

Original Research Article

Gross and Histological Studies of the Renal Arteries in Marwari Sheep (*Ovis aries*)

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ABSTRACT

Keywords

Marwari sheep,
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A study conducted on the renal arteries of 12 *Marwari* sheep of either sex between the ages of 1.5 -2 years. Each renal arteries emanated laterally from the abdominal aorta at the level of the third lumbar vertebra. Each of them were divided into the lobar branches before reaching the hilus. Which gave 4-8 interlobar branches which ended into arcuate and interlobular arteries. The sub endothelial layer of renal artery was irregularly oriented. The inner elastic membrane showed corrugations. The middle layer consisted thick layer of smooth muscle cells. The outer layer consisted of irregular elastic and collagen fibres along with longitudinally arranged bundles of smooth muscle fibres.

Introduction

Marwari sheep constitutes a major portion of the sheep population in western part of Rajasthan which has 14.31 million sheep (about 40%) and plays an important role in the economy of arid and semi-arid tract. Low rainfall and scanty vegetation are common in the western part of Rajasthan and the conditions become oppressive when extreme environmental conditions bring about the adaptive changes in organs necessary for physiological adjustments in these extreme ambient conditions.

The present investigation has been planned to study the gross and histological structure of the kidney to justify its importance and essentiality in the body. In mammals the

kidneys are the chief excretory organs of the body. They have a major role in the maintenance of fluid and electrolyte balance and in control of the blood pressure. The kidneys also produce and release a humoral agent (erythropoietin) in to the blood stream which affects the blood formation. This suggests that the organ has an extraordinary complex structure.

Materials and Methods

The study was conducted on the renal arteries of 12 *Marwari* sheep of either sex between the ages of 1.5 -2 years. The kidney with renal arteries from the freshly slaughtered animals were procured from

Municipal slaughter house, Bikaner. For the histological examination the small pieces of artery were collected from 24 renal arteries (12 right and 12 left). The tissues were preserved in 10% formal saline for 48 hrs, Bouin's fluid for 12 hrs, and Zenker's fluid for 18 hrs. Fixed tissue was latter washed in running tap water for 6-10 hours followed by dehydration in ascending grade of alcohol, clearing, embedding in paraffin wax of melting point of 58-60 °C, preparation of blocks, section cutting (5-6 µm thick), and mounting of section on albuminized slides, drying of sections and finally stained with the following routine histological stains to demonstrate different components of renal arteries.

Results and Discussion

The kidney was supplied with blood via the right and the left renal artery, each of which emanated laterally from the abdominal aorta at the level of the third lumbar vertebra. Each of them were divided in to the lobar branches before reaching the hilus which gave 4-8 interlobar branches which ended into arcuate and interlobular arteries. Similar findings were reported by Jain and Singh (1987) in goat and Vodenicharov and Danchev (2003) in wild pig, Konig and Liebich (2006) and Dyce *et al* (2010) in domestic animals.

Fig.1 Section of kidney at cortico medullary junction showing (A) Arcuate artery, (C) collagen fibre, (CT) Cortex, (MD) Medulla, (V) Arcuate vein



Fig.2 Section of Renal artery showing (C) collagenous fibres, (CSM) Circular smooth muscle fibres, (E) Elastic fibres, (LSM) Longitudinal smooth muscle fiber



In histological section all the three layers were well-developed in the renal artery of the sheep. The endothelial layer was composed of one row of cells. Their nuclei were situated at various distances from each other. The sub endothelial layer was irregularly oriented. The inner elastic membrane showed corrugations. The middle layer (tunica media) consisted of rows of smooth muscle cells. A small amount of collagen fibres and some amount of elastic fibres were found between the smooth muscle cells. The outer layer (tunica adventitia) consisted of irregular elastic and collagen fibres. In addition to these fibres, longitudinally-arranged smooth muscle bundles were seen (Fig.2) which was confirmed by the findings of Gholami *et al* (2007) in sheep. The internal elastic membrane was visible. Collagen fibres surrounded the large blood vessels, especially at the corticomedullary junction (Fig.1). Similar findings were also reported by Singh in *Marwari* goat and Beniwal (1995) in camel.

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