



HISTOLOGICAL POSTNATAL STUDY OF LIVER IN IRAQI QUAIL (*COTURNIX COTURNIX*)

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Abstract

This study was carried out to investigate the histological changes that occurred in the liver of Iraqi Quail (*Coturnix coturnix*) of two postnatal ages. To obtain this target, specimens from liver were collected from twenty birds at one and fifty postnatal ages were set as group G1 (ten birds) and G2 (ten birds) respectively. The specimens were fixed with 10% neutral buffered formalin for subsequent aspects of routine processing such as dehydration, clearing, embedding and block preparation. Section of 6µm were prepared and stained with routine hematoxylin–eosin (H&E). The histological examination of liver that revealed many events occurred with progress of age. The hepatocytes and portal triad differed in size among the developed ages. 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. Hepatic lobules were not observed at G1 and G2.

Key words: Histological, Postnatal, liver, Quail.

Introduction

The first record of wild Japanese quail appeared in the eighth century in Japan (Suda *et al.*, 2002). The Japanese quail originated from North Africa, Europe and Asia, is used worldwide as an experimental animal and model for aviculture (Berto *et al.*, 2013). Quail production can be considered a branch of the modern poultry industry. Similar to the majority of animal production systems, it demands constant improvements on the application of new technologies and sanitary control. Most studies have been published on Japanese quail nutrition (Garcia *et al.*, 2002). They are raised primarily for production of eggs, meat and used as laboratory animals similar to mice and rats (Tsutsumi, 1972 and Sreeranjini *et al.*, 2010). The liver consists of a number of cells, hepatocytes, endothelial cells, Kupffer cells, hepatic stellate/Ito cells and fat storing cells (Gunasegaran, 2010; Dirwal *et al.*, 2019). Some countries such as Japan, India, China, Italy, Russia and the United States all have established commercial

Japanese quail farming industries (Hubrecht and Kirkwood, 2010).

Materials and Methods

Twenty healthy quail birds (*Coturnix Japonica*) of both sexes were used in this study. The birds at one day were collected from local hatchery in the province of Babylon and the birds at 50 days of age from local quail farm in Al-Talief, Babylon were used in the present study. Ten birds for each age, were set as group G1 and G2 respectively. All birds were weighed with delicate balance and anesthetized using chloroform until all birds were dead and after that the birds were fixed on an anatomical plate by fixing pins from four ends to obtain a good view for anatomical work. A small cleft at the abdomen in midline and transverse incision under the pectoral muscle were done to open the body cavity, then seen the liver. The liver was preserved by 10% neutral buffered formalin for 48 hrs to prepare them for histological sections. Specimens were dehydrated through ascending series of ethyl alcohol (70%, 80%, 90% and 100%) each for 2 hrs., then cleared with

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xylene in tow steps each for half hrs. The specimens were in filtrated with paraffin wax on (58-60°C), then embedded with paraffin wax to obtain blocks of paraffin, (5-7)um paraffin sections were obtained by using rotary microtome (suvarna *et al.*, 2012).

Results and Discussion

At 1st day (G1): the present study revealed that the hepatocytes are small in size, polyhedral shape and have central nuclus , the liver parenchyma was covered by thinner a capsule (Fig. 1-2). This result agree with (Khaleel *et al.*, 2017) who report the capsule was noticed thinner in mallard than in gull. The findings of present study showed an irregular sinusoids lining with endothelial cells and kuppffer cells (stellate cells) (Fig. 3). The results of (Al-Abdulla, 2015), in liver of Iraqi local duck correspond with the present finding. Who mentioned that the sinusoids that appear irregular in shape and it lining with two type of cells stellate cells called (Kupffer’s or hepatic macrophage cells) and flattened endothelial cells. The present study also showed the portal triad found in

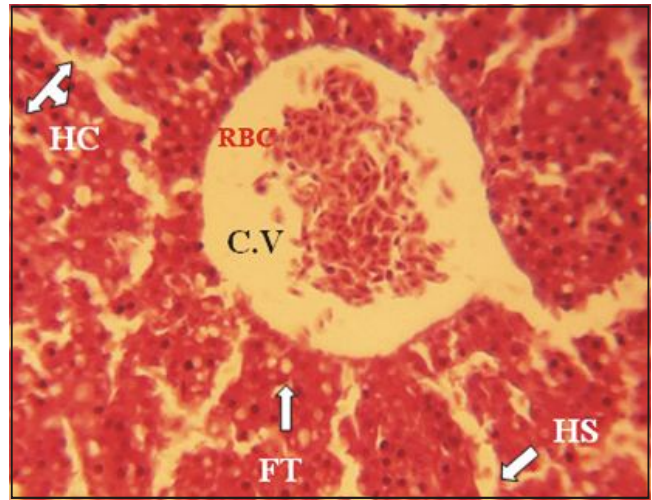


Fig. 3: Photomicrograph of the liver birds at 1 days shows: Central vein (C.V), Hepatic irregular sinusoids (HS), Red blood cells (RBC) and Hepatic cord (H), Fat droplet (FT). H & E stain (40x).

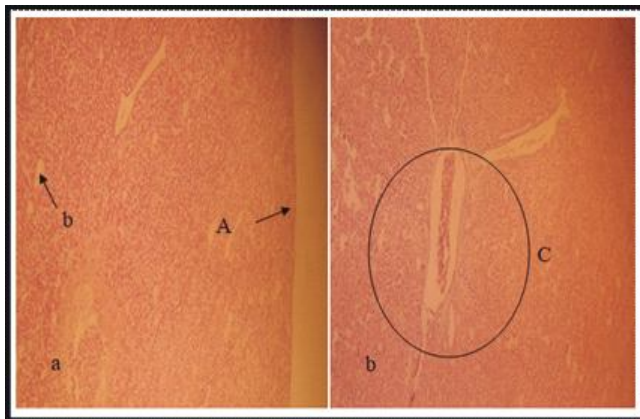


Fig. 1: Photomicrograph of the Liver quail at 1 day showed Capsule (A), central vein (B), Portal area (C). (H&E. a, 10X. b, 10X).



Fig. 4: Photomicrograph of the liver birds at 1 days shows: portal triad (P.T), fat droplet (Ft). H & E stain (10x).

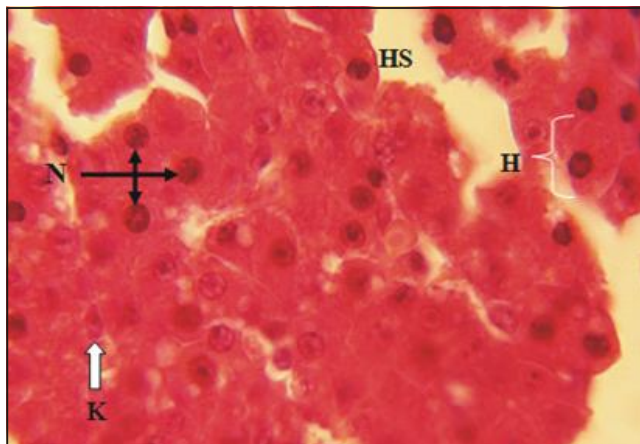


Fig. 2: Photomicrograph of the liver birds at 1 days shows: Hepatic sinusoids (HS), Hepatocyte (H) nucleus of hepatocyte (N) and Kupffer cells (k). H&E stain (100X).

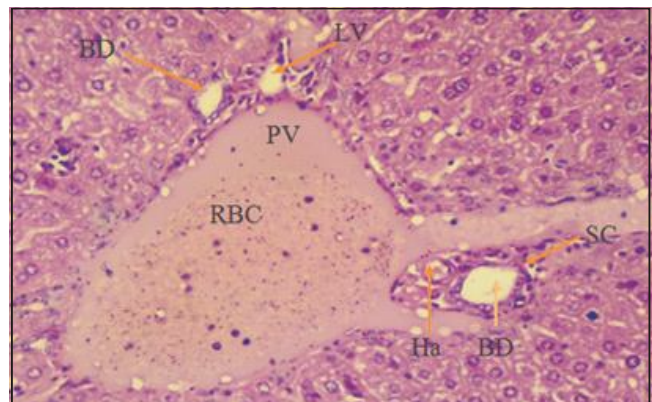


Fig. 5: Photomicrograph of liver at 50 days old shows : Portal area, Portal vein (PV), Hepatic artery (Ha), Bile duct (Bd), Lymphatic vessel (Lv), nucleated erythrocytes (RBC), simple cuboidal lined to bile duct (sc). H&E. (20X).

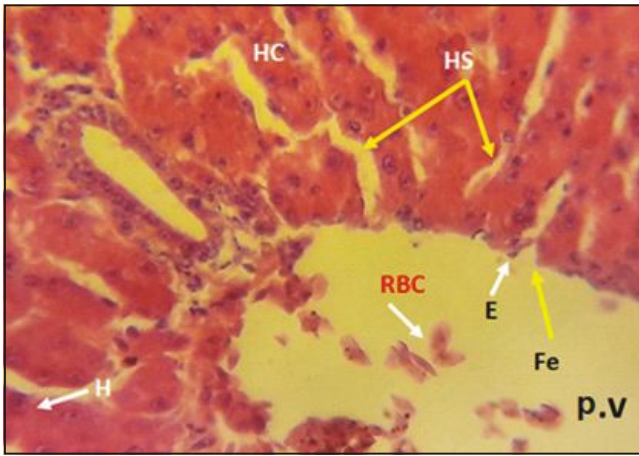


Fig. 6: Photomicrograph of the liver birds at 50 days shows: portal vein (C.V), Hepatic sinusoids (HS), Hepatic cords (HC), Fenestrated (Fe), Endothelium (E), Red blood cells (RBC), Hepatocyte (H). H&E stain (100X).

Table 1: Shows hepatic cells diameter (m) and nucleus (m) of quail birds in different ages (Values represent mean \pm S.E).

Parameter age	Hepatocytes (m)	Nucleus (m)
1 day	0.54 \pm 0.02 ^C	0.23 \pm 0.04 ^E
50day	0.88 \pm 0.02 ^A	0.43 \pm 0.02 ^B
LSD _{0.05}	0.083	0.041

few numbers consist of portal vein, bile duct and branch of hepatic artery and accumulation of adipose droplet in hepatic cells (Fig. 4). However, (Kulkarni *et al.*, 2013) mentioned that the liver converts fatty acids and glycerol into phospholipids for the formation of cell membranes, to cholesterol for bile salts.

At 50th day (G2): The hepatocytes at this group as hexagonal in shape, contained large nucleus and central vein has circular lumen lined by endothelial cells and surrounded by hepatic cords, which appeared more arranged toward the end of hexagon (Fig. 5). The sinusoids were appear more regular in shape and arranged around central vein and Portal triad well formed (Fig. 6). Faraj and Al-Bairuty, (2016) mentioned the same structure of portal triad in starling bird and both small and large sizes of bile duct were observed in the portal triad. The table 1 Showed hepatic cells diameter and nucleus of quail birds in different ages.

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