

## Study of Atherosclerotic Lesions in Non-human Primates of Assam

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**Abstract:** Atherosclerosis is a major age-related process and public health problem. Occurrence of atherosclerosis in non-human primates is not common. In the present study, aortas of 10 adult non-human primates of Assam State Zoo and Department of Forest and Environment, Government of Assam were collected and examined by Sudan IV stain for the presence of spontaneously occurring atherosclerotic lesions. The lesions recorded in two animals were fatty streaks (1) and fatty dots (1).

**Key words:** Atherosclerosis, atherogenesis artercosclerosis, pathogenesis, fatty streaks, fatty dots, non-human Primates

### INTRODUCTION

Atherosclerosis is a major age-related process and public health problem. Its clinical manifestations continue to be responsible for approximately 50% of all deaths occurring annually (Cefalu and Wagner 1997). Atherogenesis has long been accepted as the pathologic process that leads to occlusive arterial lesions principally responsible for myocardial and cerebral infarction, gangrene of the extremities, and subsequent loss of function (Sasahara *et al.* 1994).

The pathogenesis of naturally occurring arteriosclerosis in primates differs significantly from that induced in them by feeding cholesterol (Lindsay and Chaikoff, 1965). Spontaneously occurring aortic atherosclerosis in monkeys and baboons had been reported by Migaki *et al.* (1971) and McConnell *et al.* (1974). Robert and Vesselinovitich (1977) were of the opinion that non-human primates provided the best approximation of the ideal model for studies of the various parameters of the atherosclerosis for the purpose of better understanding the human condition. Goswami (1994) examined the presence of spontaneously occurring atherosclerotic lesions in aortas of 25 adult captive non-human primates. The only lesion recorded was the deposition of lipid in the form of fatty streaks in 9 animals. Atherosclerosis scarcely occurred in both the left and right coronary arteries of rhesus monkey (*Macaca mulatta*) and Japanese monkey (*Macaca fuscata*) at old age (Tohno *et al.*, 2008).

### MATERIAL AND METHODS

In the present study, a total of 10 aortas of non-human

primates *i.e.* rhesus macaque (*Macaca mulatta*) (5), Assamese macaque (*Macaca assamensis*) (1), Slow loris (*Nycticebus coucang*) (2) and golden langur (*Presbytis geei*) (2) were collected from Assam State Zoo and Department of Forest and Environment, Govt. of Assam during the period from December, 2007 to November, 2009. After removing the adventitial fat, they were split open, cleared in tap water, flattened over a tray and subsequently fixed in 10% formalin saline for 24 to 48 hours. The vessels were examined for any arteriosclerotic lesions, lipid deposits, fibrous thickening, calcium deposits, ossifications, aneurysms, presence of parasitic tracts etc. The fixed aortas were stained with Sudan IV stain according to the technique of Holman *et al.* (1958) to delineate fatty lesions. The gross lesions were graded according to the criteria recommended by the WHO study group on atherosclerosis (1958).

### RESULTS

In the present study, the spontaneous atherosclerotic lesions were recorded in rhesus macaque and an Assamese macaque two animals. The unstained aortas showed no visible lesion. After staining with Sudan IV, aorta of a rhesus macaque showed fatty streaks ranging from pinpoint dots to about 0.5 cm in length (Fig. 1) and aorta of an Assamese macaque showed fatty dots (1-2mm). The streaks were smooth, soft and non elevated and were stained orange red in colour. They occurred as longitudinal streaks arranged parallel to long axis of the aorta mostly in and around the aortic branching.

### DISCUSSION

Spontaneously occurring atherosclerotic lesions in non-human primates was recorded earlier by Migaki *et al.* (1971), Robert and Vesselinovitich (1977) and Goswami

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Fig1. Photograph showing atherosclerotic lesion of fatty streaks (→) in a stained aorta

(1994). Robert and Vesselinovitch (1977) reviewed the earlier works on different species of non human primates, and few lesions such as fatty streaks and necrotic foci in aortas were documented. The present finding is similar to the findings of Goswami (1994). Chakraborty (1991) examined spontaneously occurring atherosclerotic lesions in captive wild herbivores in the Assam State Zoo and recorded several types of lesions in addition to the lesions recorded in the present study. They suggested that types of food, the geo-climatic condition of soil and the physiological status of the animal might have played a role on the causation of atherosclerotic lesions in aortas and the present study also endorsed their views.

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