

SOME ANATOMICAL STUDIES ON THE ARTERIAL BLOOD SUPPLY OF THE TARSAL JOINT OF THE GOAT

BY

M.R.A. GAD AND Z.A. YADAM.

Department of Anatomy and Histology Fac. of Vet. Med. Cairo Univ. Beni-Suef Branch.

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SUMMARY

The work was carried out on ten pelvic limbs of the five normal goats of both sexes. Eight of them were treated by ordinary routine methods using to study the arteries. The other two limbs prepared to x-ray films. The dissection and x-ray films revealed that, the dorsal aspect of the tarsal joint in goat received its arterial supply via the branches of the A. dorsalis pedis. While the A. saphena and its branches, Aa. Plantaris medialis et lateralis, were considered as the main sources of the arterial supply of the plantar aspect of that joint.

INTRODUCTION

Although the arterial blood supply of the appendages of the domestic animals attracted the attention of many research workers (Ghoshal and Getty, 1967 in goat; Ghoshal and Getty, 1969; Ghoshal, 1975 and Dyce et al., 1987 in domestic animals; Swillim, 1975 in donkey Evans and Christensen, 1979 in dog and Smuts and Bezuidenhout 1987 in camel). Few of them have thrown inadequate light on the arterial blood supply of the joints. Therefore, and owing to the meager information about this particular subject, the present work is a trial on this line. The goat is considered as the most suitable and cheaper substitute among the domestic ruminants to be used as the subject for routine dissection. Further it is hoped that these findings will be of value in some clinical and surgical problems.

MATERIAL AND METHODS

The work was carried out on ten pelvic limbs of five healthy goats of both sexes and different ages. The goats were slaughtered, well bled and pelvic limbs were separated. Eight of the pelvic limbs were injected by 60% gum milk latex coloured red with carmin via the femoral artery using

a suitable canula for each. The specimens were preserved by the ordinary routine methods, using 10% formaline to which 4% phenol were added, 48 hours before dissection to study the origin, course and distribution of the tarsal arteries. Barium sulphate diluted to a suitable consistency was used as a contrast media injected to the femoral artery of the other two pelvic limbs for x-ray films. Mediolateral view was taken with x-ray potential of 65 KVP, 100 MAS, 0.25 sec. and 100 cm. FFD. The nomenclature used was that adopted by N.A.V. (1983) and Ghoshal and Getty (1969) as if it was possible.

RESULTS

The dorsal aspect of the tarsal joint in the goat received its arterial blood from the A. dorsalis pedis while the arterial blood of the plantar aspect derived from the A. saphena and its branches; A. plantaris medialis and A. plantaris lateralis.

- I. Arteries of the dorsal aspect: represented by three branches, proximal, middle and distal.
1. Proximal branch (Figs. 1 & 2/3): It is of a considerable size arise from the planter aspect of the A. dorsalis pedis at the level of the tarsocrural articulation. It passes plantarally under

cover of the extensor tendons, divides into two branches. The latter branches redivided before reaching the dorsal aspect of the joint capsule forming rete tarsi dorsale (Fig. 1/9) which distributed to the dorsal and both medial and lateral aspects of the tarsocrural and dorsal intertarsal sacs of the joint capsule. Also they give supply to both medial and lateral collateral ligaments of the tarsal joint as well to the intertarsal ligaments. In two out of the examined cases another small branch arises from the A. dorsalis pedis, proximal to the preceding artery, at the level of the medial tibial malleolus and distributed to the proximal aspect of the tibio-tarsal sac of the joint capsule in addition to the tibial attachment of the lateral collateral ligament of the tarsal joint.

2. Middle branch (Figs. 1 & 2/4): Represented by one or two small branches arose from the A. dorsalis pedis at the level of the Os centroquadratale and distributed to the medial and lateral sides of the dorsal aspect of the proximal and distal intertarsal sacs of the joint capsule sharing in the formation of the dorsal tarsal reta and anastomosed with a branch from the A. tarsea perforans.

3. Distal branch (Fig. 1/10): The distal branch originates from the plantar aspect of the A. tarsea perforans (R. perforans proximalis of Ghoshal and Getty, 1969) at the level of the distal intertarsal articulation. It is of a considerable size supplying the distal part of the tarsal articulation "tarsometatarsal articulation". It gives off one or two branches to the dorsal aspect of the distal intertarsal and tarsometatarsal joint capsule before it traversed the tarsometatarsal canal and joins the medial plantar artery.

II. Arteries of the plantar aspect: The plantar aspect of the tarsal joint in goat received its arterial supply mainly from the A. saphena (Figs 1/6 & 3/1) and its branches; A. plantaris medialis (Figs 1/7 & 3/2) and A. plantaris lateralis (Figs 1/8 & 3/3) in addition to small tributaries from A. tarsea perforans.

The saphena artery gives off two small tributaries; medial and lateral tarsal branches; at the level of the tarsocrural articulation. They distributed into the medial and lateral plantar aspect of the tarsocrural

sac of the joint capsule and the structures. In three out of the examined cases represented by one branch which was distributed before reaching the joint capsule and distributed on the same area. Another stronger branch originates either from the dorsal aspect of the artery, just before its bifurcation or from the medial plantar artery, divides into 2-3 small branches and distributed to the caudal aspect of the tarsocrural and talocalcaneal articulations as well as the short part of the medial collateral ligament. The plantar aspect of the proximal and distal tarsal articulation receives its arterial supply from small twigs from both medial and lateral plantar arteries. The plantar aspect of the tarsometatarsal articulation receives its arterial supply from A. tarsea perforans after it traversed the tarsometatarsal canal to join the medial plantar artery.

DISCUSSION

In agreement with our findings, Ghoshal and Swillim (1967) in goat and (1969) in domestic animals, Ghoshal (1975) in domestic animals, Eriksen and Christensen (1979) in dog and Smuts and denhout (1987) in camel, stated that the dorsal aspect of the tarsal joint received its arterial supply from the A. dorsalis pedis. On the other hand, Swillim (1979) reported that the caudal tibial artery also share in the arterial supply of the tarsal joint in donkey through R. articularis and A. plantaris caudalis lateralis. The result which was detected here in goat. None of the available literature gave any detailed information about the distribution of the arteries to the dorsal aspect of the tarsal joint.

The arterial blood supply of the plantar aspect of the tarsal joint, as reported by Ghoshal and Swillim (1969) in domestic animals and Swillim (1979) in donkey derived mainly from the A. saphena and its branches as Aa. plantaris medialis et lateralis and A. tarsea perforans which passed in the line of our findings in goat. Moreover, the present finding except the plantar aspect of the tarsometatarsal articulation in goat received its arterial blood supply from A. tarsea perforans before it joined the A. plantaris medialis to form the Arcus plantaris profundus.

LEGENDS

Fig. 1: Diagrammatic representation illustrating the x-ray of the tarsal joint of the goat "medio-lateral view":

- 1- A. Tibialis cranialis.
- 2- A. dorsalis pedis.
- 3- Proximal branch of A. dorsalis pedis.
- 4- Middle branch of A. dorsalis pedis.
- 5- A. tarsea perforans.
- 6- A. saphena.
- 7- A. plantaris medialis.
- 8- A. plantaris lateralis.
- 9- Rete tarsi dorsale.
- 10- Distal branch of (5).

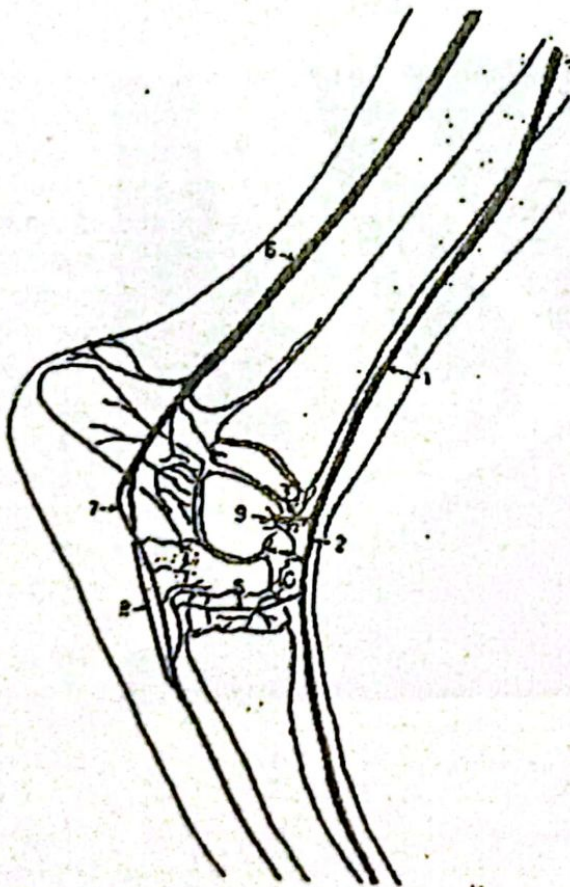
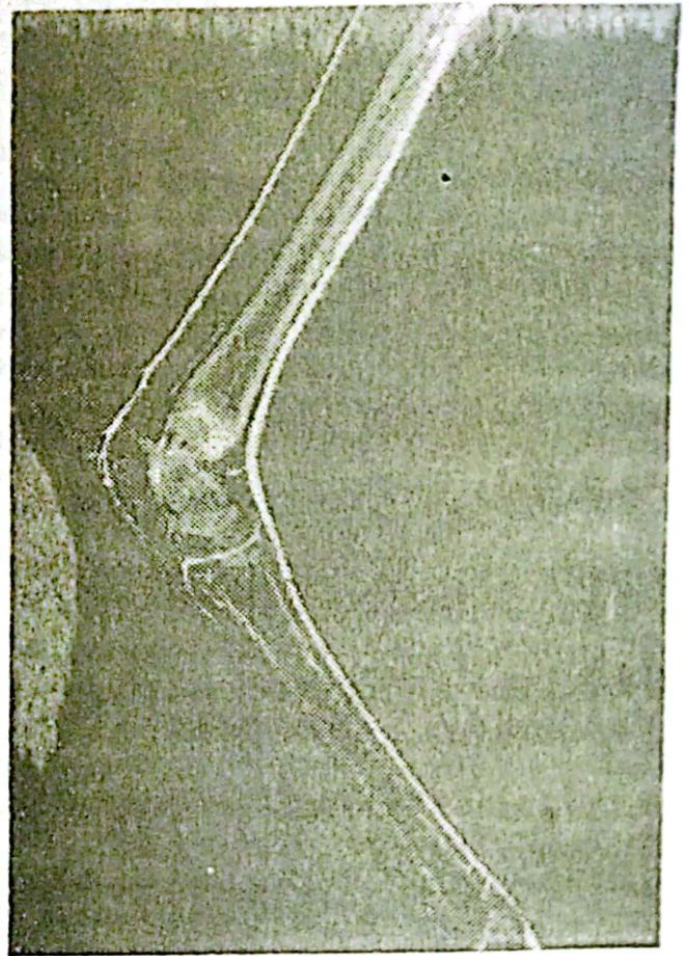


Fig. 2: Photographic representation showing the arterial blood supply of the dorsal aspect of the tarsal joint in goat. "Medial view":
1- A.tibialis cranialis. 2- A.dorsalis pedis.
3- Proximal branch of (2). 4- Middle branch of (2). 5- A.tarsea perforans.

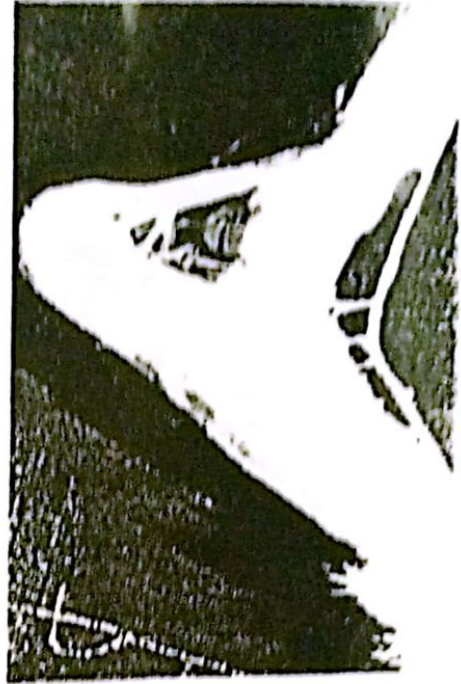


Fig. 3: Photographic representation showing the arterial blood supply of the plantar aspect of the tarsal joint in goat "medial view":
1- A.saphena. 2- A.plantaris medialis. 3- A.plantaris lateralis.



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