

MORPHOLOGY AND TOPOGRAPHICAL ASPECTS OF THE WILD BOAR LIVER

Bianca CARVALHO-DE-SOUZA

Undergraduate Student of Veterinary Medicine/UFRRJ

Marcio Antonio BABINSKI

Department of Morphology, Biomedical Institute, Fluminense Federal University (UFF).

Marcelo ABIDU-FIGUEIREDO

Department of Animal Biology, Rural Federal of Rio de Janeiro University, (UFRRJ)

ABSTRACT

Wild boar is an animal belonging to the class Mammalia, order Artiodactyla and suborder Suiformes. The liver, the largest gland in the body, has both external and internal secretions, which are formed in the hepatic cells. In wild boar we find the following lobes: left medial and lateral, right medial and lateral, square and the presence of the caudate process as well of the gall bladder. The papillary process was not observed. The liver of wild boar is similar to that of the domestic pig.

Key words: wild boar, liver, morphology

RESUMO

O javali é um animal pertencente à classe Mamalia, ordem Artiodáctyla e subordem Suiforme. O fígado corresponde a maior glândula do corpo e seu tamanho reflete a multiplicidade de suas funções que tanto podem ser exócrinas como endócrina. Nos fígados dos animais examinados identificamos a presença dos seguintes lobos: medial e lateral esquerdo, medial e lateral direito, quadrado e a presença do processo caudado bem como da vesícula biliar. Não foi observada a presença do processo papilar. O fígado de javali apresenta morfologia semelhante à do porco doméstico.

Palavras chave: javali, fígado, morfologia

INTRODUCTION

Morphological and quantitative data concerning exotic wild animals is still scarce and more information are needed. This data will be interesting specially in species with some potential of intensive exploration as protein source or as a biological model (SWINDLE et al., 1988)

Wild boar (is under control of the Brazilian Institute of Enviroment) is an animal belonging to the class of *Mammalia*, order *Artiodactyla* and suborder Suiform (NOWAK and PARADISO, 1983). It is an ancestral of the domestic swine and both are considered of the same specie (*Sus scrofa*). The breeding of these two species produce fertile descendents and the domestic swine is the result of wild boar multiple breeding process that began in China around 4900 bc (NOGUEIRA-FILHO, 2000).

Despite the fact that anatomy of mammals is quite different between them, the some organs are similar in the majority of the species. However, the differences in the structure, number and organization of the anatomical topography are too numerous and presents a typical configuration in the different species (BANKS, 1992).

The liver, the largest gland in the body, has both external and internal secretions, which are formed in the hepatic cells. Its external secretion, the bile, is collected after passing through the bile capillaries by the bile ducts, which join like the twigs and branches of a tree to form two large ducts that unite to form the hepatic duct (CUNNINGHAM, 1993; DUKES, 1996).

The bile is either carried to the gall bladder by the cystic duct or poured directly into the duodenum by the common bile duct where it aids in digestion. The internal secretions are concerned with the metabolism of both nitrogenous materials and carbohydrates absorbed from the intestine and carried to the liver by the portal vein. The carbohydrates are stored in the hepatic cells in the form of glycogen that is secreted in the form of glicosis directly into the blood stream. Some of the cells lining the blood capillaries of the liver are concerned in the destruction of red blood corpuscles (CUNNINGHAM, 1993; DUKES, 1996).

The liver is divided in several hepatic lobes, which are divided further in microscopic hepatic lobules. Therefore, the goal of the present study is to describe some morphologic characterization of the hepatic lobes of the wild boar.

MATERIAL AND METHODS

Twenty livers of healthy adult wild boars (*Sus scrofa scrofa*) male and female animals were used. Animals originate from the Pro Fauna Ltda., abattoir licensed for slaughtering and commercialization of wild animals, and under control of the Federal Inspection Service (SIF) and IBAMA (Environment Brazilian Institute), located in the city of Iguape, in the State of São Paulo (SP-Brasil). Animals were sacrificed in agreement with the abattoir's regulations, by electric shock desensitization. Following the abdomen was sectioned and the livers dissected. All livers were fixed in formalin solution during 24hs, washed and dissected to macroscopic analyses. In each liver the hepatic lobes were observed and registered.

RESULTS

Depending on the age and the condition of the animal, the liver of the wild boar is either light or dark brownish red. The high content of interlobular connective tissue, which is characteristic of the wild boar's liver, makes the small hepatic lobules readily visible and is a mean of identifying it. The interlobar notches are deep and divide the liver into several distinct lobes. To the left of an imaginary line connecting the esophageal notch with the notch for the round ligament are the left medial and left lateral lobes. To the right of a line connecting the caudal vena cava with the fossa for the gall bladder are the right medial and right lateral lobes. The quadrate lobe ventral to the hepatic porta is small and does not reach the ventral border of the liver. The caudate process above the porta projects dorsally and to the right. There is no papillary process. The diaphragmatic surface of the liver is strongly convex in adaptation to the concavity of the diaphragm. The visceral surface is deeply concave, and in the fixed state presents the impressions of the organs that lie against it. There is no renal impression, because the liver of the wild boar does not make contact with the right kidney. The caudal vena cava, in crossing the dorsal border of the liver, is usually completely embedded in liver tissue. The liver lies against the diaphragm almost entirely within the intrathoracic part of the abdominal cavity. The greater part of the liver lies to the right of the median plane, allowing the stomach, which is more to the left, to make contact with the left dorsal portion of the diaphragm. The most cranial point of the liver lies, with the most cranial point of the diaphragm, directly over the sternum and reaches the level of the fifth intercostal space. The caudal extent of the liver is along the eighth and ninth ribs on the left, and reaches a caudally convex line on the right, which begins at the proximal end of the

thirteenth or fourteenth rib, passes to the costochondral junction of the tenth or eleventh rib, and from there nearly transversely to the ventral midline. The gall bladder is embedded in a deep fossa between the quadrate and right medial lobes. It is long and pear-shaped, but does not reach to the ventral border of the liver.

DISCUSSION

The human liver has been described in detail by anatomists, surgeons and radiologists (BERTEVELLO & CHAIB, 2002), with the intention of hepatic transplantation. ORTALE et al. (2004) studied the hepatic artery and its main anatomic variations correlating with split-liver surgery.

Despite the fact that hepatic anatomy of mammals is quite different between them, the physiology and histological components are similar in the majority of the species. However, the differences in the structure, number and organization of these components are too numerous and presents a typical configuration in the different species (BANKS, 1992).

Anatomically, the liver of the domestic mammals presents a ventral border divided in lobes by deep fissures. According to SCHWARZE (1953) the liver of the swine presents 4 lobes and 3 fissures. The lobes are left medial and lateral, right medial and lateral, square and the caudate process. Those observations resemble each other with ours for the wild boar liver.

GETTY(1981) describe the liver of the swine with 4 fissures and 5 lobes, left medial and lateral, right medial and lateral, quadrate and caudate in disagreement of our results for wild boar where we found the left medial and lateral, right medial and lateral, square and the presence of the caudate process.

DYCE et al. (1990) reported that the liver of swine like left medial and lateral, right medial and lateral, square and the presence of the caudate process. NICKEL et al. (1979) pointed that the left medial and lateral, right medial and lateral, square and the presence of the caudate process in the liver of the swine.

Our results are similar to that observed by NICKEL et al. (1979) and DYCE et al. (1987), for the lobes of the pig liver. SCHALLER (1999) described the left medial and lateral, right medial and lateral, square and the presence of the caudate process of caudate lobe in the liver of the swine.

SOUZA et al. (2002) working with adult cathetus found the presence of the left medial and lateral, right medial and lateral, square and caudate lobes with the papillary and caudate process. It was observed yet the absence of the gall bladder. These results differ from ours for the presence of the gall bladder and absence of the papillary process in the liver of wild boars.

MACHADO et al. (2004) dissected adult and young livers of cathetus and found the presence of the left medial and lateral, right medial and lateral, caudate lobes with the papillary and caudate process, absence of the gall bladder and the square lobe. These results differ from ours for the presence of the gall bladder and square lobe and absence of the papillary process in the liver of wild boars.

CONCLUSION

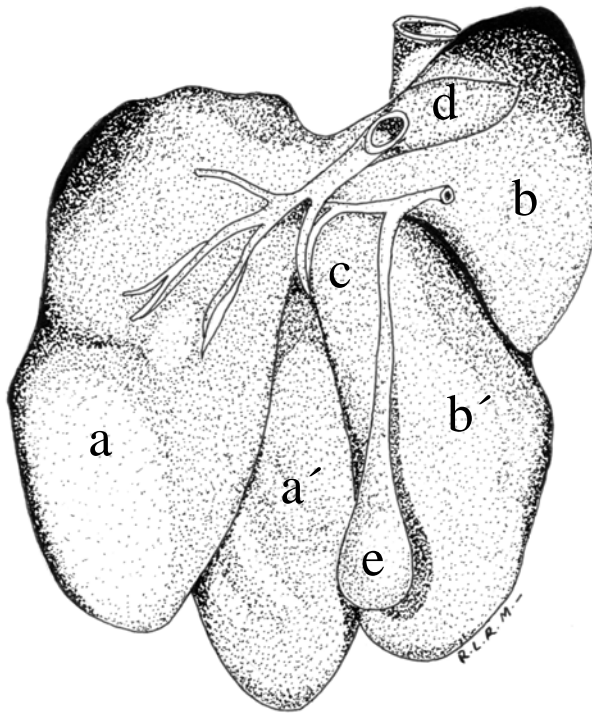
The present data should therefore provide important information for devising experiments and interpreting results when using the wild boar liver as a model for surgery, especially when making comparisons to others species and human anatomy. In wild boar we find the following lobes: left medial and lateral, right medial and lateral, square and the presence of the caudate process as well of the gall bladder. The papillary process was not found. Therefore, the liver of wild boar is similar to that of the domestic pig.

ACKNOWLEDGMENTS: Mr. Paulo Bezerra from the Pro Fauna Ltda.

REFERENCES

1. BANKS, W.J.. *Histologia Veterinária Aplicada*, 2nd ed. Manole, São Paulo, Brasil, pp. 562–564. 1992
- 2 . BERTEVELLO, P.L.; CHAIB, E. Hepatic artery system variations correlated to split- liver surgery. *Anatomic study in cadavers. Arq Gastroenterol*, 39(2):81-85. 2002
3. CUNNINGHAM. J G *Trat de Fisiol Veterinária*. Ed.Guanabara Koogan..596 p1993
4. DYCE, K.M.; SACK, W.O.; WENSING, C.J.G. *Tratado de Anatomia Veterinária*. Rio de Janeiro, Guanabara-Koogan, 696 p. 1987.
5. DUKES ,H.H *Fisiologia dos Animais Domésticos*. Rio de Janeiro, Guanabara Koogan.. 856 p Editores Melvin J Swenson, William O Reece.1996

6. GETTY, R. *Anatomia dos Animais Domésticos*. 5^a ed. vol. 2, Rio de Janeiro, Interamericana.. Editores Cynthia Ellenport Rosenbaum, Daniel Hillmann. 1981.
7. MACHADO, R.B.P; DANTAS,C.H.G; OLIVEIRA,M.F; MOURA, C.E.B; ASSIS NETO,A.C; AMBROSIO,C.E;MIGLINO,M.A; ALBUQUERQUE,J.F.G.*Anatomia do Fígado de Catetos Adultos e Neonatos*.Anais Digital do XXI Congresso Brasileiro de Anatomia e II Simpósio sobre Ensino de Anatomia.Foz de Iguaçu. 178p Paraná. Brasil. 24 a 28 de Outubro de 2004.
8. NICKEL, R.; SCHUMMER, A.; SEIFERLE, E. *The Viscera of the Domestic Mammals*. 2^a ed. Berlin, Verlag Paul Parey.. 401 p1979.
9. NOGUEIRA-FILHO, S.L.G. *Manual de Criação de Javali*. Viçosa, MG, Centro de Produções Técnicas, v.1. 50p. 2000.
10. NOWAK, D.M.; PARADISO, J.L. *Walker's Mammals of the World*. 2nd ed. The John Hopkins Univerity Press, EUA, 1184-1185. 1983.
11. ORTALE, J.R.; MECIANO-FILHO, J.; REZENDE, M.F.; MEDEIROS, M.M. Topographical relationships among the portal branches and the hepatic tributaries in the left lateral division of the liver of brazilian individuals. *Braz J Morphol Sci* 21(1):39-46. 2004.
12. SCHALLER, O. *Nomina Anatômica Ilustrada*. São Paulo, Manole,. 614p.1999
13. SCHARZE, E. *Compêndio de Anatomia Veterinária*. Tomo II..313 p1953
14. SOUZA, W.M.; SOUZA, N.T.M.; CUSTODIO, A.A.; CARVALHO, R.G.; MIGLINO, M.A. Estudo Morfológico do Fígado de Catetos e Queixadas e a Distribuição das Veias Hepáticas. *Anais do XX Congresso Brasileiro de Anatomia*. Maceió, Alagoas Brasil185 p. 06 a 11 de Outubro de 2002.
15. SWINDLE, M.M., SMITH, A.C., HEPBURN, B.J.S., Swine as models in experimental surgery. *J. Invest. Surg.* 1 (1), 65–79. 1988



LEGEND OF FIGURE

Fig.1. Schematic draw showing the topographic anatomy (visceral view) of the wild boar liver where **a**= left lateral lobe **a'**= left medial lobe **b**= right lateral lobe = right medial lobe **c**=quadrate lobe **d**=caudate process **e**=gall bladder