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The histological changes in the kidney and liver of Quail induced by Malathion

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ABSTRACT

This study was conducted to evaluate the toxic influence of the applied malathion in the liver and kidney tissues in Quail. 18 Quails were distributed in 3 groups. 1 as a control group. Group 2 treated one day every week for 28 days. Group 3 treated one day every two weeks for 56 days. The result showed in G2 decreases in BW, G3 noticed increased in BW. G2 the hepatocytes plates architectures are disrupted appearances, congestion in sinusoid and in hepatic central vein. Enlargement of portal vein. In G3 showed moderate spread damage of hepatocytes and proliferation of bile duct. congestion in the portal vein & artery. The sinusoid & central vein was expanded & congested. degeneration in the endothelium of central vein. the histopathological changes in the kidney in G2 showing atrophied of the glomeruli, congestion & infiltration of lymphocytes of some glomeruli, in G3 showing congestion, distraction & shrinkage of glomeruli. In conclusion; exposure of Quails to local malathion result in marked histopathological changes in G2 more than G3 in liver & kidney tissues and a significant injury in kidney tissues more than liver tissues.



Introduction

Malathion (Math) non systemic organophosphorous pesticide with wide spectrum uses, It has been extensively used to control external parasite (lice, mites, ticks, mosquitoes, fleas etc...) of poultry birds. And used in sheep, goat, and camel in Iraq.[1,2] and keep crops against different types of pest and fungi [3] as well as used in agriculture and public health. [4].

Mechanism of action:

Malathion is active on the nerves system of the tick, lice etc. By inhabiting the activity of enzyme cholinesterase and lead to abnormal accumulation of acetylcholine in the nerve ending and stimulation muscarinic, nicotinic, and central effect [5].

Routes of exposure:

Inhalation is not a significant route of exposure to Malathion; dermal exposure constitutes major route of exposure during and following Malathion application to animals or field. Math residues are often detected in food but this level of exposure is not of cancer [6].

Signs of toxicity:

Symptoms of exposure to malathion include watery eyes, running nose, loss of appetite, diarrhea, coughing, urination, stomach pain, muscle tetany, stiffness, tremors [7].

Aim of the study:

The present study was aimed at evaluating the histopathological effects of Malathion in the liver and kidney of quails.

Malathion may be liquid, dusts, wettable powders, emulsions, special, spray, shampoos for treating head lice [8].

Material and Methods

Experimental Quails:

Total of 18 common Quails (*Coturnix coturnix*) were obtained from the local market in Mosul, weight average 195 -200 g, housed in . the research unit in the College of veterinary Medicine in the University of Mosul, Mosul city , Iraq.light and temperature are controlled and supplied with food and fresh tap water. Every group were separated in hygienic cages of 1×1×1meter.

The application Of Malathion insecticide is Diluted 100g of Malathion with 900g of flours and diffuse the mixtures under the winged between the feathers by rate 5g of Malathion to two wings was obtained from VAP Malathion -50 WP, Vapco, made in Jordon .

Expernmintal design:

the adaptation to feed after 2 weeks of, surrounded environment and housing The experimental Quails were divided into three symmetric collections randomly with 6 birds for each:

Group1: served as a control group.

Group 2: treated one day every week for 28 days.

Group 3: treated one day every two week for 56 days.

The body weight of each Quail was recorded at the beginning of the experimental before diffuse and recorded again before euthanasia of the animals.

Preparation of Histological tissue to use **microscopic examination:**

1-samples have been taken from kidney and liver. Normal saline was added for cleaning porposes and was cut into slices an average thickness of 4-5 mm.

2- samples should be fixed by immersion in formalin 10% for 24 hours before they are processed [13].

3- The section must be passed through Ascending ethanal for dehydration and clearing solvents (typically ethanol and xylene) before they can be placed in molten wax.

4- After processing the specimens are placed in an embedding center in wax-filled molds in point of 56-58c, one hour each.

5-The Paraffin sections are usually cut at a thickness of 5µm using Reichert Rotatory microtome.

6- The steps of classic staining of the slices.

Stains Used (H& E stain):

The liver and kidney sections were stained with Mayers H& E. All sections were examined by Olympus light Microscope, and take the pictures.

Result

1- Group 1(Control Group).

gross examination

a-The liver was brown in color , reddish, the size and appearance were normal

b- The Kidney was a large brittle longitudinal structure; it has dark red to dark brown color.

2- Group 2 :(treated every week for 28 days)

gross examination

a-The liver looked dark yellow in color& enlargement in size was noticed .

b-The kidney looked blue or brown in color& normal in size.

Histological finding of Kidney

In this group, showing atrophied of the glomeruli, mesangial space expansion, congestion & infiltration of lymphocytes of some glomeruli, (Fig.1) Ballooning of renal tubes epithelium causing stenosis , necrosis in the proximal & distal convoluted tubules (Fig.2), infiltration of lymphocytes between the renal tubules (Fig.3).

Histological finding of Liver

The administration of malathion to Quails for short (28 days) & long (56 days) periods resulted in the hepatocytes plates architectures become disrupted appearances, congestion in sinusoid & in hepatic central vein, enlargement of portal vein and congestion (fig 4).

3- Group 3 :(treated every 2nd week for 56 days)

Macroscopically examination

The liver appeared deep yellow in color & enlargement in size

The kidney looked enlargement, and deep brown in color

Histological finding of Kidney

congestion in the renal artery, Atrophied glomeruli with distension of bowman's space hemorrhage in the renal artery, (Fig 5).

Histological finding of Liver

Group 3, moderate spread damage of hepatic tissues has been noted, marked distortion of hepatocyte architecture. congestion in the portal vein & artery. The sinusoid & central vein was expanded & congested. degeneration in the endothelium of central vein showing congestion & hemorrhage in the portal area and focal necrosis with inflammatory cells, (Fig.6.7.8).

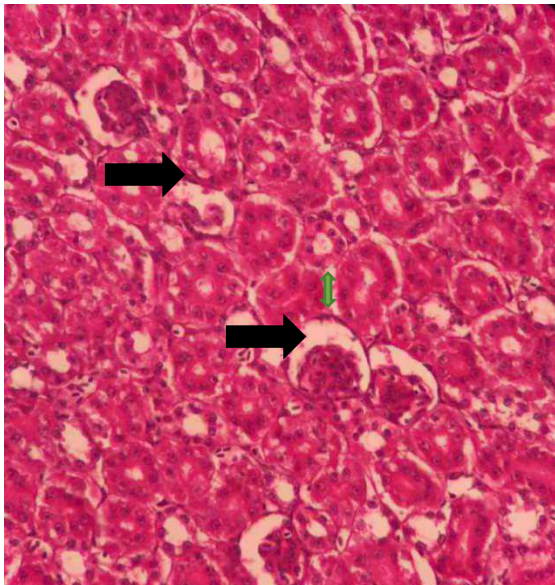
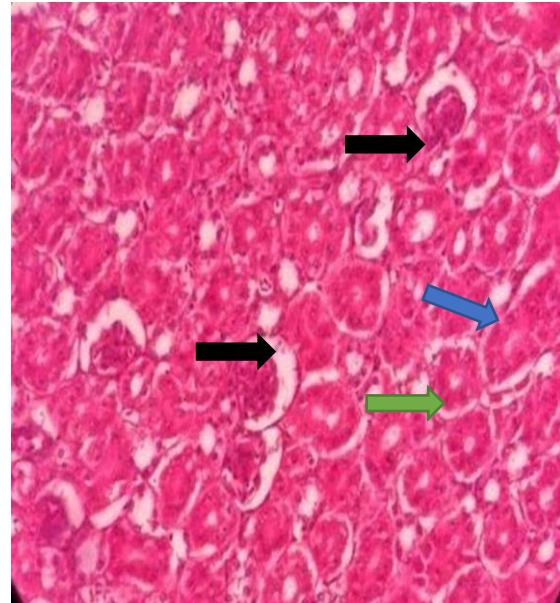


Fig.1. photomicrograph from Quails Kidney of group 2 showing atrophy of a glomerulus (black arrows) & widening of urinary space with lymphocyte (green arrows), (X200).

Fig.2. photomicrograph of Quail kidney of group 2 showing infiltration of lymphocytes and congestion in glomeruli, loss their characteristic appearance of proximal (green arrow) & distal convoluted tubules (blue arrow), (X200).



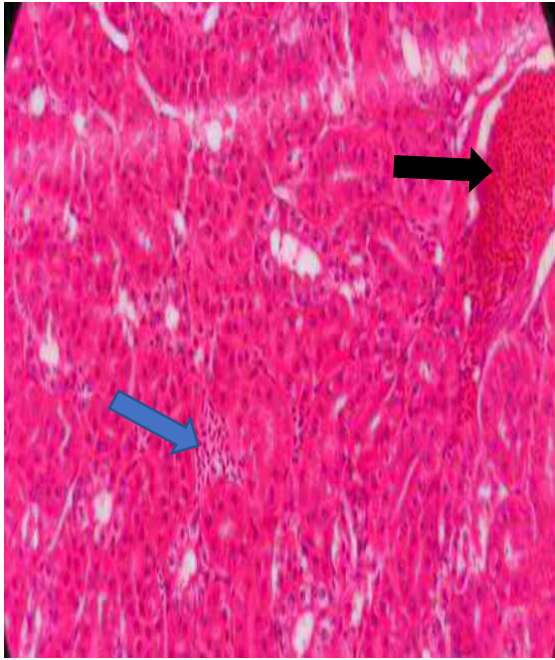


Fig3 .photomicrograph from Quail kidney of group 2 showing congestion & dilation of renal blood vessels in renal tubules (black arrow), infiltration of lymphocytes between the renal tubules (blue arrow), (X400).

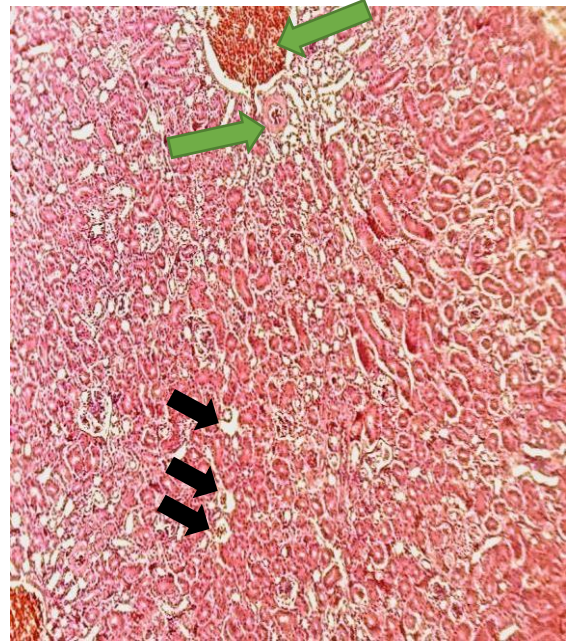


Fig.5. photomicrograph of Quail kidney of group 3 showing congestion in the renal artery & vein (green arrow) Atrophied glomeruli with distension of bowman's space (black arrow), (X200).

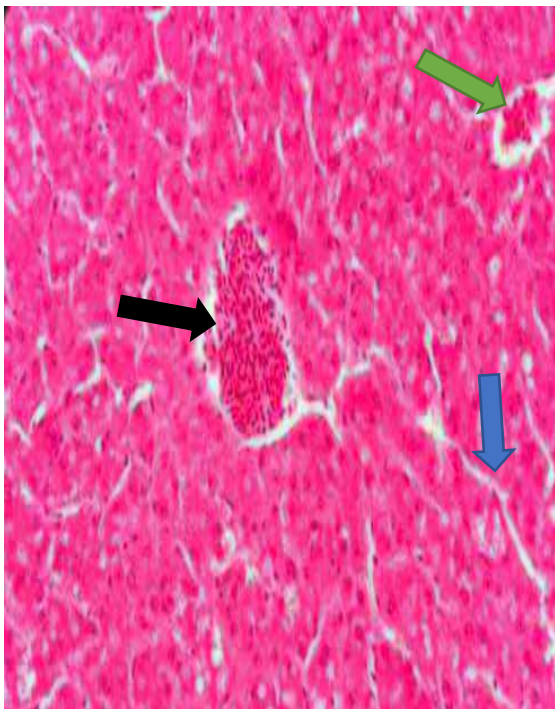


Fig 4 photomicrograph from Quail liver of group 2 showing congestion of central vein (black arrow), & expanded of sinusoid (blue arrow), Distinctive enlargement of portal vein and congestion (green arrow) (X200).

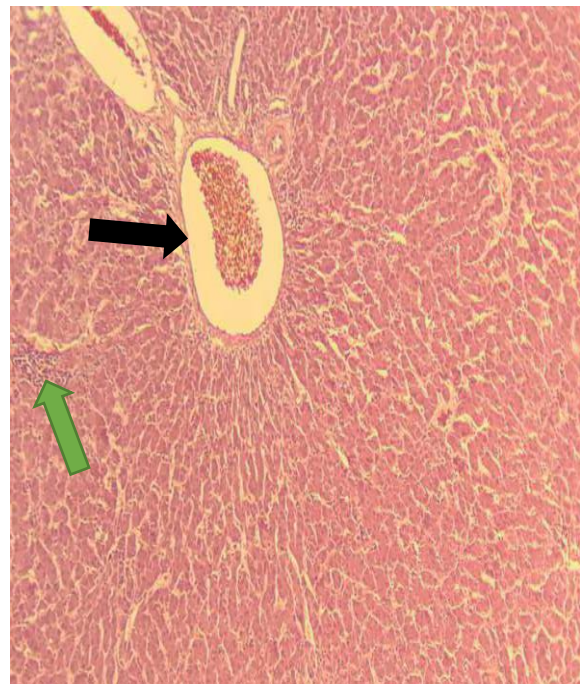


Fig.6. photomicrograph from Quail liver of group 3 showing congestion & hemorrhage in the portal area (black arrow) and focal necrosis with inflammatory cells(green arrow)(X200).

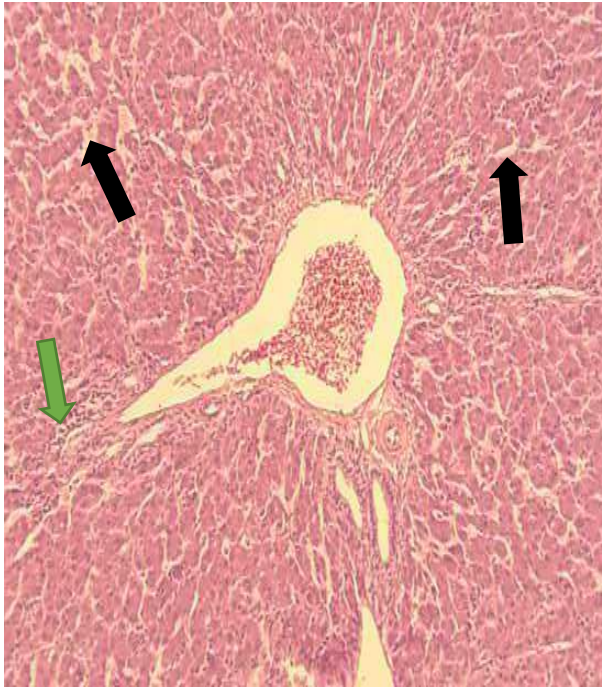


Fig. 7. photomicrograph from Quail liver of group 3 showing enlargement of sinusoids (black arrow),and infiltration with inflammatory cells(green arrow) (X200).

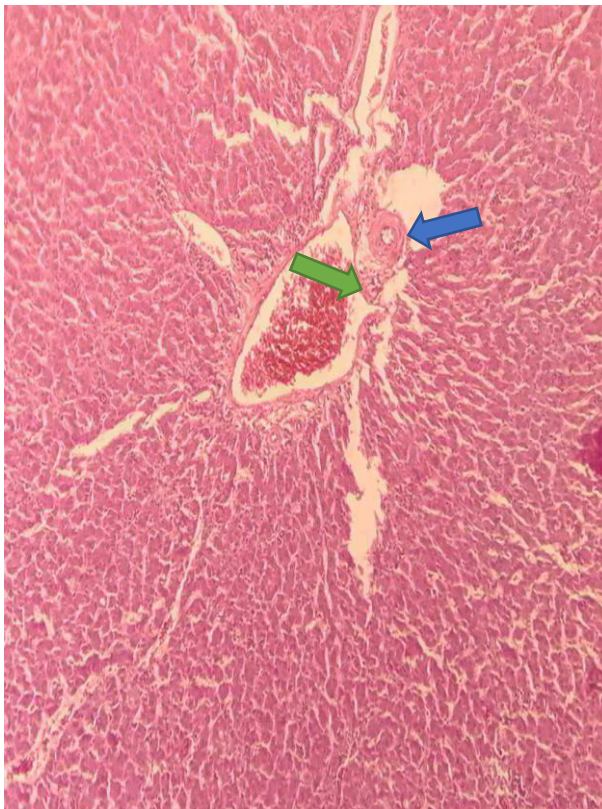


Fig.8.photomicrograph from Quail group 3 showing congestion in the portal artery (blue

arrow), degeneration of the endothelium cell of central vein (green arrow).

Discussion

2-Histological study of kidney

Group 2 In this group, showing atrophied of the glomeruli, the urinary spaces are widening, congestion & infiltration of lymphocytes of some glomeruli, lost their characteristic appearance of proximal & distal convoluted tubules. Infiltration of lymphocytes between the renal tubules. Results of the present work similarly to that reported by [10 ,11]

The section of kidney of group 3 revealed histologically changes which include congestion, distraction & glomerular shrinkage. Severe infiltration of lymphocyte between the renal tubules, expansion of the glomerular chamber, congestion & hemorrhage in the renal vein & artery, vacuolation in the inter tubular spaces. This is in agreement with [10].

By comparing the kidney samples of G2 with that of G3, both showed damage of the kidney, although it was sever in G2 which is due to high accumulation of malathion in the blood of the exposed quail with absorption of malathion by dermis. This may be attributed to the increase in the doses exposure (4 doses) through four weeks. It lead to high absorption and increase the toxicant concentration in the blood.

3-Histological study of liver

Group 2

In Group 2, the dose of malathion in the Quail to 28 days. the hepatocytes plates showed in the tissue of Liver architectures are disrupted appearances. Congestion in sinusoid & in hepatic central vein, enlargement of portal vein and congestion. According to these findings strong histological changes can be seen in the liver. This changes may be due to long time of exposure of malathion to 28 days. Results of the present work similarly to that reported by [10,11,12].

Group 3

Liver tissue section showed mild histopathological changes like moderate spread damage of hepatic tissues was appeared, marked distortion of hepatocyte architecture. Propagation of bile duct. The portal vein & artery was congested. The sinusoid & expanded central vein. degeneration in the endothelium of central vein.

groups 2 showed sever histopathological change when comparing with group 3 due to high accumulation each 7 days of malation in the Quails blood was exposed ,the readily absorption of malathion through dermis, this may be because the high doses was exposure (4 doses) through four weeks leading to increases toxicant concentration

in the blood. Results of present work similarly to that reported by [12]

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