MORPHOLOGICAL, HISTOLOGICAL FEATURES AND SOME HISTOCHEMICAL STUDY OF RACING PIGEON (Columba livia)

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Abstract
The aim of present study was to determined the morphology and histology features as well as some histochemical aspects of liver in the racing pigeon. The results showed that the liver of racing pigeon was dens and large, brown in color and have two lobes. The right lobe composed of two parts while the left lobe composed of three parts the liver of racing pigeon characterized by no gall bladder and that different in anther birds histology of the liver in racing pigeon consist of hepatocytes which radially arrange round the center veins, interconnective lamina of one - two cell thickness, the sinusoids were irregular in shape and lined by the endothelial cells and kuffers cells histochemical aspect showed the hepatic cells positive to best carmine for glycogen granules also the moderate to osmium potassium dichromat fore present lipid drops.

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1. Introduction
The liver is largest gland in birds and vertebral, it is accessory gland in the digestive system. It is import organ because the able excreted, store, metabolism, detoxited secret the bile and also able the phagocytes (Dellman and Brown, 1979; Whitlow, 2000). The liver in a vain consist of two lobes, it is right lobe larger than the left lobe in pigeon and ostrich and duck (Bailey et al., 1997; Yoshid et al., 2010; Al – Abdula, 2014) while the two lobes are equal in galliformes (Schmid et al., 2003). The histological of liver in birds cover by the capsule called Glisson capsule which composite of connective tissue ,this capsule is thick in some birds such as in ostrich liver (Attia and Soliman, 2005) when studies on the liver in ostrich while the thine capsule in the liver of local coat birds (Sleman, 2013).

The capsule continuous to sub-divided the liver in into lobes no extend into lobes (Hodgr, 1974). Homdi et al. (2013) referred the parenchyma of liver has hepatocytes which are arranged in plat and rang 1 - 2 cells. The hepatocytes are arranged redly around the center veins (Morio et al., 2006; Dyce et al., 2010). Al Hajam (2008) and Carmen and Solcan (2008) revealed that the studies on liver in chickens the hepatocytes were polyhedral shape and contain spherical nuclei and sometime two nuclei and contain the granular cytoplasm. The sinusoids are blood capillaries which have two types of cells, satellite cells called Kuffer’s or hepatic macrophage cells and flatted endothelium cells (Strick Marched and Weiss, 2003; Aughey and Frye, 2010). Al – Abdula (2014) referred that the study on duck liver the portal area located between liver lobules and consist of the branch of hepatic artery, portal veins and bile duct which lined by the one layer of cuboidal cells siting on basal lamina.
The histochemical study revered the number granules of glycogen in cytoplasm of hepatocytes when staining by PAS stain (Periodic Acid Schiff) (Nigam and Fridland, 1970; Al – Abdula, 2014). The glycogen granules which needed the animal for energy as well as the glycogen level relate with age in Poult Emberyo and Turkey (Rorebrough et al., 1978). Petcoff et al. (2006) referred the lipids appeared as black oil droplet in the hepatocytes with different level in the birds. The aim of present study was to provide and determine the morphology, histology and histochemical feature of liver in the racing pigeon (Columba livia).

2. Materials and Methods

Ten specimens of liver from healthy adult two sex of racing pigeon were collected after slaughter and washed with normal saline solution (0.9 % NaCl) and it kept in 10 % formalin for fixed to the 48 hours and processed for light microscope were preformed (Luna, 1968), paraffin section were stained by harries hematoxylin and eosin and beast carmine for glycogen granules contain in the liver tissue also used osmium dichromate for lipids drops contain (Bancroft and Steven, 1986). The slides are examined and photo was taken by digital camera.

3. Results and Discussion

The result of the liver of racing pigeon (Columba livia) lies in the ventral position of body cavity. It is red brown in color and divided in to right lobe and left lobe. The right lobe which sub-divided in to two parts while the left lobe which sub-divided in to three parts and this was in agreement with Nickel et al. (1977) and different with Schmidt et al. (2003) and Salmen (2013). The liver of racing pigeon has no gallbladder, the present study different with another birds (Salmen, 2013; Dyce, 2010 and Al- AAar Ji, 2015) when studies on liver of coot birds, male turky, chicken respectively. The results of histology established indicate the liver of racing pigeon is large gland enclosed by serosal lining that contain a thin capsule of connective tissue which continuous to sub divided the liver into lobe and lesser extend in to lobules, this capsule was called as Glissons capsule. This study was agreed with the results of Hodge (1974) and disagree with Attia and Solimon (2005) and in their study of ostrichs liver, the observed capsule was composed of thick connective tissue.

The parenchyma tissue consist of principle by hepatocyte cells which arranged around the center vein as the hepatocords in two cells thickness, the hepatocyte are polygonal shape and have rounded nucleus, the sinusoids are arranged irregular shape which present between hepatocytes (Fig – 3 and 4). These result are similar with Hodg (1974); Alha Jam (2008) and Al- Aarji, 2015). They revealed the hepatocytes to two cells in chicken and male Turkey. The sinusoids lined by endothelial cells flatted shape with present another cell called Kuffers cell which contact with endothelial cell. The Kuffers cells contain a large nucleus with some debris in cytoplasm (Fig – 4). The present study was agreed with the findings of Homadi et al. (2013) when study of liver in Lorus conus, Agaporins fischeri and Numida melagris and same (Al - Abdulla, 2014) when study of liver in local ducks.

Histochemically, the stain showed that the main stored substance in hepatocytes is glycogen and lipid. The hepatocytes were positive reaction to best carmine stain. Reaction in the liver of racing pigeon the glycogen as red color deposition as identified throughout the cellular parenchyma of liver (Fig – 5 and 6). These results are conformable with the findings of Al – Abdulla (2015) and Attia and Solomon (2005) when stained the liver by PAS (Periodic Acid Shift) for discovered the glycogen granules in hepatocyte. The present study showed that lipid drops in the hepatocyte when staining by the Ossomium potassium dichromat procedure. The lipids appear as brawn to black color in the hepatocytes and throughout parenchyma cells (Fig – 7 and 8). This is like the results which was pointed by Hamadi et al. (2013) when studies Larus conus, Agaporins fischeri and Numida melagris.
ANATOMICAL PICTURES

Figure – 1: Parietal view show A - right lobe

Figure – 2: Visceral view show A-right lobe
B-left lobe

HISTOLOGICAL PICTURES

Figure – 3: Histological section of liver showed (A) interlobular duct, (B) central vein, (C) hepatocyte, H & E (4X)

Figure – 4: Histological section of liver showed (A) connective tissue (B) sinusoids H&E (10X)

Figure – 5: Histological section of liver showed (A), interlobular duct (B), central vein H&E (10)

Figure – 6: Histological section of liver showed (A) central vein (B) sinusoids (C) hepatocytes (D) kuffer cell H&E (40X)
Figure – 7: Histological section of liver showed distribution density of glycogen in hepatocytes (PAS) (10X)

Figure – 8: Histological section of liver showed (A) central vein (B) sinusoids (C) hepatocytes (PAS) (40 X)

Figure - 9: Histological section of liver showed distribution of hepatocytes (osmium dichromat stain) (10 X)

Figure – 10: Histological section of liver showed distribution of hepatocytes (osmium dichromat stain) (40 X)

4. References


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