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MULTIPLE RENAL ARTERIES (*AA. RENALES*) IN MINK AND DOG

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ABSTRACT

29 mink and 35 dog specimens investigated showed some occurrence of double renal arteries. Double renal arteries in mink were identified in 20.7 %, and in dog in 22.9 % of the individuals researched. Other researchers who investigated those species found a considerably lower percentage of them.

Key words: renal arteries, mink, dog

INTRODUCTION

Sign-posting the arteries departing from the abdominal aorta, in the majority of individuals double renal arteries are identified. The occurrence of double renal arteries in dog was described by e.g., Kosik (1923), Berg (1962), Reis and Tepe (1965). Each of the researchers found them in the species in a different percentage of cases.

Double renal arteries were identified also in other animal species, e.g., in blue fox – Brudnicki et al., (1996), as well as in raccoon dog – Brudnicki et al., (1986).

The latest literature reports of some cases of the occurrence of multiple renal arteries in humans also (Goscicka et al., 1996, Bergman et al., 1992), which seems to show that such researches remain justifiable today.

Investigating the bifurcation of the abdominal aorta in dog and mink, the cases of double renal arteries were identified and, consequently, the authors of the present paper described them and compared the results obtained with those provided by others.

MATERIALS AND METHODS

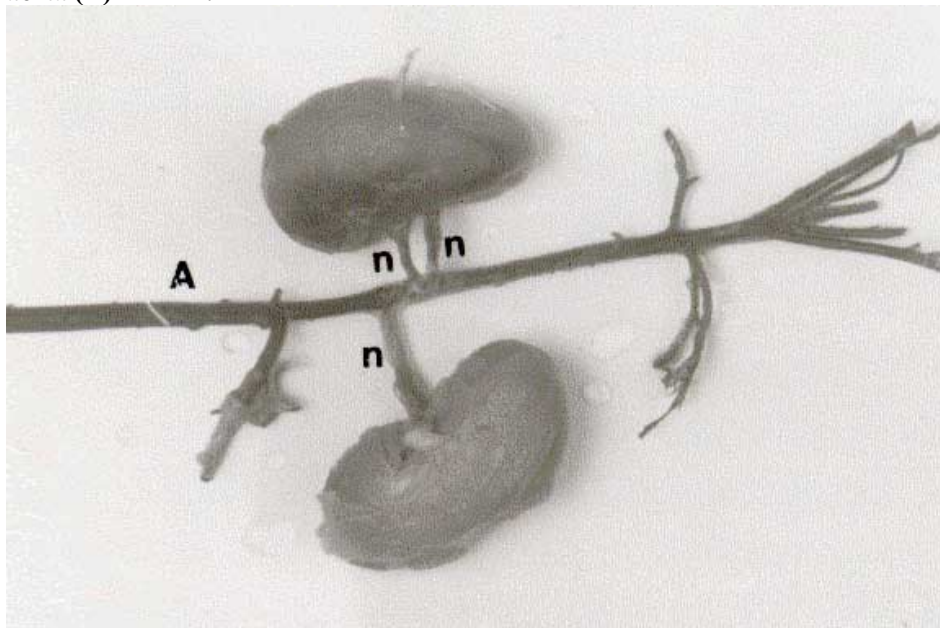
The research was conducted in 29 mink individuals (out of which 14 were females), *Mustela vison* (Briss.), as well as in 35 dog individuals (out of which 15 were females), *Canis lupus f. domestica* (L.). Prior to the research, the length of the animal bodies was defined, starting from the nuchal crista of the occipital os to apex ossis sacri. The mean mink body length measured in that way amounted to 31.5 cm (27.5 cm - 39.0 cm, SD=5.2), and mean dog body length to 56.8 cm (35.5 cm - 87.5 cm, SD=7.55). The research material, namely mink carcasses, were obtained from large breeding farms located in the vicinity of the city of Bydgoszcz, and whole dogs (following the euthanasia) from an animal shelter.

The animals were filled through thoracic aorta (*aorta thoracica*) with synthetic latex (NB-30) which assured careful filling of the vessels (West 1962). The material was being fixed in a 5 % formalin solution for 9 weeks, and then renal vessels were prepared.

RESULTS

The research showed that in almost all the minks (n=26, namely 89.7 %) renal arteries departed from the abdominal aorta *aorta abdominalis* asymmetrically, and in the other three (10.3 %) individuals the arteries departed at the same level. They descended from the abdominal aorta as single vessels in 21 (72.4 %) individuals, and before they descended into the hilus renalis, in most of them (75.9 %) they bifurcated into two branches. In six (20.7 %) minks the occurrence of a single right renal artery and double left renal artery was observed ([phot. 1](#)).

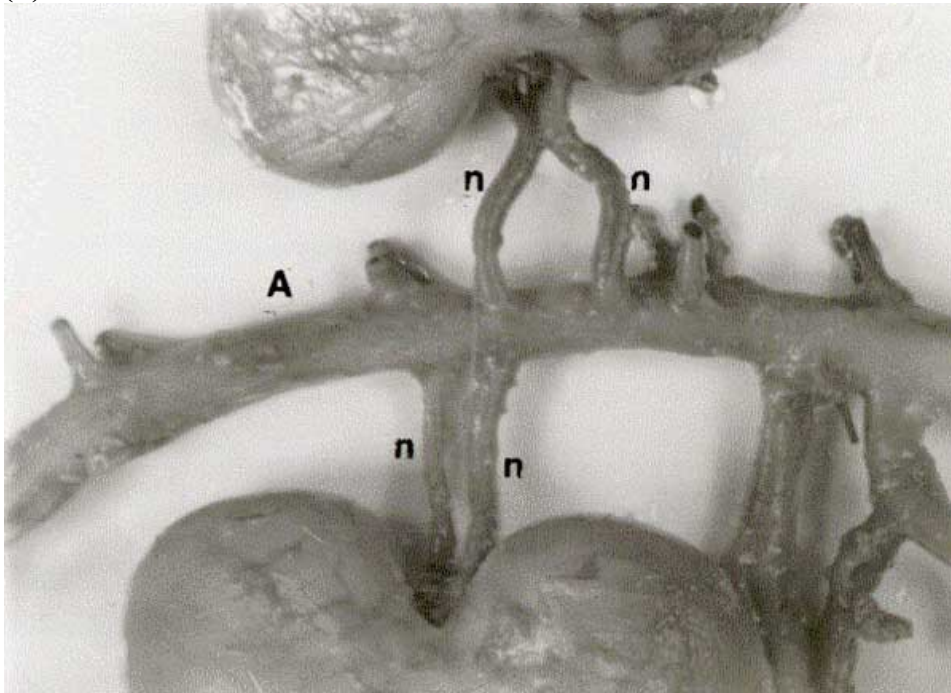
Phot. 1. Asymmetrical double renal arteries (n) departing from the abdominal aorta (A) in mink.



Renal arteries in 27 (77.1 %) dogs departed from the aorta as single vessels. In the majority of them, namely in 24 (68.6 %) specimens, the departure of the right renal artery was moved towards the head, whereas in other 9 (25.7 %) individuals, symmetrical renal arteries departed from the abdominal aorta at the same level.

Besides, in 7 (20.0 %) dogs the occurrence of asymmetrical double renal arteries was observed; in four males and two females a single right renal artery and a double left renal artery were observed, whereas in one male the right renal artery was double and the left renal artery remained a single vessel. In yet another case, in a female (2.9 %) symmetrical double renal arteries were identified ([phot. 2](#)).

Phot. 2. Asymmetrical double renal arteries (n) departing from the abdominal aorta (A) in mink.



DISCUSSION

Multiple renal arteries in dog and mink have been described by a few authors. At the beginning of our century Kosik (1923) identified the occurrence of multiple renal arteries in a few percent of the dogs researched (2 %) only. Similarly multiple renal arteries were rarely noted in raccoon dog (5 %) Brudnicki et. al., (1986), and in blue fox (2.5 %), Wiland and Knasiecka (1970). In the 70s the cases of multiple renal arteries recorded in dogs constituted slightly over 10 % of all the recorded cases (10.9 %), Berg (1962); (12.8 %), Reis and Tepe (1965), whereas in the material investigated by the authors of the present paper multiple renal arteries were identified in 22.9 % of the specimens.

For the last thirty years a similar difference in the frequency of the occurrence of multiple renal arteries has been noted in mink. Wiland and Knasiecka (1970) observed such vessels in 11.7 % of the specimens, whereas, as observed by the authors of the present paper, they were identified to occur currently in 20.7 % of the specimens of that species.

Bearing in mind that Goscicka et al., (1996) identified multiple renal arteries in 20 % of the human foetus sampled from the same area, one may assume that the reason for such significant changes in the frequency of the occurrence of multiple renal arteries could not have been differences among different populations only. Renal arteries play an important role in absorption and filtering processes. Morphological variations observed here could have been also linked to other environmental processes of the last hundred years. Even though the morphological research cannot provide an explanation for the phenomena, yet it could have been a result of the organism adapting to the pollution of the environment.

REFERENCES

1. Berg R., 1962: Systematische Untersuchungen über das Verhalten der Äste der *Aorta abdominalis* bei *Canis familiaris*. Monatshefte für Veterinärmedizin, 17: 307-315.
2. Bergman R. A., Cassell M. D., Sahinoglu K., Heidger P. M., Jr., 1992: Human doubled renal and testicular arteries. Ann. Anat., 174: 313-315.
3. Brudnicki W., Jablonski R., Skoczylas B., 1986: Przypadek wielokrotnych tetnic nerkowych *aa. renales* u jenota (*Nyctereutes procyonoides* Gray). Zesz. Naukowe ATR w Bydgoszczy. 140 (Zoot. 14): 25-28.
4. Brudnicki W., Jablonski R., Skoczylas B., Wiland C., 1996: Przypadek wielokrotnych tetnic nerkowych (*aa. renales*) u lisa srebrzystego (*Vulpes vulpes*). Zesz. Naukowe ATR w Bydgoszczy 204 (Zoot. 28).
5. Goscicka D., Szpinda M., Kochan J., 1996: Akzessorische Nierenarterien bei menschlichen Fetten. Ann. Anat., 178: 559-563.
6. Kosik O., 1923: Variace vetvi aortae abdominalis u psa. Biologicke opisy Wysoke Skoly Zverolekarsske, Brno CSSR, 2: 1-23.
7. Reis R. H., Tepe P., 1965: Variations in the patern of renal vessels and their relation to the type of posterior vena cava in the dog (*Canis familiaris*). Am. J. Anat., 99: 1-5.
8. West W. T., 1962: Injection of the arterial system of the mouse. Stein Technol., 37: 99-104.
9. Wiland C., Knasiecka V., 1970: Przypadki wielokrotnych tetnic nerkowych u norki i lisa niebieskiego. Rocz. WSR w Poznaniu, 49: 107-111.

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