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Autor: Karada, H.

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An anatomical study on the arteries to the left adrenal gland of sheep and goat

H. Karadağ

Summary

The arteries supplying the left adrenal gland were determined in 12 mature sheep and goats of both sexes and different breeds. The adrenal branches arose from the first and second lumbar arteries in both species but in one goat they originated from the first lumbar artery while in another from the last intercostal artery. The cranial adrenal branches arose from the celiac artery in 8 sheep, both from the celiac and cranial mesenteric arteries in 3 sheep and from the common celiacomesenteric trunk in 1 sheep. In all goats the cranial adrenal branches originated from the cranial mesenteric artery. The caudal adrenal branches arose singly from the renal artery in all sheep and goats. In both species any branch from the aorta or caudal phrenic arteries to the adrenal gland was not seen.

Key words: adrenal gland – adrenal arteries – sheep – goat

Eine anatomische Untersuchung über die Arterien der linken Nebenniere bei Ziegen und Schafen

Es wurden die Arterien der linken Nebenniere bei zwölf Ziegen und Schafen untersucht, die sowohl männlich als auch weiblich sind und verschiedenartig gefüttert wurden. Die Rami suprarenales sind auch bei beiden Arten aus den ersten und zweiten Aa. lumbales entstanden. Es ist festgestellt worden, dass sie bei einer Ziege aus der ersten A. lumbalis und bei einer anderen Ziege aus der letzten A. intercostalis hergekommen sind. Die Rami suprarenales craniales sind bei den 8 Schafen aus der A. celiaca, bei den 3 Schafen sowohl aus der A. celiaca als auch der A. mesenterica cranialis und bei einem Schaf aus dem Truncus celiacomesentericus communis entsprungen. Aber bei allen Ziegen sind die Rami suprarenales craniales aus der A. mesenterica cranialis entsprungen. Bei allen Schafen und Ziegen sind die Rami suprarenales caudales allein aus der A. renalis sinistra entstanden. Bei beiden Tierarten hat man keine Arterie aus der Aorta oder aus den Aa. phrenicae caudales zu den Nebennieren gesehen.

Schlüsselwörter: Nebenniere – Arterien – Schaf – Ziege

Introduction

There is no general agreement about the origin of arteries to the adrenal gland in small ruminants. According to Zietzschmann (1943) and Doğuer (1970) arteries to the adrenal gland arise from the renal artery, aorta, phrenic arteries and other adjacent arteries. Simoens et al. (1983) stated that the adrenal branches in ruminants might arise from the cranial lumbar arteries

and in sheep from the descending aorta. On the other hand it was pointed out that these branches originate from the second lumbar artery in cows and from the first and second lumbar arteries in sheep and goat (Dursun, 1981; Wilkens and Münster, 1984). Hossain (1972) expressed that the adrenal branches derive from the last intercostal and first lumbar arteries in goat. It was shown that the cranial adrenal branches originate from the celiac and caudal phrenic arteries in sheep and

goat (Wilkins and Münster, 1984). According to Hossain (1972) they arise from the cranial mesenteric artery in goat. It has also been reported by Simoens et al. (1983) that the cranial adrenal branches were inconstant branches to the adrenal gland in ruminants.

The caudal adrenal branches arise from the renal artery in ruminants (Zietzschmann, 1943; Dursun, 1981; Wilkins and Münster, 1984), in sheep and goat (Goshal, 1975) and in goat (Hossain, 1972). According to Simoens et al. (1983) they might arise from the abdominal aorta in ox or be single in sheep.

The purpose of the present study is to describe in detail the arterial supply to the left adrenal gland of sheep and goat.

Material and methods

12 adult sheep and goats were used in this study. The animals were of both sexes and of different breeds. After the animals were anesthetized and exsanguinated, the ribs on the left side were cut off by a costotome. Luke-warme starch solution coloured with carmine (Dursun, 1976) was injected through the thoracic aorta toward the abdominal aorta. After the cadavers were stored at 4 °C for a day they were dissected. The branches to the adrenal gland were prepared using the dissection microscope. In this investigation the branches to the left adrenal gland only were determined.

Results

The adrenal branches originated from the first and second lumbar arteries. Two branches arising from the first lumbar artery and one branch from the second lumbar artery furnished the left and right faces of the caudal

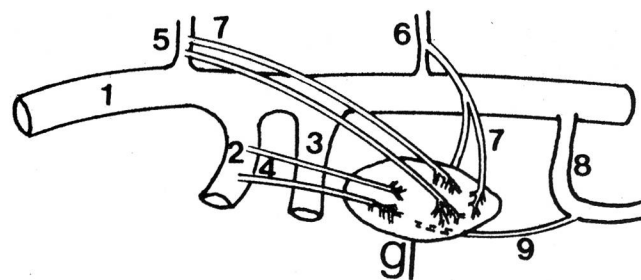


Fig. 1: Arteries of sheep to adrenal gland.

- 1 - Abdominal aorta
- 2 - Celiac artery
- 3 - Cranial mesenteric artery
- 4 - Cranial adrenal branches
- 5 - First lumbar artery
- 6 - Second lumbar artery
- 7 - Adrenal branches
- 8 - Renal artery
- 9 - Caudal adrenal branches
- gl - Adrenal gland

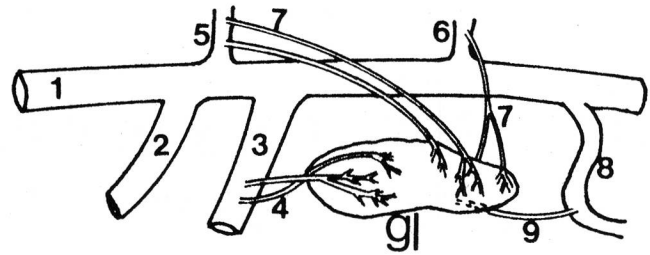


Fig. 2: Arteries of goat to adrenal gland.

- 1 - Abdominal aorta
- 2 - Celiac artery
- 3 - Cranial mesenteric artery
- 4 - Cranial adrenal branches
- 5 - First lumbar artery
- 6 - Second lumbar artery
- 7 - Adrenal branches
- 8 - Renal artery
- 9 - Caudal adrenal branches
- gl - Adrenal gland

extremity dividing into 5 to 6 small vessels in both species (Fig. 1 and 2). Adrenal branches arose from the first lumbar artery in two branches (one goat), and from the last intercostal artery in three branches in another one. In the first case there was no other branch originating from the second lumbar artery, in the second case no further branch from the first or second lumbar artery.

The cranial adrenal branches were 1 to 4 in number. In sheep these branches to the adrenal gland arose 1.7 to 2.2 cm from the origin of the celiac artery (Fig. 1). In 3 sheep they arose 2 cm distal to the origin of the celiac artery and 1.8 cm from that of the cranial mesenteric artery and in 1 sheep they arose 2 cm from the origin of the common celiacomesenteric trunk. In all goats used in our study the cranial adrenal branches originated 1.5 to 2.7 cm from the origin of the cranial mesenteric artery (Fig. 2). These branches distributed on the cranial extremity of the adrenal gland (celiacomesenteric) dividing into 3 to 4 smaller vessels in both species.

Tab. 1: The arising variabilities of the adrenal branches in 12 sheep and goats

		adrenal branches originated from		
		first lumbar artery	second lumbar artery	last intercostal artery
in	1 goat	+	-	-
	1 goat	-	-	+
	10 goats	+	+	-
	12 sheep	+	+	-

Tab. 2: The arising variabilities of the cranial adrenal branches in 12 sheep and goats.

		cranial adrenal branches originated from		
		celiac artery	cranial mesenteric artery	common celiacomesenteric trunk
in	1 sheep	-	-	+
	3 sheep	+	+	-
	8 sheep	+	-	-
	12 goats	-	+	-

Una ricerca anatomica sulle arterie della ghiandola surrenale sinistra nelle capre e nelle pecore

In questo lavoro vennero analizzate le arterie delle ghiandole surrenali di 12 capre e pecore di ambo i sessi nutrite in maniere differenti. I rami suprarenali originano in tutte e due le specie dalla prima e dalla seconda arteria lombare. Si è potuto constatare che in una capra questi rami suprarenali provenivano dalla prima arteria lombare e che in un'altra capra invece dall'ultima arteria intercostale. I rami suprarenali craniali provenivano in 8 pecore dall'arteria celiaca, in tre pecore sia dall'arteria celiaca che dall'arteria mesenterica craniale e in una pecora dal tronco celiaco mesenterico comune. Per contro in tutte le capre i rami suprarenali craniali provenivano tutti dall'arteria mesenterica craniale. In tutte le capre e pecore i rami suprarenali caudali provenivano tutti dall'arteria renale sinistra. In tutte e due le specie non esistono arterie che provengono dall'aorta o dalle arterie freniche caudali siano collegate con le ghiandole surrenali.

Etude anatomique sur les artères de la glande surrénale gauche chez la chèvre et le mouton

Les artères de la glande surrénale gauche ont été examinées chez 12 chèvres et moutons mâles et femelles d'espèces différentes. Les rameaux suprarenaux avaient leur origine sur les premières et secondes artères lombaires chez les deux espèces. Chez une chèvre, l'origine des rameaux suprarenaux était située sur la première artère lombaire et chez une autre chèvre sur la dernière artère intercostale. Les rameaux suprarenaux craniaux provenaient de l'artère coéliqua chez 8 moutons, aussi bien de l'artère coéliqua que de l'artère mésentérique craniale chez 3 moutons et du tronc coélicaco-mésentérique commun chez 1 mouton. Chez toutes les chèvres, les rameaux suprarenaux craniaux étaient issus de l'artère mésentérique craniale. Chez tous les moutons et les chèvres, les rameaux suprarenaux caudaux étaient dérivés de l'artère rénale gauche seulement. Chez les deux espèces, aucune artère en provenance de l'aorte ou des artères phréniques caudales en direction des glandes surrénales n'a été décelée.

The caudal adrenal branches arose singly 2.2 to 3.0 cm and 2.5 to 3.2 cm from the origin of the renal artery in sheep and goat, respectively (Fig. 1 and 2).

Discussion

According to some references (Dursun, 1981; Wilkens and Münster, 1984) the adrenal branches originate from the first and second lumbar arteries in sheep and goat. Hossain (1972) reported that these branches arise from the last intercostal and first lumbar arteries in goats. In the present study it was observed that these branches arise from the last intercostal artery in only one goat. In this case there was not any branch from the first and second lumbar arteries to the adrenal gland. According to Simoens et al. (1983) the adrenal branches might arise from the descending aorta directly in sheep. This description was not seen in both species in this investigation.

It was stated that the cranial adrenal branches originate from the celiac or caudal phrenic arteries in sheep and goat (Wilkens and Münster, 1984), from the cranial mesenteric artery in goat (Hossain, 1972) and also were inconstant branches to the adrenal gland in ruminants (Simoens et al., 1983). The results of this study show that the cranial adrenal branches arise from the celiac artery in 8 sheep, both from the celiac and cranial mesenteric

arteries in 3 sheep and from the common celiacomesenteric trunk in one sheep. However, as Hossain (1972) mentioned that they originate from the cranial mesenteric artery and not from any other artery in goat is contrary to Wilkens and Münster's (1984) claim who reported that the cranial adrenal branches might arise from the caudal phrenic arteries in sheep and from the celiac and caudal phrenic arteries in goat.

For the caudal adrenal branches we could prove the statements of other authors (Zietzschmann, 1943; Doğuer, 1970; Hossain, 1972; Ghoshal, 1975; Dursun, 1981; Simoens, et al., 1983; Wilkens and Münster, 1984) that they arise from the renal artery and that they are single in sheep and goats which were used in our study.

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Korrespondenzadresse: Dr. Hüseyin Karadağ, Head of Departement of Basic Veterinary Sciences, Faculty of Veterinary Medicine, Yüzüncü Yıl University, Van-Türkiye

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