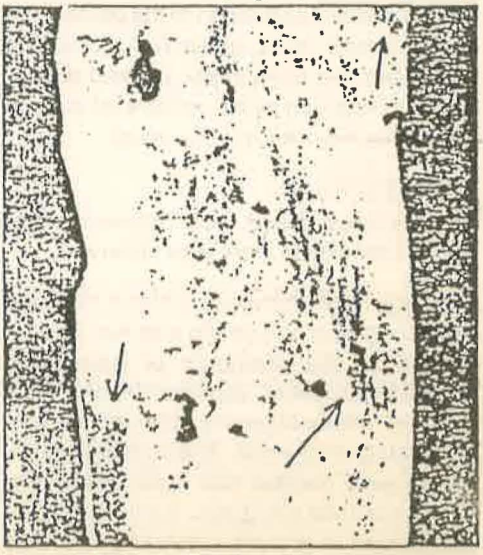

Fig. 1. : Fatty streaks in the aorta of a spotted deer. (arrow)

fatty streaks showed focal thickening of the tunica intima and vacuoles due to the removal of fat.

(b) Fibrous plaque : Fibrous plaque was noticed in 12 (17.6%) animals. All the lesions were observed in the aged animals. Generally it appeared as circumscribed or elongated, centrally depressed, white, elevated, hard and rough structure measuring 1.32 cm - 2.60 cm in diameter over the intimal surface (Fig. 2). The plaques were inconsistently sudanophilic. Microscopically, the intima was thickened with hyalinization of its innermost part and vacuolated degenerated area. There was fragmentation and duplication of internal elastic lamina with varying degree of degenerative changes. Elastolysis were noticed in tunica media.

Atherosclerosis is stated to be a rare condition in wild and captive animals[3], however, the malady in the form of fatty streaks[6,9,10] and fibrous plaques[6,9,11,12] have been reported in domestic animals.

Fig. 2. : Fibrous plaque in the aorta of a giraffe. (arrow)

2. Calcification :

Calcification was recorded in 8 cases and was grossly recognised as uneven, hard, sometime raised structure invariably associated with lesions like fibrous plaque, aneurysm or parasitic infection in aged animals. Microscopically, irregular areas of various sizes were seen in tunica media. The elastic tissue in and around the area of calcification was degenerated. In one of the spotted deer, calcium deposition in tunica media was suggestive of old degenerating parasitic lesion.

3. Aneurysm :

Aneurysm was recorded in 10 cases and in almost all the cases, lipid deposition was descernible on Sudan IV stained specimen. Saccular type of lesions was generally seen (5-13 mm in diameter). These dilatations were generally recorded in the abdominal aorta. Microscopically, the saccular part of the vessel was mostly composed of collagen fibres along with fine fragment of elastic and reticulin fibres. Calcification, fibrous plaque and aneurysm were invariably associated with aged animals. These conditions have also been reported by other[1,3,4,6,12] in wild animals.

4. Parasitic lesions :

The parasitic lesions were recorded in 7 cases, maximum being in spotted deer. These were located both in thoracic and abdominal parts of aorta (Fig. 3). The parasites were identified as *Onchocerca* sp. Occurrence of *Onchocerca* in a four horned antilope and filaroid infestation in a hippopotamus have also been documented[1,9]. Microscopically, the changes comprised of elevation and protrusions of the intimal surface in lumina, marked degeneration of elastic fibres, disruption of internal elastic lamina, fibrosis and encapsulation of the parasite. In few advanced cases, extensive calcification was noted. On SEM study, marked disruption and distortion of the endothelial surface in the affected area was observed.

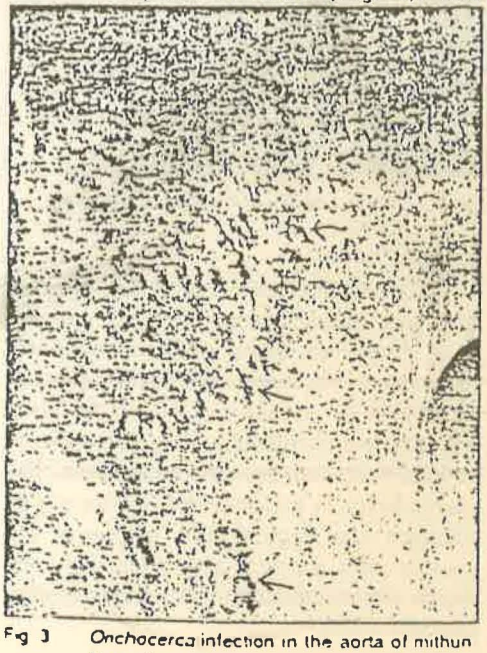

Fig 3 *Onchocerca* infection in the aorta of mithun Note the tortuous tunnels formed by the parasites (arrow)

5. Miscellaneous :

Besides these, the following non-specific conditions were also observed.

(a) Intimal thickening : Intimal elevation was detected in one giraffe and was characterised by the presence of transverse wrinkled/corrugated appearance of intimal surface. Microscopically, the intima was moderately thickened. The internal elastic lamina were swollen with focal elastolysis. The intimal thickening was mainly due to the proliferation of ground substances and few muscle cells. In tunica media, the smooth muscle cells and the bands of muscle fibres were arranged haphazardly.

(b) Fibrous nodules : Nodular lesion (5-8 mm in diameter) was noticed in one spotted deer and was localised in tunica adventitia. Microscopically, the tunica intima covering the nodule was slightly or moderately thickened as a result of increased amount of collagen and muscle fibre.

McKinney[9] and With[13] were of the opinion that atherosclerosis may develop in herbivores even on very low fat diet, as available in natural habitat. The present study lent support to these observations. However, the

role played by geoclimatic environment, type of food and the physiological status of the animals in the causation of these lesions in aortae needs further study.

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