

RENAL VENOUS SYSTEM OF THE LION (PANTHERA LEO) AGROSS ANATOMICAL DESCRIPTION

By

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SUMMARY

Eight normal kidneys of four adult lions were used in this study. Work revealed that lion kidney, of either sides, is drained by two renal veins which open in the caudal vena cava either independently (Right kidney) or by a common trunk (Left kidney). Within the renal hilus, the renal veins were organized into a superficial (capsular) and a deep (parenchymal) systems. No anastomoses could be recognized between the tributaries of both systems.

INTRODUCTION

The objective of the classic comparative anatomy has been understand structure by establishing homologies among organs and thereby deducing the course of evolution of the organisms and their organs. Moreover, the morphology of the organs is linked to the functions they perform (Walker, 1987). In this respect Fourman and Moffat (1977) conducted several extensive vascular studies on the kidney of different mammals including rodents, carnivores and lion. However, Abuzaid (1989) described only the branching pattern and segmentation of lion's renal artery.

The purpose of the present study is to provide a gross morphological description of the renal veins in the kidney of the lion.

MATERIAL AND METHODS

Both kidneys of four lions were obtained from four dead subjects at Giza Zoological Garden. The specimens were thoroughly flushed with normal saline through the renal artery to remove clotted blood.

Then they were injected, via the caudal vena cava

shortly beyond the origin of the renal veins, with gum milk latex coloured blue with ultra marine (4 kidneys) for routine dissection and with vinyl acetate (4 kidneys) for cast preparation.

Nomenclature was adopted according to N.A.V. (1983).

RESULTS

In the lion, either of both kidneys is drained via two renal veins (2 A). The right renal veins opened into the caudal vena cava (2 A/b & 2 B/b) either independently (3 cases) or by a common trunk (one case), while those of the left kidney joined each other forming a common trunk that joined the caudal vena cava 1-1.5 cm further back (2 A/c & C/c). In all the examined specimens, the common trunk of the left renal veins received the gonadal vein (testicular or ovarian vein) (2 A & C/d).

Vv. renales sinister (2 A/c & 2C/c; 3 A & B):

The two left renal veins sprang from the caudal vena cava via a short common trunk of about 1.5-2 cm length. They coursed as a dorsal and a ventral renal veins toward the renal hilus, where each

vein gave rise to a very short superficial and deep stems. Each of these stems divided into three (sometimes four) major branches; cranial, middle and caudal.

The rami of the superficial stem of either side (capsular veins) radiated subcapsularly toward the lateral renal border where they joined each other in an arcade manner (Fig. 1 & 3 B). From these arches, several tributaries were emanated and joined the corresponding tributaries of the opposite renal side (2 B & 2C).

The branches of the deep stem of the renal veins, interlobar veins were relatively stronger and arborized into several medullary branches, before giving rise to Vv. arcuate (3 A). Each of the latter veins joined its neighbour as its fellow of the other side forming a sort of venous net from which several tributaries were radiated into the cortical tissue.

No anastomosis could be noticed between the superficial (capsular) and parenchymal (deep) venous systems.

Vv. renales dexter (2 A & 2B):

The two right renal veins arose, either independently (3 cases) or by a common trunk (one case), from the caudal vena cava 1-1.5 cm. cranial to the origin of the left ones. They coursed toward the hilus renalis, each vein gave rise to a short superficial and deep stems. The superficial stem of the caudal renal vein detached 3-4 capsular veins on the dorsal surface of the kidney, while that of the cranial renal vein gave also 3-4 capsular branches that ramified on the ventral renal surface (Fig. 2 B).

The superficial (capsular) veins behaved similar pattern like those of the left kidney.

The deep stem of the caudal renal vein detached dorsal, caudal and ventral interlobar veins within the caudal half of the kidney, while the corresponding stem of the cranial renal vein detached dorsal, cranial and ventral interlobar veins within the cranial half of the kidney.

Whatever, their origin, the interlobar veins, be-

haved similar pattern of branching like the left kidney.

DISCUSSION

The present study revealed that in the lion, in the cat (Krahmer, 1966 and Weser, 1968) and dog (Evans and Christensen, 1979) the renal veins are always double.

The slight caudal displacement of the origin of the left renal veins of the lion recorded here is similar to that of the pig (Popesko, 1963 and 1964, Ghoshal et al., 1976 and Ghoshal et al., 1981). On the other hand, both the right and left renal veins of the dog and cat join the caudal vena cava at the same level (Ellenberger and Baum, 1943 and Koch, 1976).

The origin of the gonadal vein from the left renal vein in the lion, was also reported in the dog (Krahmer, 1966 and Weser, 1968) and cat (Evans and Christensen, 1979).

The superficial (capsular) veins reported in the present study were also recorded in the dog (Waller, 1964) and cat (Zimmermann, 1971).

Unlike the arterial system, the renal veins of the lion did not show segmental organization, they anastomose freely with each other and connect all portions of the kidney. A result of this study confirms the statements of Wrobel (1961) in the pig; Weller (1964) in the horse; Mousa (1964) in the camel; Osman and Ragab (1987) in the donkey, and Horacek et al. (1987), in the cat.

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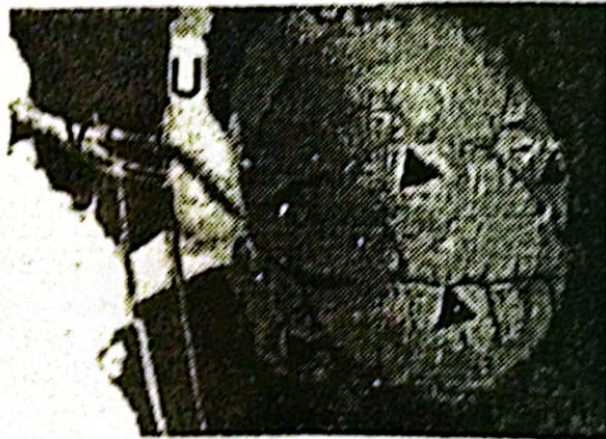
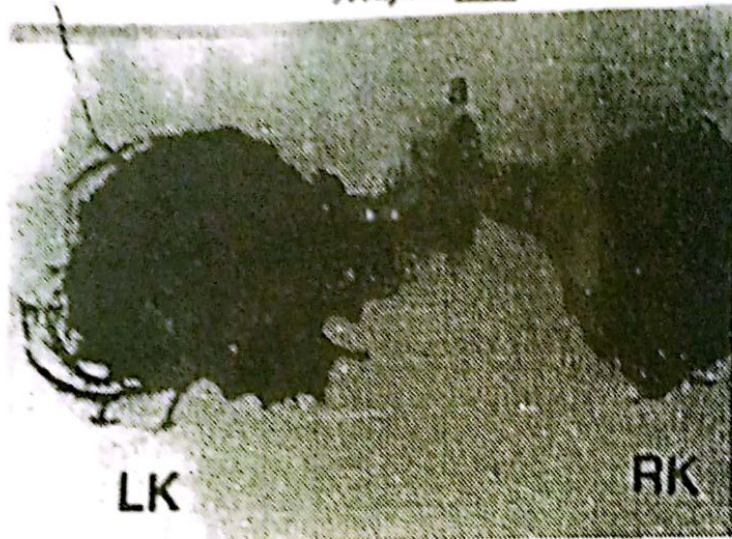
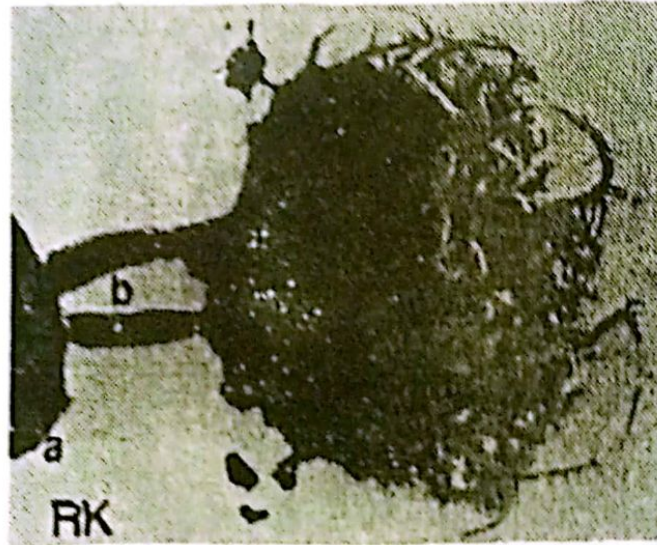


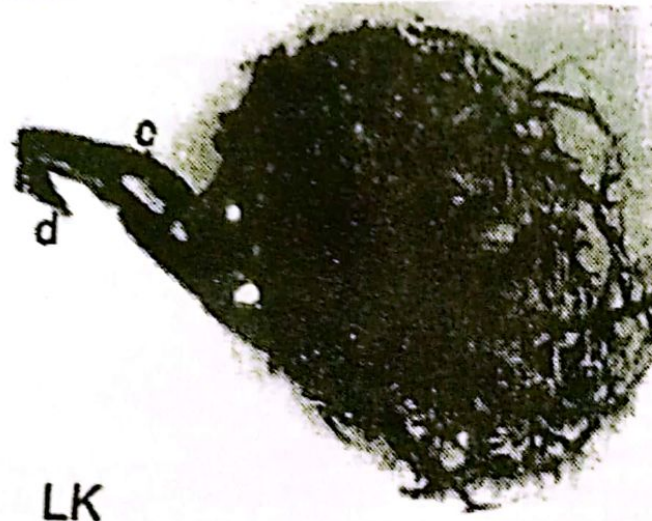
Fig. (1) : Left kidney of the lion (ventral view, Note, the superficial venous system (arrows heads) joins each other in an arcade manner at the lateral renal border (arrows). " V. left renal vein U. left ureter "reflected" C.P. cranial pole."



A



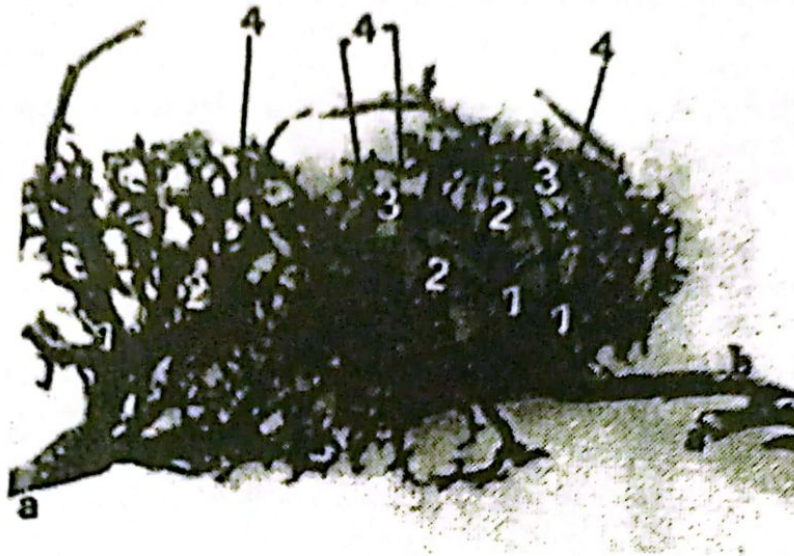
B



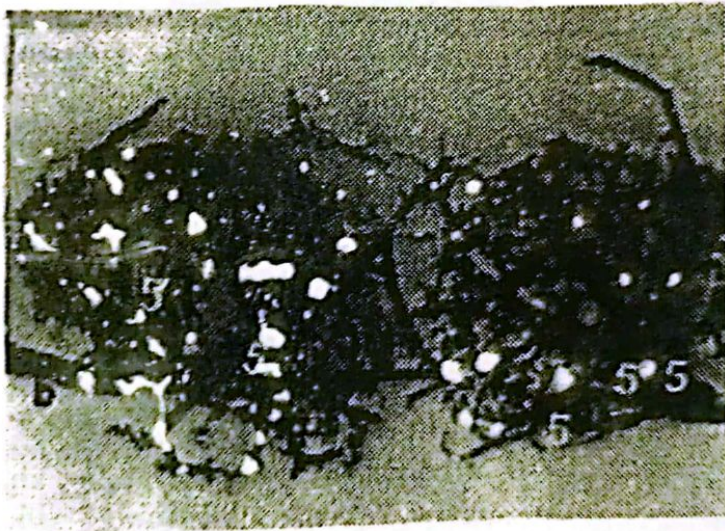
C

Fig. (2) : vinyl acetate corrosion cast of the venous system of lion's kidney, dorsal view (A)
Higher magnification of the right renal cast (B) and left renal one (C)

- LK. cast of left kidney
- RK. cast of right kidney
- a. caudal vena cava
- b. right renal veins
- c. left renal veins
- d. left gonadal vein



A



B

Fig. (3) : Vinyl acetate corrosion cast of the left renal vein of lion, interior (deep) system (A) and exterior (superficial) system (B).

- a. Ventral renal vein
- b. Dorsal renal vein
- 1- interlobar veins.
- 2- medullary veins.
- 3- Arcuate (subcortical) veins
- 4- cortical veins.
- 5- superficial (subcapsular) veins.