

ESTUDO DOS ELEMENTOS ARTERIAIS E VENOSOS DO HILO RENAL DE BOVINOS DA RAÇA CANCHIM

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RESUMO: Considerando-se a importância do conhecimento anatômico, com vista a sua utilização em áreas aplicadas da Medicina Veterinária, busca-se com o presente trabalho informações referentes ao número de raízes venosas e ramos arteriais do hilo renal em bovinos da raça Canchim. Para tanto, utilizou-se 30 animais adultos, sendo todos machos, provenientes do Frigorífico Friboi de Anápolis-GO. Após a retirada dos rins e a sua fixação durante 48 horas, em formol a 10%, procedeu-se a dissecação do hilo renal. Observou-se como números mínimo e máximo, 3 e 8 ramos arteriais esquerdos, respectivamente, sendo que o número total de 3, 4 e 8 ramos aparecem 1 vez (3,3%), 5, 6 e 7 em 9 vezes (30,0%). Já os ramos arteriais direitos, variam de 4 a 8, sendo que, 8 ramos aparecem 1 vez (3,3%), 7 em 2 vezes (6,7%), 4 em 3 vezes (10,0%), 5 em 10 vezes (33,3%), e 6 em 14 vezes (46,7%). As raízes venosas direitas tem como números mínimo e máximo, 5 e 10, respectivamente, sendo que, o número total de 5, 6 e 8 raízes aparecem 1 vez (3,3%), 10 em 2 vezes (6,7%), 9 em 3 vezes (10,0%), 7 em 22 vezes (73,4%). Já as raízes venosas esquerdas, variam de 6 a 11, sendo que, 11 raízes aparecem 1 vez (3,3%), 6 em 3 vezes (10,0%), 9 em 4 vezes (13,3%), 8 em 6 vezes (20,0%) e 7 em 16 vezes (53,4%).

PALAVRAS-CHAVE: rim, arteriais, veias, bovino, anatomia

STUDY OF THE ARTERIAL AND VENOUS ELEMENTS OF THE RENAL HILUS IN CANCHIM BOVINES

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ABSTRACT: Considering the importance of the anatomic knowledge on intention in this utilization in peculiar areas of Veterinary Medicine, was attempt with this present work dates concerning to the number of venous root and arterial ramus of the renal hilus in bovines of canchim race. For this 30 grown-up, males animals, deriving from Friboi's Slaughterhouse of Anápolis-GO was used. After the kidney's removal and its fixation for 48 hours, immersed on formaldehyde 10 %, the renal hilus dissection was performed. Minimum and maximum numbers from 3 and 8 left arterial branches, observed was, respectively, the branches 3, 4 and 8 appears once (3.3%); 5, 6 and 7 nine times (30.0%). The right arterial branches varies from 4 to 8, being that 8 branches appears once (3.3%); 7 twice (6.7%); 4 three times (10.0%); 5 ten times (33.3%); and 6 in fourteen times (46.7%). The right venous root has like minimum and maximum numbers 5 and 10 respectively, about thin roots in a total number of 5, 6 and 8 appears once (3.3%); 10 twice (6.7%); 9 three times (10.0%) and 7 twenty two times (73.4%). At once the left venous root varies from 6 to 11, about this 11 roots appears once (3.3%); 6 three times (10.0%); 9 four times (13.3%); 8 roots appears in six

KEY WORDS: kidney, arteries, veins, bovine, canchim, anatomy

ESTUDIO DE LOS ELEMENTOS ARTERIALES Y VENOSOS DEL HILO RENAL DE BUEYES DE LA RAZA CANCHIM

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RESUMEN: Delante de la importancia del conocimiento anatómico y con el objetivo de la utilización en áreas aplicadas de la Medicina Veterinaria, hemos buscado en dicho trabajo informaciones sobre el número de raíces venosas y ramos arteriales del hilo renal en bueyes de la raza Canchim. Para ello, hemos utilizado 30 animales adultos, siendo todos machos que han venido del Frigorífico Friboi de Anápolis – GO. Después de quitar los riñones y fijarlos durante 48 horas en formol a 10%, se hizo la disección del hilo renal. Hemos observado como números mínimo y máximo, 3 y 8 ramos arteriales izquierdos, respectivamente, siendo que el número total de 3, 4 y 8 ramos aparecen 1 vez (3,3%), 5, 6 y 7 en 9 veces (30,0%). Sin embargo los ramos arteriales derechos suelen cambiar entre 4 a 8, siendo que 8 ramos aparecen 1 vez (3,3%), 7 en 2 veces (6,7%), 4 en 3 veces (10,0%), 5 en 10 veces (33,3%) y 6 en 14 veces (46,7%). Las raíces venosas derechas tienen como números mínimo y máximo, 5 y 10 respectivamente, siendo que, el número total de 5, 6 y 8 raíces aparecen 1 vez (3,3%), 10 en 2 veces (6,7%), 9 en 3 veces (10,0%), 7 en 22 veces (73,4%). Además las raíces venosas izquierdas, suelen cambiar entre 6 a 11, siendo que, 11 raíces aparecen 1 vez (3,3%), 6 en 3 veces (10,0%), 9 en 4 veces (13,3%), 8 en 6 veces (20,0%) y 7 en 16 veces (53,4%).

PALAVRAS-CLAVE: riñón, arterias; venas, bueyes, anatomía

Introduction

The present study refers to the disposition of the arterial and venous vascular elements of the renal hilum of bovines of the Canchim race.

After detailed analysis of the specific literature to this matter, we have just found reports in swine (FERREIRA, 1975; SOUZA *et al.*, 1984; COSTA *et al.*, 1991). When consulting the treatises of Veterinary Anatomy, we have just observed unclear and imprecise data.

The aim of this study was to look for anatomical variations in the behavior of these vessels, to supply subsidies for research of surgical-experimental nature and still to contribute for the development of the Comparative Anatomy.

Material and Methods

Thirty pairs of kidneys of male adult bovine of the Canchim race obtained from Friboi's Slaughterhouse, Anápolis/GO were used in this study.

After the withdrawal of the organs with the correspondent segments of the aorta artery, caudal cava vein and ureter initial tract, we carried out the fixation of the material in 10% formol aqueous solution for a minimum period of 48 hours. The dissection of the vascular elements of the renal pedicle was performed by removing the fatty tissue that involves these vessels.

To proceed the analysis of the results, schematic drawings of the dissected preparations were elaborated by dividing the region of the renal hilum in quadrants by means of two perpendicular lines to each other. Thus, the first line was traced

from a pole to another at craniocaudal direction, and the second line was situated on the hilar center, at dorsoventral direction. In this way, four quadrants could be delimited, that are, craniodorsal, cranioventral, caudodorsal and caudoventral.

The schemas were paired presenting and showing the arrangement of the vessels in the hilar region; there by, both kidneys were submitted to a 90° rotation at the mediumdorsal direction.

Results and Discussion

Analyzing the number of branches of the renal artery, it was found that the right renal artery gives off from four (10.0%) to eight (3.3%) branches, with greater frequency of six (46.7%) branches; and the left renal artery supplies from three (3.3%) to eight (3.3%) branches, with greater frequency of five, six and seven (30.0% for each) branches. As regards the number of venous roots, the right renal vein participates with five (3.3%) to ten (6.7%) roots, with larger incidence of seven (73.4%) roots; and the left renal vein contributes with six (10.0%) to eleven (3.3%) roots, with larger concentration of seven (53.4%) roots.

As regards the positioning of the arterial branches and venous roots in the quadrants (Figures 1 to 10), we have found that, for the right renal artery the branches concentrated mainly on the craniodorsal quadrant followed by the caudoventral, caudodorsal and cranioventral quadrants; for the left renal artery, it was observed a larger incidence in the caudodorsal quadrant followed by the caudoventral, craniodorsal and cranioventral quadrants (Tables 1 and 2).

With regards to the right renal vein, the roots concentrated more on the craniodorsal quadrant followed by the caudoventral, caudodorsal and cranioventral quadrants; and for the left renal vein, the craniodorsal quadrant presented larger number of roots, followed by the caudodorsal, caudoventral and cranioventral quadrants (Tables 3 and 4).

By analyzing the global situation for the right and left renal arteries and for the right and left renal veins, it occurs prevalence of exclusively peripheral branches and roots.

As regards the number of branches of the renal artery, the treatises related to the Veterinary Anatomy have referred to equine as standard animal and have just mentioned the presence of "renal arteries" (FRANK, 1883; BONNIER, 1898; MONGIARDINO, 1903; MARTIN, 1904; MONTANÉ & BOURDELLE, 1913; MARTIN, 1915; MONTANÉ & BOURDELLE, 1920; LEPOUTRE, 1921; LESBRE, 1923; SCHMALTZ, 1928; BOURDELLE & BRESSOU, 1937; BOURDELLE & BRESSOU, 1938; BRUNI & ZIMMERL, 1947; MASSUI, 1960; NICKEL, SCHUMMER & SEIFERLE, 1960; GONZÁLEZ Y GARCIA & GONZÁLEZ ALVARES, 1961; DOBBERSTEIN & HOFFMANN, 1963; KOCH, 1963; KOCH, 1965; BRUCE, 1969) or they have generically registered the presence of two or three (BOSSI, 1909; CARADONNA, 1930; FAVILLI, 1931; FRANDSON, 1992), four to six (MANNU, 1930; ELLENBERGER & BAUM, 1977), five to eight (GURLT'S, 1873; SISSON & GROSSMAN, 1959; SCHWARZE & SCHRÖDER, 1972) and six to eight branches (BRADLEY, 1922). Other authors have referred to "diverse branches" (MONGIARDINO, 1903; LEPOUTRE, 1921; LESBRE, 1923; GETTY, 1986), "several" branches (FRANCK, 1883; MARTIN, 1904; MARTIN, 1915; SCHMALTZ, 1928; NICKEL, SCHUMMER & SEIFERLE, 1960; DOBBERSTEIN & HOFFMANN, 1963; KOCH, 1963; KOCH, 1965), "a certain number" (ZIMMERL, 1949), "thick and short trunks" (BOURDELLE & BRESSOU, 1937) and "arterial divisions" (BOURDELLE & BRESSOU, 1938).

We compared our results with the ones of FERREIRA (1975); SOUZA, BORELLI & FERREIRA (1984) and COSTA, PEREIRA & RODRIGUES (1991), who affirmed that the right

renal artery had given off five (30.0%), six (23.3%), four (20.0%), three (16.7%) and two (10.0%) branches, while the left renal artery had given off four (36.7%), three (20.0%), five (13.3%), two (10.0%), seven (3.3%) and eight (3.3%) branches; when studying 30 pairs of kidneys of Landrace breed swine's, 15 males and 15 females, they registered variations from four to eight branches for the right renal artery, with larger incidence of six (16.7%) and eight (16.7%) branches; and for the left renal artery, from five to thirteen branches, with greater frequency of eight (23.3%), nine (20.0%) and seven (16.7%) branches; when using 30 pairs of kidneys of Large White breed swine's, 15 males and 15 females, they observed from six to twenty branches, with larger incidence of ten (20.0%) for the right kidney and from four to eighteen branches, with greater frequency of ten (16.7%) and eleven (16.7%) for the left kidney, respectively. In our preparations, we observed a variation from four to eight branches, with larger incidence of six (46.7%) for the right kidney and from three to eight branches, with greater frequency of five, six and seven (30.0% for each) for the left kidney.

Referring to and analyzing conjointly the arterial concentrations, FERREIRA (1975) pointed out a greater number of vessels on the cranioventral quadrant followed by the craniodorsal, caudodorsal and caudoventral quadrants at the right, and on the craniodorsal quadrant followed by the caudodorsal, cranioventral and caudoventral quadrants at the left; SOUZA, BORELLI & FERREIRA (1984) observed the following sequence: cranioventral quadrant followed by the caudoventral, craniodorsal and caudodorsal quadrants for both kidneys; COSTA, PEREIRA & RODRIGUES (1991) found the craniodorsal quadrant followed by the cranioventral, caudoventral and caudodorsal quadrants. On the other hand, we have found for the arteries different sequence from the previous ones, that is, caudodorsal quadrant followed by the caudoventral, craniodorsal and cranioventral quadrants at the right, and craniodorsal quadrant followed by the caudoventral, caudodorsal and cranioventral quadrants at the left.

With regards to the global situation of the branches of the renal arteries, FERREIRA (1975) pointed out that 60.0% of them were located preponderantly in the periphery and 13.3% equally in the periphery and in the center, at the right; and, at the left, 50.0% of the branches were situated preva-

lently in the periphery, 26.7% only in the periphery, 16.7% equivalently in the periphery and in the center, and 6.7% preponderantly in the center. SOUZA, BORELLI & FERREIRA (1984) have revealed the presence of 63.3% of the branches exclusively in the periphery and 36.7% preponderantly in the periphery on the right side; 70.0% exclusively in the periphery and 30.0% preponderantly in the periphery on the left side. COSTA, PEREIRA & RODRIGUES (1991) have found 60.0% of the branches of the renal artery preponderantly in the periphery and 40.0% exclusively in the periphery at the right; and, 70.0% of them located prevalently in the periphery and 30.0% only in the periphery at the left. In our study, we have found 70.0% of the branches of the right renal artery exclusively in the periphery, 26.7% preponderantly in the periphery and 19.0% preponderantly in the center; for the left renal artery, we have found 66.7% of the branches exclusively in the periphery, 23.3% preponderantly in the periphery, 6.7% equivalently in the periphery and center and 3.3% preponderantly in the center.

By analyzing the number of venous roots, we verified that some treatises have reported the existence of an only vein (MARTIN, 1904; MARTIN, 1915; LEPOUTRE, 1921; LESBRE, 1923; MANNU, 1930; FAVILLI, 1931; BRUNI & ZIMMERL, 1947; MASSUI, 1960; NICKEL, SCHUMMER & SEIFERLE, 1960; DOBBERSTEIN & HOFFMANN, 1963; SCHWARZE & SCHRÖDER, 1970; SCHWARZE & SCHRÖDER, 1972; ELLENBERGER & BAUM, 1977). BOSSI (1909) has mentioned four or five venous roots, data that were also found by us (five venous roots) in 3.3% at the right. The reports of other consulted authors (MONGIARDINO, 1903; MONTANÉ, 1913; BRADLEY, 1922; MARTIN, 1923; CARADONNA, 1920; BOURDELLE & BRESSOU, 1938; GONZÁLEZ Y GARCIA & GONZÁLEZ ALVARES, 1961; SISSON & GROSSMAN, 1959; GETTY, 1986; FRANDSON, 1992) have not made possible any comparison type with our results.

FERREIRA (1975) found the right renal vein with two (53.3%), one (33.3%), three (10.0%) and four (3.3%) roots and the left renal vein with two (60.0%), one (30.0%), three (6.7%) and four (3.3%) roots, while SOUZA, BORELLI & FERREIRA (1984) have pointed out two (83.3%), three (13.3%) and four (3.3%) roots at the right, and two (60.0%), three (30.0%), one (3.3%), four

(3.3%) and five (3.3%) venous roots at the left. COSTA et al. (1991) have observed five (33.3%), three (26.7%), four (20.0%), one (10.0%), two (10.0%) roots for the right kidney, and three (26.7%), four (26.7%), five (16.7%), two (13.3%), six (13.3%) and seven (3.3%) for the left one. In our preparations, we have obtained seven (73.4%), nine (10.0%), ten (6.7%), five, six and eight (3.3% for each) at the right, and seven (53.4%), eight (20.0%), nine (13.3%), six (10.0%) and eleven (3.3%) at the left.

Referring to the venous roots, FERREIRA (1975) has registered greater concentration on the cranioventral quadrant followed by the craniodorsal, caudodorsal and caudoventral quadrants at the right, and on the craniodorsal quadrant followed by the caudodorsal, cranioventral and caudoventral quadrants at the left. SOUZA, BORELLI & FERREIRA (1984) have configured the cranioventral quadrant as the most concentrated on the right and left sides, followed by the caudoventral, craniodorsal and caudodorsal quadrants, findings that agree entirely with the observations of COSTA, PEREIRA & RODRIGUES (1991). In our preparations, we have found a greater concentration on the caudodorsal quadrant followed by the caudoventral, craniodorsal and cranioventral quadrants at the right, and on the craniodorsal quadrant followed by the caudoventral, caudodorsal and cranioventral quadrants at the left.

As regards the position of the venous roots, FERREIRA (1975) has found only peripheral (80.0%), predominantly peripheral (6.7%), exclusively central (6.7%), prevalently central (3.3%) and equivalently central and peripheral (3.3%) positions, at the right; and, at the left, exclusively peripheral (76.7%), equivalently central and peripheral (10.0%), predominantly peripheral (6.7%) and only central (6.7%) positions were registered. On the other hand, SOUZA, BORELLI & FERREIRA (1984) have showed exclusively peripheral (76.7%), equivalently central and peripheral (16.7%), preponderantly peripheral (3.3%) and exclusively central (3.3%) positions at the right; and, at the left, they have found exclusively peripheral (83.3%), equivalently central and peripheral (13.3%) and preponderantly peripheral (3.3%) positions. COSTA, PEREIRA & RODRIGUES (1991) have found the following dispositions: preponderantly peripheral (46.7%), exclusively peripheral (36.6%), preponderantly central (13.4%) and equivalently central and peripheral (3.3%)

positions at the right; and, at the left, exclusively peripheral (40.0%), preponderantly peripheral (30.0%), equivalently central and peripheral (20.0%) and preponderantly central (10.0%) positions at the left. In our study, we pointed out the

venous roots in exclusively peripheral (83.3%) and preponderantly peripheral (16.7%) positions at the right, and exclusively peripheral (86.7%) and preponderantly peripheral (13.3%) positions at the left.

Table 1 - Distribution of the branches of the right renal artery according to the quadrants and the global position in the hilar region, in bovines of the Canchim race. Anapólis, 1999

CAS	QUADRANTS				QUADRANT LIMIT				TOT.	GLOB POS
	I	II	III	IV	I-III	I-II	II-IV	III-IV		
1 M	1	-	1	-	2	-	-	-	4	P.P.
2 M	1	1	2	-	-	-	-	-	4	P.C.
3 M	1	1	2	-	-	-	-	-	4	E.P.
4 M	2	1	2	1	-	-	-	-	6	P.P.
5 M	2	1	2	1	-	-	-	-	6	P.P.
6 M	1	1	1	2	-	-	-	-	5	P.P.
7 M	1	2	2	-	-	-	-	1	6	P.P.
8 M	1	3	1	1	-	-	-	-	6	E.P.
9 M	1	1	2	2	-	-	-	-	6	E.P.
10 M	1	3	1	3	-	-	-	-	8	P.P.
11 M	2	1	1	1	-	-	-	-	5	E.P.
12 M	-	2	1	2	-	1	-	-	6	P.P.
13 M	1	1	1	2	-	-	1	-	6	E.P.
14 M	1	1	1	1	-	-	1	-	5	E.P.
15 M	1	2	1	2	-	-	-	-	6	E.P.
16 M	1	1	2	3	-	-	-	-	7	E.P.
17 M	1	1	2	1	-	-	-	-	5	E.P.
18 M	1	1	1	2	-	-	-	-	5	E.P.
19 M	1	1	3	-	-	-	-	-	5	E.P.
20 M	1	2	1	2	-	-	-	-	6	E.P.
21 M	1	2	2	2	-	-	-	-	7	E.P.
22 M	-	2	2	2	-	-	-	-	6	E.P.
23 M	1	1	1	2	-	-	-	-	5	E.P.
24 M	1	1	2	2	-	-	-	-	6	E.P.
25 M	1	1	1	2	-	-	-	-	5	E.P.
26 M	1	1	1	2	-	-	-	-	5	E.P.
27 M	1	1	2	2	-	-	-	-	6	E.P.
28 M	1	-	2	2	-	-	1	-	6	P.P.
29 M	1	2	1	2	-	-	-	-	6	E.P.
30 M	-	2	2	1	-	-	-	-	5	E.P.

I – Cranioventral quadrant; II – Craniodorsal quadrant; III – Caudoventral quadrant; IV – Caudodorsal quadrant; E.C.P. – Equivalently central and peripheral; E. P. – Exclusively peripheral; P. C. – Preponderantly central; P. P. – Preponderantly peripheral; M – Male; CAS. – Cases; GLOB. SIT. – Global position; TOT. – Total.

Table 2 - Distribution of the branches of the left renal artery according to the quadrants and the global position on the hilar region, in bovines of the Canchim race. Anapólis, 1999

CAS	QUADRANTS				QUADRANT LIMIT				TOT.	GLOB POS
	I	II	III	IV	I-III	I-II	II-IV	III-IV		
1 M	1	1	2	-	-	-	-	-	4	P.C.
2 M	1	1	1	-	-	-	-	-	3	P.P.
3 M	3	-	2	1	-	-	-	-	6	E.C.P.
4 M	3	1	2	1	-	1	-	-	8	P.P.
5 M	2	-	4	1	-	-	-	-	7	P.P.
6 M	1	2	1	2	-	-	1	-	7	P.P.
7 M	1	1	-	2	-	-	1	-	5	E.P.
8 M	1	1	2	-	-	-	1	1	6	P.P.
9 M	2	2	-	2	-	-	1	-	7	E.P.
10 M	1	2	2	2	-	-	-	-	7	E.P.
11 M	1	1	2	1	1	-	-	-	6	E.P.
12 M	1	2	2	2	-	-	-	-	7	E.P.
13 M	1	1	1	2	-	-	-	-	5	E.P.
14 M	1	1	2	1	-	-	-	-	5	E.P.
15 M	1	2	1	1	-	-	-	-	5	E.P.
16 M	1	1	1	2	-	-	1	-	6	E.C.P.
17 M	1	4	1	1	-	-	-	-	7	P.P.
18 M	-	3	2	-	-	-	1	-	6	E.P.
19 M	-	2	1	1	-	1	1	-	6	E.P.
20 M	2	1	1	1	-	-	-	-	5	E.P.
21 M	1	1	1	2	-	1	-	-	6	E.P.
22 M	1	1	1	3	-	1	-	-	7	E.P.
23 M	1	2	1	2	-	1	-	-	7	E.P.
24 M	1	2	2	-	1	-	-	-	6	E.P.
25 M	1	2	1	-	-	-	-	1	5	E.P.
26 M	1	1	2	1	-	-	-	-	5	E.P.
27 M	1	2	2	1	-	-	1	-	7	P.P.
28 M	1	1	2	1	-	-	-	-	5	E.P.
29 M	1	2	1	2	-	-	-	-	6	E.P.
30 M	1	2	2	-	-	-	-	-	5	E.P.

I – Cranioventral quadrant; II – Craniodorsal quadrant; III – Caudoventral quadrant; IV – Caudodorsal quadrant; E.C.P. – Equivalently central and peripheral; E. P. – Exclusively peripheral; P. C. – Preponderantly central; P. P. – Preponderantly peripheral; M – Male; CAS. – Cases; GLOB. SIT. – Global position; TOT. – Total.

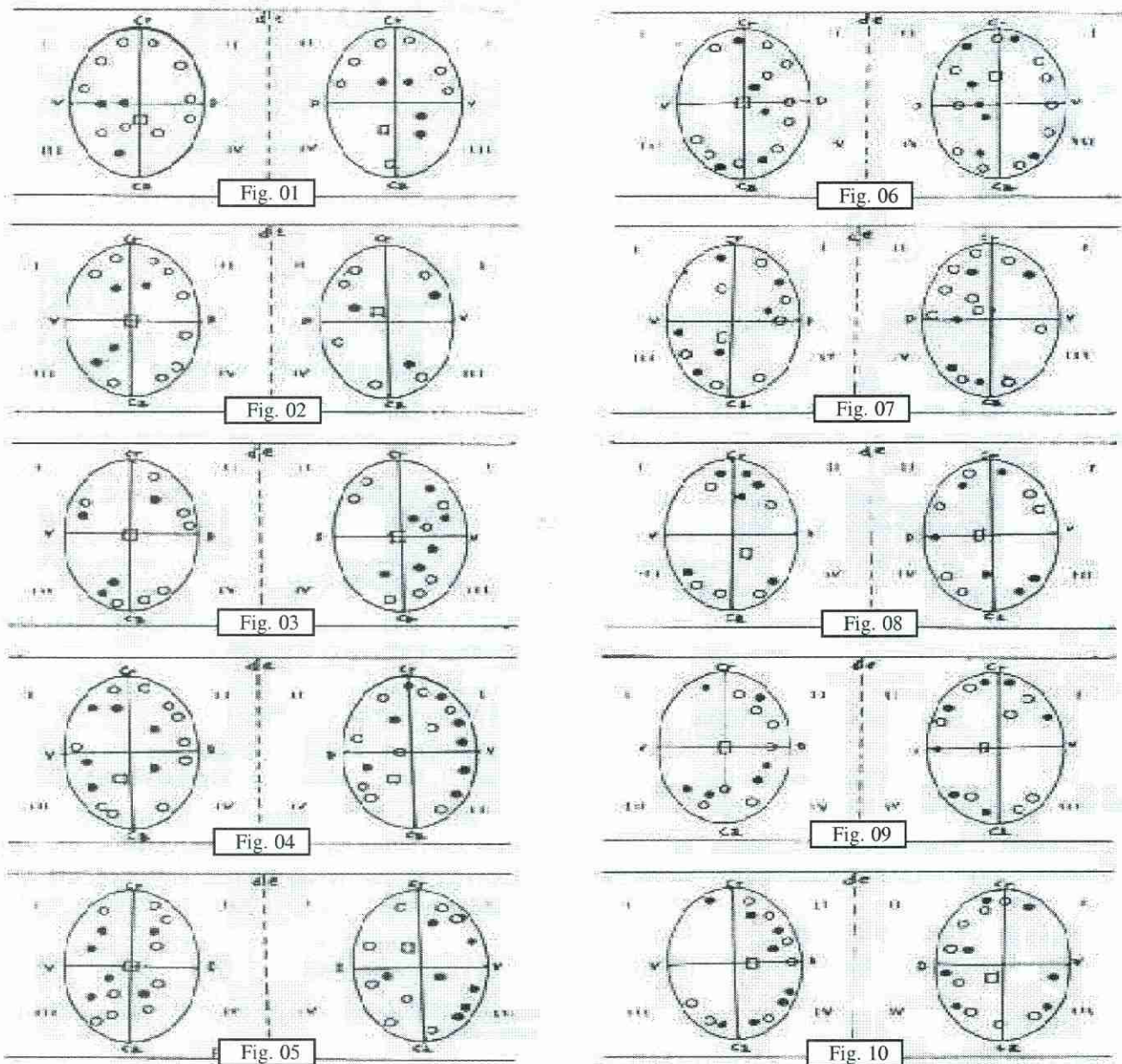
Table 3 - Distribution of the roots of the right renal vein according to the quadrants and the global position in the hilar region, in bovines of the Canchim race, Anapólis, 1999

CAS	QUADRANTS				QUADRANT LIMIT				TOT.	GLOB. POS
	I	II	III	IV	I-III	I-II	II-IV	III-IV		
1 M	2	2	2	2	-	-	1	-	9	P.P.
2 M	2	3	1	3	-	-	-	-	9	E.P.
3 M	1	3	1	2	-	-	-	-	7	E.P.
4 M	2	4	2	2	-	-	-	-	10	E.P.
5 M	1	3	3	2	-	-	-	-	9	P.P.
6 M	1	3	2	2	-	-	1	1	10	E.P.
7 M	1	2	1	1	-	-	1	1	7	E.P.
8 M	1	1	2	1	-	-	-	-	5	E.P.
9 M	-	3	1	1	-	-	1	1	7	E.P.
10 M	-	3	2	1	-	-	1	-	7	E.P.
11 M	1	3	1	2	-	-	-	-	7	E.P.
12 M	1	2	2	1	-	1	-	-	7	E.P.
13 M	1	3	1	2	-	-	-	-	7	E.P.
14 M	2	2	2	-	-	-	-	-	6	P.P.
15 M	1	2	2	2	-	-	-	-	7	E.P.
16 M	1	1	2	3	-	-	-	-	7	E.P.
17 M	2	1	2	1	-	-	-	1	7	E.P.
18 M	1	2	2	2	-	-	-	-	7	E.P.
19 M	2	2	2	1	-	-	-	-	7	P.P.
20 M	2	2	1	2	-	-	-	-	7	E.P.
21 M	2	1	2	2	-	-	-	-	7	E.P.
22 M	1	3	3	-	-	-	-	-	7	P.P.
23 M	2	2	1	2	-	-	-	-	7	E.P.
24 M	2	2	1	2	-	-	-	-	7	E.P.
25 M	2	2	1	2	-	-	-	-	7	E.P.
26 M	1	1	3	2	-	-	-	-	7	E.P.
27 M	-	3	2	2	-	-	-	-	7	E.P.
28 M	-	2	2	3	-	-	-	-	7	E.P.
29 M	1	2	2	1	-	-	1	-	7	E.P.
30 M	2	1	3	1	-	-	-	-	7	E.P.

I – Cranioventral quadrant; II – Craniodorsal quadrant; III – Caudoventral quadrant; IV – Caudodorsal quadrant; E.C.P. – Equivalently central and peripheral; E. P. – Exclusively peripheral; P. C. – Preponderantly central; P. P. – Preponderantly peripheral; M – Male; CAS. – Cases; GLOB. SIT. – Global position; TOT. – Total.

Table 4 - Distribution of the roots of the left renal vein according to the quadrants and the global position in the hilar region, in bovines of the Canchim race, Anapólis, 1999

CAS	QUADRANTS				QUADRANT LIMIT				TOT.	GLOB. POS
	I	II	III	IV	I-III	I-II	II-IV	III-IV		
1 M	3	3	-	-	-	-	1	1	7	E.P.
2 M	1	2	1	2	-	-	-	-	6	E.P.
3 M	2	2	2	2	-	-	-	-	8	P.P.
4 M	3	2	1	2	-	-	1	-	9	P.P.
5 M	2	2	1	3	-	-	-	-	8	E.P.
6 M	3	1	2	2	1	1	1	-	10	E.P.
7 M	1	4	2	1	-	-	1	-	9	P.P.
8 M	2	2	-	2	-	-	-	-	6	E.P.
9 M	2	2	2	1	-	-	-	-	7	E.P.
10 M	-	3	-	2	-	1	-	1	7	E.P.
11 M	1	1	2	2	1	-	-	-	7	E.P.
12 M	-	2	2	2	-	1	-	-	7	E.P.
13 M	-	2	1	3	-	-	1	-	7	E.P.
14 M	-	3	1	2	-	-	-	-	6	E.P.
15 M	-	3	1	3	-	-	-	-	7	E.P.
16 M	1	3	2	2	-	-	-	-	8	E.P.
17 M	1	2	2	2	-	-	-	-	7	E.P.
18 M	1	2	1	3	-	-	-	-	7	E.P.
19 M	2	2	3	2	-	-	-	-	9	E.P.
20 M	3	2	1	1	-	-	-	-	7	E.P.
21 M	-	3	1	2	-	1	-	-	7	E.P.
22 M	1	2	2	2	-	-	-	-	7	E.P.
23 M	1	3	2	2	-	-	-	-	8	E.P.
24 M	1	3	1	2	-	-	-	-	7	E.P.
25 M	2	2	2	2	-	-	-	-	8	P.P.
26 M	1	2	2	2	-	-	-	-	7	E.P.
27 M	1	2	2	2	-	-	1	-	8	E.P.
28 M	1	3	1	4	-	-	-	-	9	E.P.
29 M	2	3	1	1	-	-	-	-	7	E.P.
30 M	1	2	2	2	-	-	-	-	7	E.P.



Figures 1 – 10: Schmatic draw of the arteries, veins and ureter in hilus renal, showing:

I – Cranioventral quadrant; II – Craniodorsal quadrant; III – Caudoventral quadrant; IV – Caudodorsal quadrant; Cr – Cranial; Ca – Caudal; D – Dorsal; V – Ventral; d – right; e – left; ● - Arterial branch; O - Venous root; □ - Ureter

Conclusions

By the results obtained so far, we can conclude that:

1. There is a variation from four to eight branches with larger incidence of six (46.7%) for the right renal artery, and from three to eight branches with greater frequency of five, six and seven (30.0% for each) for the left renal artery.
2. It occurs greater number of arteries on the caudodorsal quadrant followed by the caudoventral, craniodorsal and cranioventral quadrants at the right, and on the craniodorsal quadrant followed by the caudoventral, caudodorsal and cranioventral quadrants at the left.
3. The branches of the right renal artery are shown

in exclusively peripheral (70.0%), preponderantly peripheral (26.7%) and preponderantly central (3.3%) positions; for the left renal artery, the branches are shown in exclusively peripheral (66.7%), preponderantly peripheral (23.3%), equivalently central and peripheral (6.7%) and preponderantly central (3.3%) positions.

4. It was observed from five to ten venous roots with larger incidence of seven (73.4%) on the left side, and from six to eleven with greater frequency of seven (53.4%) on the right side.

5. The venous roots concentrate on the caudodorsal quadrant followed by the caudoventral, craniodorsal and cranioventral quadrants at the right, and on the craniodorsal quadrant followed by the caudoventral, caudodorsal and

cranioventral quadrants at the left.

6. The venous roots are found in exclusively peripheral (83.3%) and preponderantly peripheral (16.7%) positions at the right, and exclusively peripheral (86.7%) and preponderantly peripheral (13.3%) at the left.

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