HISTO-MORPHOMETRIC AND HISTOCHEMICAL COMPARATIVE STUDY OF THE LIVER IN COLLARD DOVE (*Frivaldszky*), RUDDY SHELDUCK (*Pallas*) IN SOUTH IRAQ.

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ABSTRACT

The results of present study showed that the liver of the Collard Dove and Ruddy Shelduck was covered by a thick connective tissue capsule, formed of collagen fibers and some reticular fibers. Hepatocytes were arranged as irregular anastomosing cords of two cells. The cords were separated from each other's by blood sinusoids. The hepatocytes were large polygonal cells with large rounded nuclei. The portal triads containing branches of hepatic artery, portal vein, bile duct and lymph_vessels.

INTRODUCTION

Liver avian is large, bilobed and have. A hepatic duct from each lobe to the duodenum. The left hepatic duct communicates directly with the duodenum, but the right one may have a branch going to the gall bladder (1).

Liver is the largest gland in the body and it can be regarded as the central organ in the maintenance of energy supply, moreover, the liver catalyzes biosynthetic and biodegrative processes and excretes final metabolic products (2).

The liver is involved in metabolism of protein, fats and carbohydrates and in the detoxication of metabolities. The liver is also the site of lipogenic enzyme production, which is influenced by diet (3). The aim of the study was determined compared between the liver histological, histochemical finding and measurement of some structures in the liver of Collard Dove (*Frivaldszky*) and Ruddy Shelduck (*Pallas*).

MATERIALS AND METHODS

A total of 12 birds contain of 6 Collard Dove and 6 Ruddy Shelduck aged one year were used in this study. The birds were euthanized prior to its dissection with an intravenous injection of sodium pentobarbitone (80 mg/kg for the collard dove and 200 mg/kg for the Ruddy Shelduck) (4). Liver were isolated from birds. For this study the liver was cut. The specimens were immersed in 10% neutral buffered formalin and Bouin's solution for 2 days, after well fixation the specimens was dehydrated by (70%, 80%, 90%, 95% and 100%) ethanol each for two hours and then specimens was cleared in xylene for one hour after that embedded in paraffin wax and then the blocks were sectioned serially at 6µm thickness and stained with following stains (5). Mayer's Hematoxylin and Eosin routine stain for general features identification, Lillies Allochrome for connective tissue(Reticular fiber) and Mc manus method for collagen materials (PAS) (6).The measurement of each structure by ocular micrometer to histometrical analysis.

RESULT AND DISCUSSION

Present study revealed that the liver in the two species of birds were large lobed gland enclosed by outer layer formed from the simple squamous epithelium (Fig. 1). This layer covered by capsule, this capsule called Glisson's capsule which was composed of dense irregular connective tissue that contains collagen and reticular fibers with the Lillie Allochrome stained (Fig. 1, 5, 9) this finding respected in the liver of coot bird (2) and in the liver of chicken (7, 8) who mentions the liver was covered by mesothelium. This capsule appears thicker in the Ruddy Shelduck was (75µm), whereas, in the Collard Dove appear thinner than was (55µm). This capsule contributes to the division of the parenchyma of gland into structural units, each of the division that hepatic lobule. The lobulation was unclear because the ill distinct hepatic septa, this result was in accord in the ostrich's liver (9) and in the fowl (10) and in the quail's (11) who mentions the lobulation of the liver was undecided. The lobule in studied birds, which was centered on the terminal branch of the hepatic vein (central vein) and was surrounded by the portal tracts, was not sharply separated off from neighboring hepatic lobule (Fig. 2, 6, 8, 10). The hepatic lobule was polygonal in shape and separated by the thin layer of connective tissue, however some collagen fibers could be demonstrated around the hepatic vessels and the bile ducts (Fig. 9). The interstitial stroma of the liver was consisted of a network of reticular fibers with the Lillies Allochrome stained (Fig. 6, 8) which supported the liver cells, encircled the blood sinusoids and was concentrated around the central vein (Fig.4, 7, 10) this consequence concord in the ostrich's liver (9). Mean diameter of center vein in Ruddy Shelduck and Collard Dove were 450 and 270 µm respectively. The parenchyma of the liver consists of hepatocytes which were arranged in plates, the thickness was two cells around sinusoids. Hepatocytes constitute parallel cords to the capsule whereas, it was arranged radially inward composed small lobules; these hepatocytes varied in shape in the two species birds. It appears to be polygonal, spherical, oval and irregular in two species. Each hepatocyte contains a round, large and centrally situated nucleus with a prominent dark nucleolus (Fig. 2, 4, 12). These results accord with (12, 13, 14, 15) they revealed that radiating plates of hepatocytes are two cells thick in the chicken, fowl, american coot bird and turkey, respectively and disagreement with (16), they founded that hepatocytes cords consisted of one cell thickness and little birds had either one or two cells and with (12, 14, 17) who observed that hepatocytes plates composed of (1-2) cells in thickness in Pintail duck and Ruffed grouse. The hepatocytes in Collard Dove was more compact in Ruddy Shelduck (Fig. 4, 12). The sinusoids have an irregular shape and spread throughout the liver in the two studied birds and appeared wider in Collard Dove than in the Ruddy Shelduck and the large cells lining the luminal surface of the sinusoids, kupffer's cells with endothelial cells (Fig. 2, 4, 12), this result agree with (18) who mention the sinusoids appear of irregular shape in the three species, Larus canus, Agaporins fischeri and Numida meleagris. The portal triads consisted hepatic vein, artery and bile duct were detected at the periphery of parenchymal lobules (Fig.1, 3, 7). The means diameter of portal vein, artery and hepatic duct in the Collard Dove were 625 µm, 175µ µm and 150 µm respectively, whereas in Ruddy Shelduck were 775 µm, 200 µm and 125 µm respectively. The bile ducts are lined by simple cuboidal epithelium with H&E and surrounded by a loose connective tissue. There are smooth muscles around larger ducts (Fig. 3, 10). This result agree with (19) who mention the portal triad were consisted of hepatic artery, portal vein, bile duct as the other domestic birds, although its distribution are less numerous in comparative to other domestic birds with (2,12)who reported that presence of bile ducts lined by cuboidal epithelium and blood vessels distributed throughout the liver tissue.



Fig. (1): Cross section of the Liver of Ruddy Shelduck showed Capsule (A), Portal area (B)and squamouse cell (C)(H & E X40 (a) and X400 (b)).



Fig. (2): Cross section of the Liver of Ruddy Shelduck showed Central vein (A), Hepatic cord(B) ,Hepatocytes (C) and Kupffer's cells (D) (H & E X400)



Fig. (3): Cross section of Collard Dove Liver of showed that Hepatic portal vein (A), Hepatic portal artery (B), Bile duct (C), endothelium layer(D) and sinusoidal (E) (H & E X400)



Fig. (4): Cross section of Collard Dove Liver of showed that liver sinusoid (A), Central vein (B), endothelial cell (C) and Hepatocytes (D) (H & E X400)



Fig. (5): Cross section of Ruddy Shelduck Liver showed that Capsule (A), Hepatic cord (B) (Lillies Allochrome stain, X40)



Fig. (6): Cross section of Ruddy Shelduck Liver showed that Central vein (A), Reticular fibers (Blue) (B) (Lillies Allochrome stain, X400)



Fig. (7): Cross section of Collard Dove Liver showed that Bile duct (A), Hepatic portal artery (B) and Hepatic portal vein (C) (Lillies Allochrome stain, X400)



Fig. (8): Cross section of Collard Dove Liver of showed that liver sinusoid (A), Central vein (B) and Reticular fibers (Blue) (C) (Lillies Allochrome stain, X400)



Fig. (9): Cross section of Ruddy Shelduck Liver showed that Capsule (A), C.T. around vein(B) and (b) showed the collagen fibers. (PAS, X100 (a), X400 (b)).



Fig. (10): Cross section of Ruddy Shelduck Liver showed that Hepatic cord (A), Portal area (B) (PAS, X100)



Fig. (11): Cross section of Collard Dove Liver showed that Central vein (A), liver sinusoid (B) (PAS, X100)



Fig. (12): Cross section of Collard Dove Liver showed that RBC in central vein (A), Hepatocytes (B) and Kupffer's cells (C) (PAS, X400).

دراسه شكلائيه نسيجيه قياسيه وكيمياء نسيجيه مقارنه للكبد لطير الفاخته والبط الصيني في جنوب العراق

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الخلاصة

اظهرت الدراسة النسيجية ان الكبد في البط و الفاخته محاط بمحفظة من النسيج الضام السميك المكونة من الألياف الغروية مع بعض الالياف الشبكية. تكون الخلايا الكبدية منتظمة على هيئة حبال غير منتظمة بسمك خليتين. الحبال الكبدية تكون مفصولة واحدة عن الاخرى بجيوب دموية. الخلايا الكبدية متعددة الوجوه ذات نواة دائرية كبيرة. المناطق البابيه تحتوي تفر عات من الوريد والشريان الكبدي وقناة الصغراء و الاو عية اللمفاوية.

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