

RAMIFICATION AND DISTRIBUTION OF THE MEDIAN NERVE IN WILD BOARS (*Sus sus scrofa*)

RAMIFICAÇÃO E DISTRIBUIÇÃO DO NERVO MEDIANO DE JAVALIS (*Sus sus scrofa*)

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SUMMARY

This work investigates, by dissection, the branching and distribution of the median nerve in limbs and forelimbs of 17 male and female wild boars (*Sus sus scrofa*). The studied parts were fixed in 10% formaldehyde aqueous solution, with a minimum 24-hour interval for the dissection. In all animals, the median nerve branched into the muscles: flexor carpi radialis (four branches), flexor digitorum superficialis (four branches) and the humeral heads of the flexor digitorum profundus (five branches), and in 88.24% of the animals it branched also into the pronator teres muscle (two branches). The average number of branches into the right and left antimeres was not significantly different.

KEY-WORDS: Anatomy. Brachial plexus. Innervation. Suidae.

RESUMO

O presente trabalho estudou, por meio de dissecações, a ramificação e distribuição do nervo mediano no braço e antebraço em 17 javalis (*Sus sus scrofa*), machos ou fêmeas. As peças foram fixadas em solução aquosa de formaldeído a 10%, tendo como intervalo mínimo para a dissecação o período de 24h. O nervo mediano supriu, mais frequentemente, em todos os espécimes, os músculos flexor radial do carpo (quatro ramos), flexor superficial dos dedos (quatro ramos) e as cabeças umerais do flexor profundo dos dedos (cinco ramos), e, em 88,24% dos exemplares, supriu o músculo pronador redondo (dois ramos). Não houve diferenças estatísticas significativas, quando comparados os resultados encontrados nos antímeros direito e esquerdo.

PALAVRAS-CHAVE: Anatomia. Inervação. Plexo braquial. Suidae.

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INTRODUCTION

In the literature, some authors (GRASSÉ, 1972; FRANDSON et al., 2005; DYCE et al., 2010) stress the importance of the median nerve to the brachial plexus, but limited themselves to general considerations in domestic species. Several other authors (SCHWARZE, 1970; BRUNI & ZIMMERL, 1977; ELLENBERGER, 1977; SACK, 1982; GHOSHAL, 1986) describe pig anatomy; however, the only reference to the median nerve concerns the innervation of the forelimb (SCHWARZE, 1970; BRUNI & ZIMMERL, 1977; ELLENBERGER, 1977), while other authors do not even mention it (SACK, 1982).

Regarding its distribution in the arm and forearm, Ghoshal (1986) reported that the median nerve branched to muscles pronator teres flexor carpi radialis and ulnaris; and to the superficial and deep flexors of the fingers as well. It even branched in a region of the carpal palmar that joins the medial palmar digital nerve II.

Aiming to contribute to the study of wild boars anatomy, especially the nervous system, and in order to provide data for the development of comparative anatomy, we studied the branching and distribution of the median nerve in the limb and forelimb, and in particular innervation frequency and the number of collateral.

MATERIAL AND METHODS

We used 17 wild boars, male and female, from the Laboratório de Pesquisa em Animais Silvestres (LAPAS) of Faculdade de Medicina Veterinária, Universidade Federal de Uberlândia (FAMEV-UFU). The descending thoracic aorta was isolated by a vertical incision made in the ninth intercostal space, and once cannulated, was injected a 10% formaldehyde aqueous solution. Subsequently, the parts were kept in the same solution and dissected within a minimum 24-hour interval.

In order to visualize the branching of the median nerve, we performed bilateral dissections, following the usual plan of incisions, starting from the skin near the breastbone reaching the brachial plexus in the axillary space. The forelimb was further sectioned and the muscles dissected. Finally, the branching of the median nerves and their antimeres were identified.

After the dissections were performed, the parts were photographed for further analysis and documentation as well.

The nomenclature adopted to describe the anatomical parts is recommended by the International Committee on Veterinary Gross Anatomical Nomenclature (2005).

Statistical analysis was performed using the Mann-Whitney test at 5% (TRIOLA, 1999), in order to verify the statistical differences between median nerves branching to the left and right antimeres of wild boars.

RESULTS

The median nerve (Figure 1) is one of the largest and most important nerves of the brachial plexus. In wild boars, the nerve ran through the medial arm, crossed the elbow joint and branched into the pronator teres muscle in 88.24% of the cases in both antimeres. The number of branches varied between one (40%), two (53.3%) and three (6.6%), totaling 25 branches in the right antimeres, an average of 1.47 branches; and one (33.3%), two (46.6%), three (13.3%) and five (6.6%), totaling 30 branches in the left antimeres, an average of 1.76; while the mean between the two antimeres was two branches (Table 1).

The median nerve then branched into the flexor carpi radialis (Figure 1), varying from one (5.89%), two (17.64%), three (11.76%), four (29.41%), five (11.76%), six (11.76%), seven (5.89%) to eight (5.89%), totaling 70 branches in the right antimeres, an average of 4.12 branches. In the left antimeres, the number of branches varied from two (17.64%), three (17.64%), four (23.54%), five (17.64%), six (17.64%) to seven (5.9%), totaling 71 branches, an average of 4.18 branches. The median on both antimeres was four branches (Table 1).

Subsequently, the superficial flexor muscle of fingers, with its superficial and deep heads, displayed one (17.65%), two (23.52%), three (17.65%) and four (41.18%) branches, a total of 48 branches in the right antimeres, an average of 2.82 and median of three branches. While the left antimeres displayed one (23.52%), two (29.41%), three (5.89%), four (23.52%), six (11.77%) and seven (5.89%) branches, totaling 52, an average of 3.06 and median two branches (Table 1).

Finally, the studied nerve supplied the humeral head of the flexor digitorum profundus muscle (Figure 1) with two (5.88%), three (5.88%), four (17.64%), five (35.29%), six (17.64%), seven (5.88%), eight (5.88%) and ten (5.88%) branches, totaling 90 branches in the right antimeres, average 5.29 and median of five branches. While the left antimeres displayed two (5.88%), three (5.88%), four (11.76%), five (23.52%), six (5.88%), seven (17.64%), eight (23.52%) and (5.88%), totaling 104 branches, average 6.12 and median of six branches (Table 1).

After branching into the muscles already mentioned, the median nerve followed the median artery covered by the flexor radialis muscle from the carpi to the carpal tunnel region.

The statistical analysis results given by the Mann-Whitney test at 5% showed no significant differences between the branching of the left and right median nerves.

DISCUSSION

Since there is a lack of data in the literature about the median nerve in wild boars, the results obtained in this study were compared to the domestic pig, a species that resembles more closely the wild boars. Regarding the branching to the muscles of the limb and forelimb,

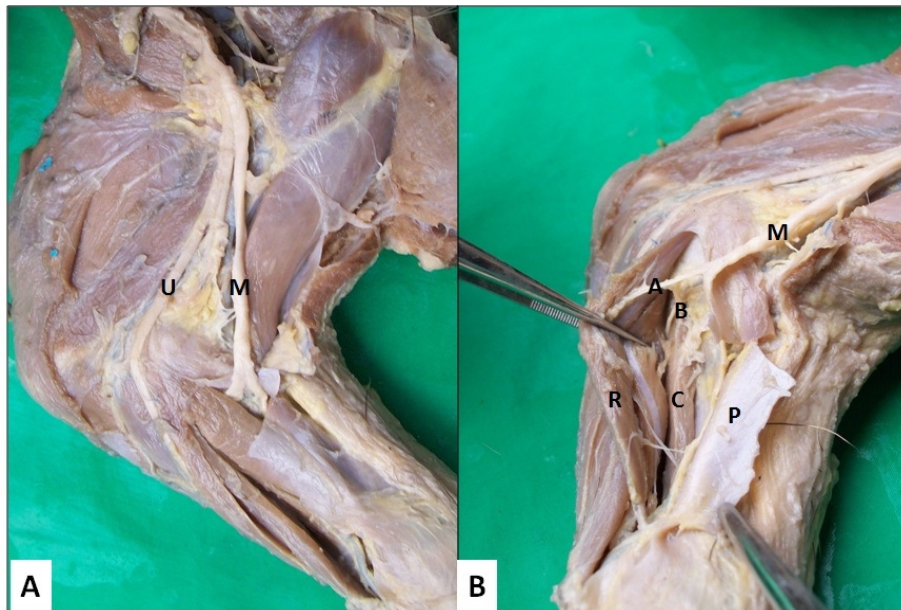


FIGURE 1 - Photographs of the medial faces of left limb and forelimb of wild boars (*Sus sus scrofa*) of median nerve (M) and ulnar nerve (U), flexor carpi radialis muscle (R), pronator teres muscle (P), humeral heads of the flexor digitorum profundus muscular branches of the median nerve to the flexor carpi radialis (A) and humeral heads of the flexor digitorum profundus (B).

TABLE 1 - Percentage (%) of median nerve branch distribution in wild boars (*Sus sus scrofa*) and standard deviation in the right (AD) and left (AE) sides, pronator teres muscles (P), flexor carpi radialis (R), flexor digitorum superficialis (S) and humeral heads of the flexor digitorum profundus (C). Uberlândia, MG, Brazil, 2012.

Number of branches	P		R		S		C	
	AD	AE	AD	AE	AD	AE	AD	AE
1	40	33.3	5.89	-	17.65	23.52	-	-
2	53.3	46.6	17.64	17.64	23.52	29.41	5.88	5.88
3	6.6	13.3	11.76	17.64	17.65	5.89	5.88	5.88
4	-	-	29.41	23.54	41.18	23.52	17.64	11.76
5	-	6.6	11.76	17.64	-	-	35.29	23.52
6	-	-	11.76	17.64	-	11.77	17.64	5.88
7	-	-	5.89	5.9	-	5.89	5.88	17.64
8	-	-	5.89	-	-	-	5.88	23.52
9	-	-	-	-	-	-	-	-
10	-	-	-	-	-	-	5.88	-
11	-	-	-	-	-	-	-	-
12	-	-	-	-	-	-	-	5.88
Standard deviation	±24.04	±18.36	±7.97	±3.78	±9.56	±11.19	±10.63	±7.97

Ghoshal (1986) observed collateral branching to the pronator teres. In wild boars, this innervation occurred in 88.24% of the animals on both antimeres. Subsequently, it branched into the muscles flexor carpi radialis and ulnaris (GHOSHAL, 1986). In this study, only the innervation of the flexor carpi radialis was observed.

In the forelimb region, the median nerve branched into the muscles flexor superficialis and profundus of the fingers (GHOSHAL, 1986). The first muscle is divided into the parts superficial and deep that receive collateral of the median nerve; while the second muscle is divided into humeral, radial and ulnar heads, and from these only the humeral head was innervated by the median nerve. It should be further noted, that the humeral head of the flexor profundus muscle displayed the highest branch average, for both right and left antimeres, 5.29 and 6.12 branches, respectively.

Ghoshal (1986) reported that in the carpal region arises a palmar branch that joins the medial palmar digital nerve II abaxial. In the animals of this study, this union was not observed in the limb and forelimb, thus suggesting that it emerges in the hand

CONCLUSION

With the proposed methodology and the studied material, we allow ourselves to conclude that: the flexor carpi radialis muscle is innervated by one to eight branches of the median nerve in the right antimeres, and, two to seven in the left antimeres, and more often by four branches on both the antimeres; the flexor digitorum superficialis receives from one to four branches in the right antimeres and from one to seven in the left, and more often three in the right antimeres and two in the left; the humeral heads of the flexor digitorum profundus consist of two to ten branches in the right antimeres and two to twelve in the left, and more often five and six in the right and left antimeres, respectively; and finally in the muscle pronator teres, 88.24% of the times, there is from one to three branches from the median nerve in the right antimeres, from one to five in the left, and more often two in both antimeres.

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