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THE EXCRETORY SYSTEM OF THE LIVER IN WILD ANIMALS. VI. BILIARY DUCTS OF THE GREAT ANTEATER (Myrmecophaga tridactyla)

ESTUDO ANATÔMICO DO SISTEMA EXCRETOR DO FÍGADO EM ANIMAIS SILVESTRES. VI. DUCTOS BILÍFEROS DO TAMANDUÁ BANDEIRA (Myrmecophaga tridactyla)

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SUMMARY

The systematization of the biliary ducts of the liver of the great anteater (**Myrmecophaga tridactyla**) is analyzed. The **ductus choledocus** has no affluents and results from the union of the **ductus cysticus** and the **ductus hepaticus** always arises from the **ramus principalis dexter** and the **ramus principalis sinister**, and is seen without tributaries in three cases, receiving them meanwhile in the other one. The **ramus principalis dexter** is made up of the **ramus lateralis lobi dextri** and the **ramus medialis lobi dextri.** The **ramus principalis sinister** is formed by the **ramus lateralis lobi sinistri**, the **ramus lobi sinistri** and the **ramus lobi quadrati.**

UNITERMS: Anatomy of wild animals; Biliary ducts; Liver; Great anteater

INTRODUCTION

In order to know better the Anatomy of wild mammals, particularly of the Edentata, we studied the biliary ducts of the liver in the great anteater.

The literature records papers, the biliary ducts in other wild species, i.e.: **Giraffa camelopardalis** (PRADA et al.[4] 1975); **Cebus** sp (BORELLI et al.[1] 1975) and **Hydrochoerus hydrochoeris** (MIGLINO et al.[3] 1986). Using similar methodology we investigated the distribution of the liver excretory ducts in **Myrmecophaga tridactyla**, a rare animal which had not yet been studied. Among the Edentata we only found publications on **Euphractus sexcinctus** (SOUZA et al. 1986)* and **Dasypus novencinctus** (SOUZA et al. 1986)**. The first authors describe the liver excretory ducts of **Euphractus sexcinctus** with the following results: the **ductus choledocus** is the result of the **ductus cysticus** and the **ductus hepaticus** confluence; the **ductus hepaticus,** lacking tributaries, is constituted in all preparations by the **ramus principalis dexter** and the **ramus principalis sinister** main branch convergence; the **ramus principalis dexter**, results from the junction of the **ramus dextri lateralis, ramus lobi dextri medials** and **ramus processi caudati** in two organs. In other two cases, the **ramus lobi dextri medialis** is an affluent of the **ductus cysticus**; the **ramus principalis sinister** is formed by convergence of the **ramus lobi sinistri lateralis, ramus lobi sinistri medialis** and **ramus lobi quadrati.**

In the **Dasypus novencinctus**, SOUZA et al. (1986)** noted that in four adult animals, three males and one female, the **ductus choledocus** did not have affluents in all preparations and resulted from the confluence of the **ductus hepaticus** and the **ductus cysticus.** The **ductus hepaticus** is formed by the union of the **ramus principalis dexter** and the **ramus principalis sinister**, in all studied organs, and there was always absence of affluents. In three preparations, the **ramus principalis dexter** originates from the confluence of the **ramus lobi dextri lateralis**, the **ramus processi caudati** and the **ramus lobi dextri medialis.** In the remaining case, the **ramus lobi dextri medialis** goes to the **ramus principalis sinister,** and the latter is constituted by the confluence of the **ramus lobi sinistri lateralis, ramus lobi sinistri medialis, ramus lobi quadrati** and the **ramus processo papillaris.**

MATERIAL AND METHOD

The liver from 4 great anteaters (**Myrmecophaga tridactyla**), three from adult males and one from an adult female, arising from the lowlands of the state of Mato Grosso do Sul, were used each one of these specimens included, after reduction, the liver and the duodenum.

After draining the biliary ducts, especially the gallbladder, the excretory system of the gland was injected with Neoprene latex-650 coloured with special pigment. The organs were then fixed in aqueous solution of 10% formaldheyde. The dissection of the biliary ducts followed observations and drawings as well photographs were taken and observing the occasional variations.

According to SCHUMMER and NICKEL[5] (1960) the great anteater's liver, was divided into three parts. These were limited by two paralell plans perpendicular to the diaphragmatic and visceral surfaces. The first plan corresponds to the major

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axis of the gall bladder cavity reaching dorsally the caudal vena cava fossa. The other is related ventrally to the round ligament and to the esophageal impression dorsally. So there are a **lobus dexter lateralis, lobus dexter medialis, lobus sinister lateralis, lobus sinister medialis, pars supraportalis** and **lobus quadratus**. The latter is usually separated from the **lobus dexter medialis**. The **Lobus caudatus** is integrated by the **pars supraportalis** and the **processus caudatus**, the latter superimposed, partially, to the **lobus dexter lateralis**.

The excretory ducts of the lobes were named in accordance with JABLAN-PANTIC[2](1963), in his publication on the decription of the lobed liver of some domestic animals (swine, dog and cat).

RESULTS

The systematization of the biliary ducts of the great anteater (**Myrmecophaga tridactyla**) was the following (Fig.1-4).

The **ductus choledocus**, that have not tributaries in all livers, arising from the union of the **ductus cysticus** and of the **ductus hepaticus**. The **ductus hepaticus** resulted from the junction of the **ramus principalis dexter** and the **ramus principalis sinister**. It did not have tributaries in 3 animals (2 males and 1 female), receiving in the remaining case, a duct from the **lobus dexter medialis**, called duct of the **lobus caudatus (processus caudatus)**, and another from the **pars supraportalis**, which received a duct from the **lobus dexter lateralis**.

The **ramus principalis dexter** was observed in 2 livers (both of males) as a result of the confluence of the **ramus lobi dextri lateralis** and **ramus processi caudati**, from the medial and lateral territories of the **lobus dexter**, and the **lobus caudatus (processus caudatus)**. The **ramus lobi dextri lateralis** received a duct from the **lobus caudatus (processus caudatus)** and in another case, this affluent received a common trunk, resulting from two components, one from the **lobus dexter lateralis**, the other from the **lobus caudatus (processus caudatus)**. In the other 2 livers, one of a male, the other of a female, the **ramus principalis dexter**, resulted from the confluence of the **ramus lobi dextri lateralis** and of the **ramus lobi dextri medialis**, and in the female, the first mentioned collector, received a common duct of the **lobus dexter lateralis** and of the **lobus caudatus (processus caudatus)**.

The **ramus principalis sinister**, in turn, appeared as a result of the union of the **ramus lobi sinistri lateralis, ramus lobi sinistri medialis, ramus lobi quadrati**, in all cases. The **ramus processi caudati**, in one liver (of a female), was the exception and received ducts from the **lobus sinister medialis, lobus quadratus** and **lobus caudatus (pars supraportalis)**. The **ramus lobi sinistri lateralis** was a common trunk of two collectors, one from the **lobus caudatus (pars supraportalis)** and the other from the **lobus sinister lateralis**, in 3 livers (all of males). In the remaining case the **ramus lobi sinistri lateralis** received a collector from the **lobus caudatus (pars supraportalis)**, and the resulting trunk of this association, joing an affluent of the **lobus sinister medialis**, in 3 organs (2 of male animals) without any tributary. In the other case, there was an affluent of the **lobus sinister medialis**. i. e., the **ramus lobi sinistri medialis**, constituting a common duct, which received 2 collectors, one from the **lobus caudatus (pars supraportalis)** and the other from the **lobus quadratus** or both in an inverted position. In one case (female) it was associated with the **ramus lobi quadrati**, forming the **ramus principalis sinister** in 3 livers (all of males) and in the remaining case, after the alluded confluence, reached the **ramus processi caudati**, to characterize the **ramus principalis dexter**; this collector of the **lobus caudatus (pars supraportalis)** was found in two organs (both in males).

CONSIDERATIONS

Our results in the great anteater (**Myrmecophaga tridactyla**) can be compared to those seen in other edentates such, as the **Euphractus sexcinctus** (MIGLINO et al.[3] 1986) and the **Dasypus novencinctus** (SOUZA et al., 1986)**.The findings in **Giraffa camelopardalis** (PRADA et al.[4] 1975), **Cebus sp** (BORELLI et al.[1] 1975) and the **Hydrochoerus hydrochoeris** (MIGLINO et al.[3]1986), do not allow any type of comparison as they are different species from that studied.

As MIGLINO et al.[3] (1986) in **Euphractus sexcinctus**, as SOUZA et al. (1986)** in **Dasypus novencinctus**, both related to the arrangement of the **ductus choledocus**, informing about its origin from the confluence of the **ductus cysticus** and **ductus hepaticus**, in all organs, we found the same disposition in the great anteater. The **ductus hepaticus** always arises from the junction of the **ramus principalis dexter** with the **ramus principalis sinister** in both species, a disposition similar to the great anteater.

The **ramus principalis dexter** in the **Euphractus sexcinctus** results from the confluence of the **ramus lateralis lobi dextri, ramus medialis lobi dextri** and the **ramus processi caudati** in two of four studied organs, in the other 2, the **ramus medialis lobi dextri** is confluent of the **ductus cysticus**; in this particular one, we observe in the **Dasypus novencinctus** appears the first behaviour, in 3 of 4 studied pieces and the remaining organ the **ramus medialis lobi dextri** goes to the **ramus principalis sinister**. In the great anteater, the **ramus lateralis lobi dextri** and of the **ramus medialis lobi dextri** always the constituted the **ramus principalis dexter**. Analysing these findings, it is noted the more often formation of the **ramus principalis dexter**, in the edentates, the convergence of the **ramus lateralis lobi dextri, the ramus medialis lobi dextri** and the **ramus processi caudati**, ducts of drainage of the medial and lateral areas of the **lobus dexter** and of the **lobus caudatus (processus caudatus)**. Relatively to the constitution of the **ramus principalis sinister**, MIGLINO et al.[3](1986)** reported that in the **Euphractus sexcinctus**, it is always made by the convergence of following ducts, **ramus lobi sinistri lateralis, ramus lobi sinistri medialis**, and **ramus lobi quadrati**. In the **Dasypus novencinctus**, SOUZA et al. (1986).**reported as components of this duct those assigned to the **Euphractus sexcinctus**, the presence of the **ramus processi papillaris** in all the cases, as well as the **ramus principalis sinister** and the **ramus processis caudatus**. In this way, except the fact that SOUZA et al. (1986)* have assigned the presence of the **ramus processi papillaris** as a component of this system in the **Dasypus novencinctus**, an information not reported for the **Euphractus sexcinctus** (MIGLINO et al.[3] 1986), we can affirm that, in general, the results shown by these authors do not differ significantly, from those of the great anteater.

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CONCLUSIONS

1. The **ductus choledocus** arises from the junction (union) of the **ductus cysticus** and the **ductus hepaticus.**
2. The **ductus hepaticus** always arises from the confluence of the **ramus principalis dexter** and the **ramus principalis sinister**, meeting up with (coming across) without (free from) confluents in three cases and receiving them as an isolated way of the **lobus dexter medialis** and the **lobus caudatus (processus caudatus)**, in the remaining case.
3. The **ramus principalis dexter**, has invariable components the **ramus lobi dextri lateralis**, the **ramus lobi dextri medialis** and **ramus processi caudati**, in 3 preparations.
4. The **ramus principalis sinister** is always constituted by the **ramus lobi sinistri lateralis**, **ramus lobi sinistri medialis** and **ramus lobi quadrati**, and beyond these, by the **lobus caudatus (processus caudatus)**, in one liver.
5. Except nominated contingents that converge to the **ramus principalis sinister** affluents arised from the **lobus sinister medialis** in two glands and from the **lobus caudatus (pars supraportalis)**, in three organs.

RESUMO

Neste trabalho são sistematizadas as vias bilíferas do tamanduá bandeira (**Myrmecophaga tridactyla**). Os resultados demonstram: o **ductos choledocus**, livre de afluentes, origina-se da união do **ramus principalis dexter** e do **ramus principalis sinister.** O **ramus principalis dexter** é invariavelmente composto pelo **ramus lateralis lobi dextri** e pelo **ramus medialis lobi dextri**, enquanto o **ramus principalis sinister** está composto pelo **ramus lateralis lobi sinistri, ramus medialis lobi sinistri** e **ramus lobi quadrati.**

UNITERMOS: Anatomia, animais silvestres; Ductos biliares; Fígado; Tamanduá Bandeira

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Figures 1 to 4: Excretory system of liver in great anteater (**Myrmecophaga tridactyla**)

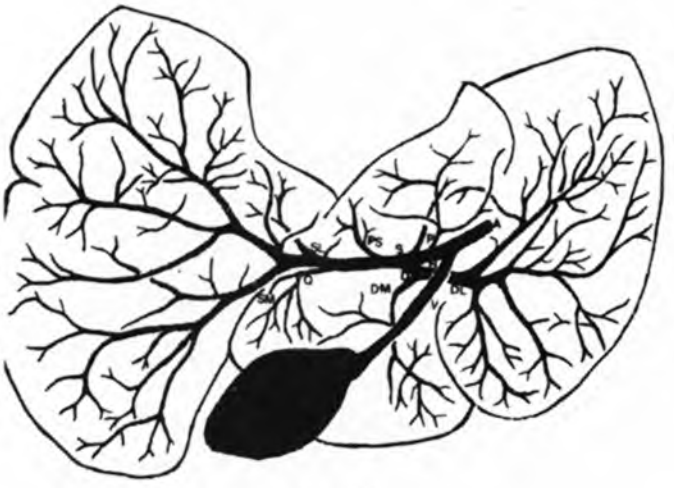

Figure 1

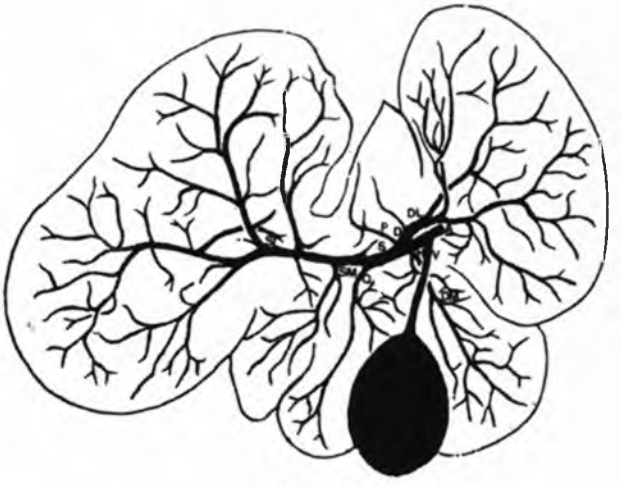

Figure 2

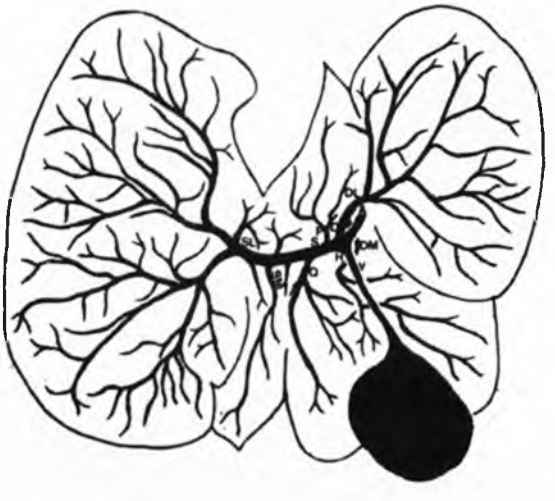

Figure 3

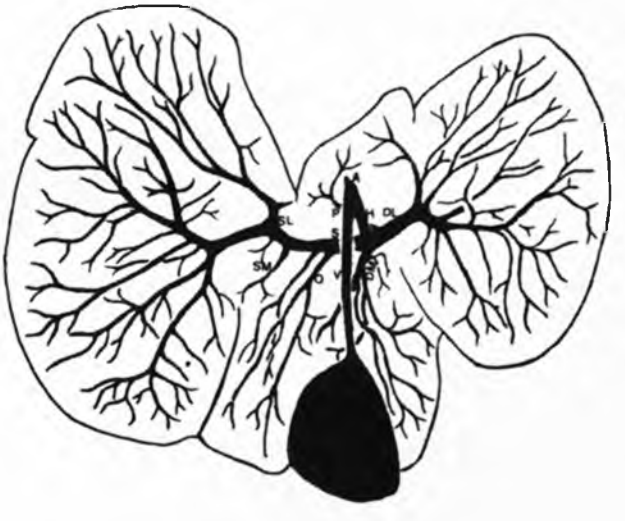

Figure 4

A - **ductus choledocus**
H - **ductus hepaticus**
V - **ductus cysticus**
D - **Ramus principalis dexter**
S - **Ramus principalis sinister**
DL - **Ramus lobi dextri lateralis**
DM - **Ramus lobi dextri medialis**
Q - **Ramus lobi quadrati**
SL - **Ramus lobi sinistri lateralis**
SM - **Ramus lobi sinistri medialis**
P - **Ramus lobus caudatus (processus caudatus)**
PS - **Ramus lobus caudatus (pars supraportalis)**