GLOBAL JOURNAL OF PURE AND APPLIED SCIENCES VOL. 7, NO. 2, MARCH 2001:241-243
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DISTRIBUTION PATTERN OF HAEMALNODES IN WEST AFRICAN DWARF GOATS

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(Received 30 November 1998; Revision accepted 23 February 2000)

ABSTRACT

Heamal nodes represent independent organ that share some morphological and functional characteristics of lymph node and spleen. They function in blood storage, blood filtration and immuneresponse.

The location and regional distribution pattern of haemal nodes were studied in 16 West African Dwarf Goats, aged 1-24 months. The results indicated that haemal nodes were consistently distributed along major blood vessels of the cervical , thoracic, abdominal and pelvic regions in all age groups. Occasionally some were observed in the head region in goats aged 4-8 months. No haemal nodes were found along and of the subcutaneous blood vessels in any region.

The mean number of nodes per region was 0.17 ± 16,2 ± 0.41, 4.92 ± 0.88, 9.4 ± 0.53 and 2.83 ± 0.51 (Mean ± SD) for the head, neck, thoracic, abdominal and pelvic regions respectively. While similar information for the different age groups were 13.38 ± 0.11,25 ± 0.33,22.35 ±, 16.67 ± 0.22 for the 1-3 months, 4-8months, 4-8months, 9-16months and 18-24monts old animal respectively.

The highest number of haemal nodes was observed in the abdominal region while the least was observed in the head region. These findings tend to suggest a direct correlation between the size of the regions involved and the number of number of nodes contained in it.

KEY WORDS : Goats, Haemal Nodes, Distribution

INTRODUCTION

A lot of controversy had existed over the nomenclature, structure and functional significance or haemal nodes, since Gibbs (1884), first described a structure resembling lylmph nodes in man. Similar structures have since been described in ruminants (Meyer, 1908; Schelhase, 1911; Folse et al., 1971, Ezeasor and Singh, 1988).

Most of the functions ascribed to haemal nodes have been based on the structural distribution and location of these nodes in goat and cattle (Winqvist, 1954; Hogg et al., 1982; Ezeasor and Singh, 1987).

However, preliminary studies on cattle indicated variations in the distribution and location of haemal nodes (Meyer, 1917; Gargiulo et al., 1987; Ibeachum, 1988). The present study is aimed at contributing basic data on the anatomical mapping of the haemal nodes in the west African Dwarf Goats which had not hitherto been described.

MATERIALS AND METHOD

Sixteen West Dwarf goats were used for the study. The goats were divided into four age groups each consisting of four animals as follows: Group 1 (1-3 months old), Group II grouping was done based on the fact that lymphoid tissues normally reach their peak of development at puberty after which they decline (Wright et al., 1956). Age at puberty in tropical goats is estimated at 4 - 8 months, while late puberty in tropical goats is estimated at 4 - 8months, while late puberty at the age of 10 months and above have been recorded for both sexes (Devendra and Burns, 1970).

The ageing was based on dentition , using the eruption time and the rate of wear of both temporal and permanent teeth as described by Clair (1960).

Six regions selected for study were as follows: Head, neck, thoracic, abdominal, pelvic and subcutaneous regions. Each of the goats was euthanised with an overdose of pentorbarbitone sodium (sagatal^{R}) at a concentration of 195mg/ml, administered introvenously at a dose of 1 m/kg body weight (Daykin, 1960). Dessection was carried out in the following order: Subcutis, head, neck, thoracic, abdominal, and pelvic regions respectively. Thereafter the spleen, kidney and lymph nodes were incised in the search of haemal nodes.

The regional distributions and exact location of the nodes were noted. The nodes in each location were counted.

Differences in the number of nodes in the regions and among the age groups were statistically evaluated by analysis of variance at 95% confidence level (Steal and Torrie, 1980).

RESULTS

A Distibution

The haemal nodes were observed to be distributed in the neck, thoracic, abdominal and pelvic regions of the body. They were located either

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singly or in clusters along the course of major blood vessels within the area, near lymph nodes or embedded in adipose tissue. Heamal nodes were observed in the head region only in animals of 4 - 8 months age group. No haemal nodes were found in the subcutis, nor in the spleen, kidney and lymph nodes.

i.**Head Region :-** Heamal nodes were very seldomly seen in this region. Only in one of the goats aged 4 - 8 months were nodes located in this region. They were found at the Caudo dorsal border of the right madibular lymph nodes and slightly Caudal to the angle of the mandible.

ii. **Neck (Cervical) Region:-** Haemal nodes were occasionally located within the neck region. The nodes were located adjacent to the retcropharyngeal lymph nodes. In the middle third of the region, nodes were located in the jugular groove, dorsal and dorsalateral to the external jugular vein and the common carotid artery. Some of the nodes were also found at the dorsal surfaces of the middle portion of the trachea as well as lateral to the cervical esophagus.

iii. **Thoracic region :-** All the nodes found in the thoracic region were located within the thoracic cavity. In most of the animals, the nodes were found attached to the adventitia at the dorsolateral and ventrolateral aspects of the thoracic aorta. The nodes were also observed near the origins of the bracheal arteries as well as those of the esophageal arteries and dorsal and ventral surfaces of the Azygous veins.

iv. **Abdominal Region :-** Majority of the nodes were found randomly distributed along the dorsal and ventrolateral aspects of the abdominal aorta. Major areas of concentration were along the right and left renal arteries, and on the surface of the kidney, where the nodes were embedded in thick adipose tissue (Fig.1).

v. **Pelvic Region:** All the haemal nodes observed in this region were located within the pelvic cavity. They were located cranian and caudal to the origin of circumflex illiac artery, along the lateral and medial surfaces of the external illiac artery and also within the angle formed by the origins of the left and right internal illiac vessels.

B. Age and Regional Variations in the Number of Haemal Nodes:

1. **Age Variations** : The number of nodes found in individual animal varied from 9-27. A gradual increase in the number of nodes were observed with increasing age. The rise, reached its peak in the 4 -8 months old goats, then gradually dropped. The least mean number of nodes (13.33) were observed in 1 - 3 months old goats, while the highest mean number

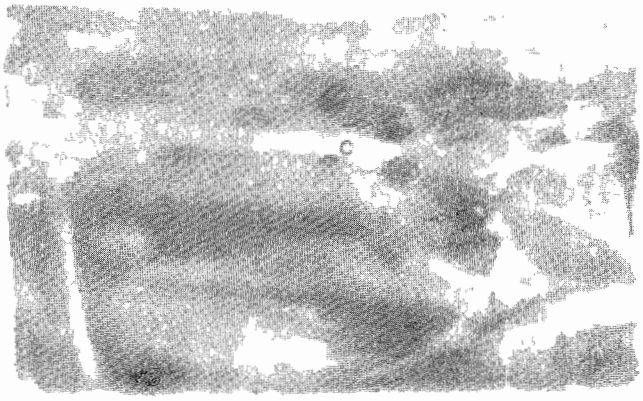

Fig 1

Showing the haemal nodes located at the bifurcation of both the external and internal illiac arteries and also along the course of both course of both the superficial circumflex illiac arteries. It is indicated by arrows. C = Common illiac artery.

Table I : Age Variations in the Number of Haemal Nodes in Goats Mean + SD Given

S/NO.	Age Group	Number (Mean Value)
1	1-3 months	13.33 ± 0.11
2	4 - 8 months	25.00 ± 0.33
3	9 - 16 months	22.35 ± 0.41
4	18 - 24 months	16.67 ± 0.22
	F-LSD (0.05)	**0.5371**

Table II Regional Differences in the Number of Haemal Nodes in Goats. Mean + SD Given

S/NO.	Region	Number
1	Head	0.17 ± 0.16
2	Neck	2.00 ± 0.41
3	Thoracic	4.92 ± 0.88
4	Abdominal	9.42 ± 0.51
5	Pelvic	2.83 ± 0.51
	F-LSD (0.05)	**0.6005**

25.00, was observed in the 4 - 8 months old goats (Table 1). Analysis of variance shows that at 50% probability level, a significant difference was observed between the mean number of nodes in age groups 1 and those of age group II, while the rest of the age groups were similar (Table I).

Regional Variations : The highest number of nodes were consistently found in the abdominal region in all the age groups investigated while the least number was located at the head region. The mean number of nodes in the head region was found to be significantly smaller than those of the remaining four regions, while those of the abdominal region was significantly higher than the number of nodes in the other respective regions (Table II).

DISCUSSION

The heamal nodes in the present study were

found consistently distributed in the cervical region along the jugular adventitia, in the thoracic, abdominal and pelvic cavities along the course of the blood vessels and near the lymph nodes. Similar distribution pattern has been reported in cattle (Ibeachum, 1988). However, no haemal nodes were observed in the present study either along the subcutaneous blood vessel or embeddied in the parenchyma of lymph nodes as reported for cattle (Plitz, 1970; Weller, 1938; Folse et al., 1971). The difference so observed may not be unconnected with the profuse vascularization of the skin of cattle unlike that of goat, which is poorly vascularized (Banks, 1993).

Through the significance of location along blood vessels cannot be ascertained properly, Ezerasor and Singh (1988), had suggested that their intercalation along blood vessels may act as site of immune surveillance in the blood stream. Their nearness to lymph nodes could be probably due to similarities in the embryological origin and development.

The result also indicated that the highest number of nodes were observed in the abdominal region followed by the thoracic region. This numerical difference may be in response to the volume of organs in these areas. Further, the age distribution showed that nodes were observed more in the 4-8 months old goats. This is understandable as the maternal antibodies of young ones at this age have started to decline. It is quite likely that the immunological response of the haemal node decreases beyond 8 months a result of other organs like spleen and lymph nodes taking over most of its functions. It could therefore be suggested that haemal nodes generally play a complementary role (defence, blood storage and concentration) to other lymphoid organs in post natal life except during the early maturity period, when it possibly plays a more prominent immunological role.

Consistent present of haemal nodes in the neck, thoracic, abdominal and pelvic region, serve as a guide to the establishment of what could be referred to a "haemo-centers", similar to lymphocenter of the lymph nodes in the these regions, thus mapping out the distribution pattern of haemal nodes goats.

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