

MORPHOLOGICAL AND HISTOLOGICAL STUDY OF LIVER IN BARN OWL, *TYTO ALBA* (SCOPOLI, 1769)

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ABSTRACT : The results of the current study indicated that the barn owl has a liver composed of two lobes and the right lobe is large than the left. The liver covered with a thin capsule of connective tissue called (Glisson's capsule) and consist of cords or plates of hepatic cells, the hepatic cords are arranged around central vein and these cords are composed of arrow of hepatic cells separated from each other by a small opening representing the blood sinusoids, the blood sinusoids are lined with two types of cells : endothelial cell that appear as flattened cell with longitudinal nuclei and kupffer cell that appear as a big cell with circular nuclei, Hepatic cells appear in polygonal cell with unclear boundaries. The portal area of liver composed of branch of portal vein, branch of hepatic artery, branch of bile duct and branch of lymphatic vessel.

Key words : Liver, barn owl, histology.

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INTRODUCTION

Liver is a gland attached to the digestive system. The liver plays a large role in many of body's vital functions and during embryonic life it synthesizes the blood cell and continues until the bone marrow is done, it also break down the hemoglobin and converts it into yellow granules (AL-Said, 2008).

Although, the liver is located outside the gastrointestinal tract, it is the pancreas that is the pancreas that associated with the small intestine through liver and pancreatic channels which are opened by general bile duct of the yellow fern in the duodenum (Frandsen *et al*, 2003; Robbins and Catran, 2005).

The liver is the largest gland in the body and is a basic organ to maintain the processing of energy as well as the liver stimulates metabolic processes and biological degradation and products of metabolic processes (Dellman and Brown, 1979; Katz, 1992; Whitlow, 2000).

The liver is surrounded by a thin layer of connective tissue called Glisson's capsule extending from them bundles of connective tissue to the liver section the lobules (Ross *et al*, 2003).

The liver divided into right and left lobes which are joined cranially at the middle, the right lobe is larger in the domestic fowl and turkey (Whitlow, 2000; Caceci, 2006).

The liver parenchyma of birds resemble the mammalian but there is some different in histological features such as absent of lobules and interlobular trabeculae, its fact the principle cell of liver is the hepatocyte (King and Mclelland, 1984; Whitlow, 2000; Dyce *et al*, 2002; Caceci, 2006).

This study designed to explain the morphological and histological structure of liver in brown owl.

MATERIALS AND METHODS

Collection samples

In this study used samples of barn owl. Samples were obtained from local market within geographical area of Baghdad city, the samples were categorized depending on the available taxonomic keys (Al-Lous, 1960).

In order to get liver , the birds were dissecting and the liver lying identified and their morphological properties were then removed the liver from lying, then the liver were fixed by fixer (Aqueous Bouin's fluid) for a period 24 hours.

Histological studies

Followed in the preparation of slides for histological study method of embedding with paraffin wax with a degree of fusion (58-60°C) according to method of Bancroft and Stevens (1982) and then sectioned to 5 Mm thickness, the section were stained with Haris's Haematoxylin- Eosin according to Humason (1979).

RESULTS AND DISCUSSION

The results of the current study indicated that the barn owl has a liver composed of two lobes and the right lobe is larger than the left and the gill bladder is located on the right lobe (Fig. 1). This is consistent with many studies of the liver in birds (Al-Zaidi, 2000; Whitlow, 2000; Caceci, 2006; Selman, 2013; Ibraheem, 2008; Al- Nassiri and Ebraheem, 2013).

The results of the current study showed that the liver is covered with a thin capsule of connective tissue called (Glisson's capsule) (Fig. 2). This consistent with many studies (Hodges, 1974; Al-Zaidi, 2000; Ross *et al*, 2003; Ibraheem, 2008; Selman, 2013; Al- Nassiri and Ebraheem, 2013). Glisson's capsule is thin and extended from it septa dividing the liver into lobules (Fig. 3). This is consistent with Andrew and Hickman (1974), which they explained that the liver has true lobulation and in the same time this result disagreement with many studies (Hodges, 1974; Al-Zaidi, 2000; Ibraheem, 2008).

The liver consist of cords or plates of hepatic cells and hepatic cords are arranged around central vein (Fig. 4). This is agreement with many studies (Al-Zaidi, 2000; Ibraheem, 2008; Selman, 2013; Al- Nassiri and Ebraheem, 2013).

Hepatic cords are composed of arrow of hepatic cell and hepatic cord which separated from each other by a small opening representing the blood sinusoids, the blood sinusoids are lined with two types of cells, first type of cells represented by endothelial cells that appears as flattened cells with longitudinal nuclei while second type of cells represented by Kupffer cells that appear as a big cells with circular nuclei (Fig. 5). This result agreement with many studies (Al-Zaidi, 2000; Ibraheem, 2008) and in the same time this result disagreement with many researchers observation, which they explain that the plates of hepatocytes are two cells thick in chicken, fowl, turkey and American coot bird (Bhatnagar and Singh, 1982; Beresford and Henninger, 1986; Bacha and Wood, 1990; Randall and Reece, 1996).

Hepatic cells appear in polygonal cells with unclear boundaries, nuclei of cells is spherical in shape the nucleolus is clear and occupies center of cell (Fig. 5),

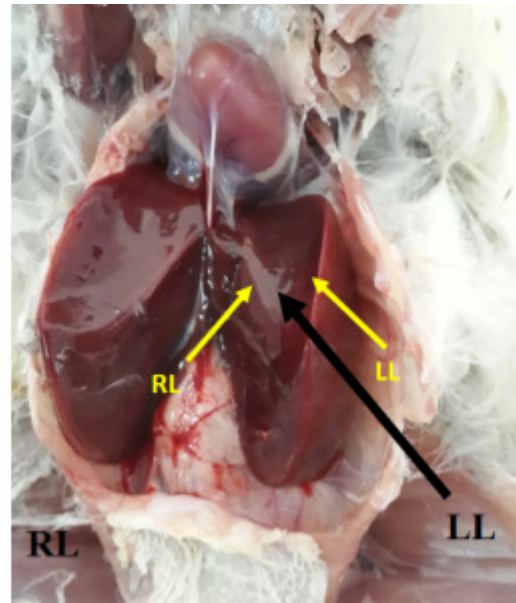


Fig. 1 : Liver in barn owl (*Tyto alba*) showing RL-Right lobe, LL- Left lobe.

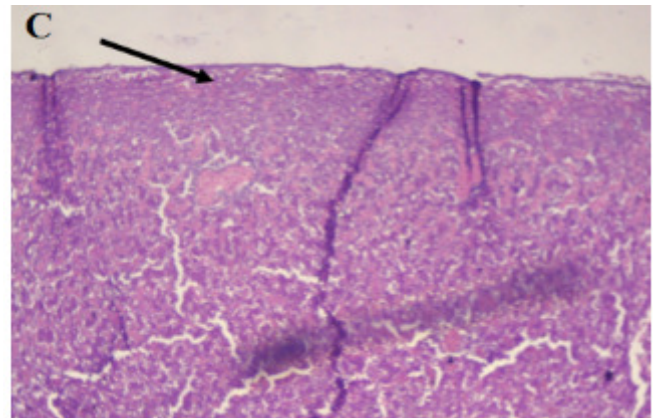


Fig. 2 : Cross section through liver in barn owl (*Tyto alba*) showing C- Capsule (H&E 100X).

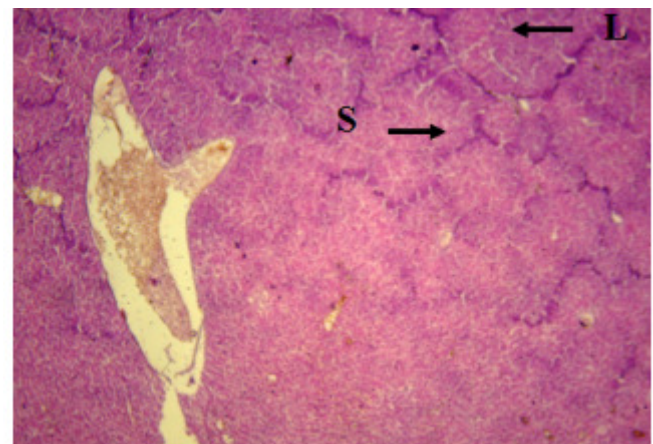


Fig. 3 : Lobule in liver in barn owl (*Tyto alba*) showing S-Septa,L- Lobule (H & E 40X).

this result agreement with many studies (Al-Zaidi, 2000; Ibraheem, 2008; Selman, 2013,).

The portal area of liver composed of branch of portal vein, branch of hepatic artery, branch of bile duct and

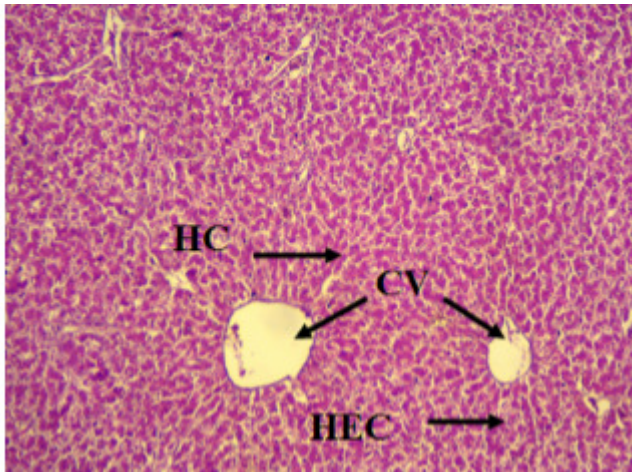


Fig. 4 : Cross section through liver in barn owl (*Tyto alba*) showing HC-Hepatic cell, HEC-Hepatic cord, CV-Central vein (H&E 100X).

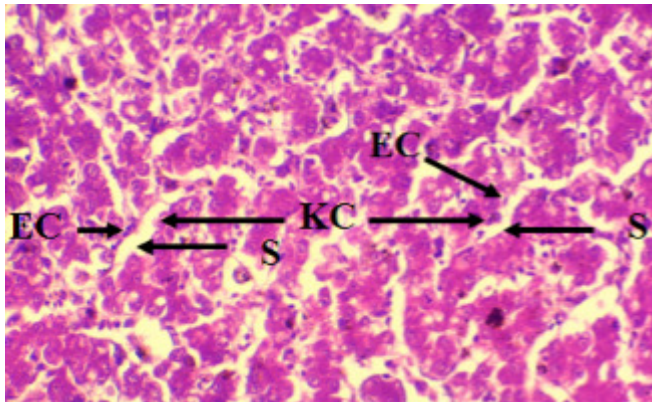


Fig. 5 : Cross section through liver in barn owl (*Tyto alba*) showing S-Sinusoids, EC-Endothelial cell, KC-Kupffer cell (H&E 400X).

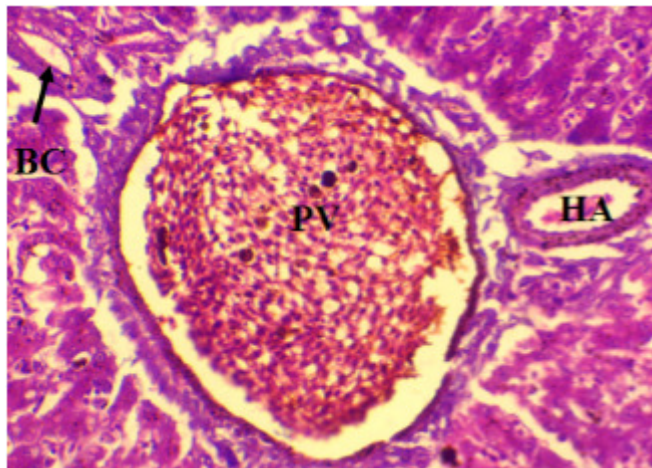


Fig. 6 a : Portal area of liver in barn owl (*Tyto alba*) PV-Portal vein, HA-Hepatic artery, BD-Bile duct (H&E 400X).

branch of lymphatic vessel. The hepatic artery is characterized by a presence of internal elastic membrane, the bile duct lining by simple cuboidal epithelial tissue while the portal vein lining by endothelial cells with smooth muscle fibers (Fig. 6a,b). This result agreement with many

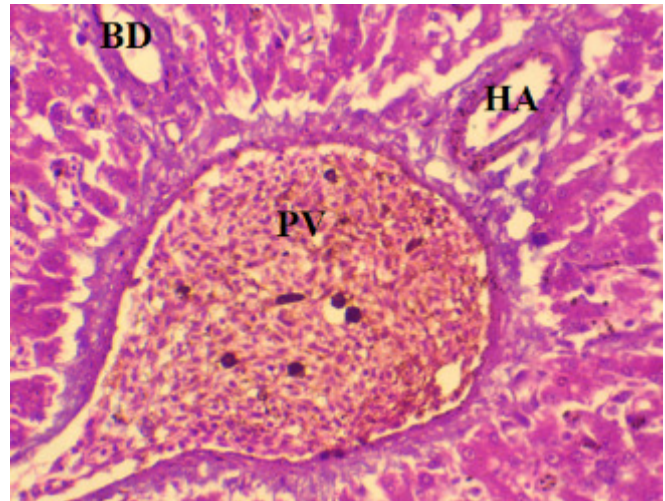


Fig. 6 b : Portal area of liver in barn owl (*Tyto alba*) PV-Portal vein, HA-Hepatic artery, BD-Bile duct (H&E 400X).

studies (Hodges, 1974; Bacha and Wood, 1990; Al-Zaidi, 2000; Ibraheem, 2008; Selman, 2013).

CONCLUSION

The liver in the white owl bird consists of two lobes the right lobe is larger than the left and the liver tissue consists of sheets or ropes of hepatic ropes that are arranged around the central vein.

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