SUMMARY

Hypercholesterolemia represent one of the important risk factors for atherosclerosis and cardiovascular disorders. In the our study laying hens fed on cholesterol and treated in statin drugs and vitamin E for five weeks to evaluate their effects on laying hens and their egg, the animal groups were as follows.

The experimental animals divided into eight groups :

Control group : Received a standard commercial feed.

Group I : Diet containing 1g cholesterol /100 g diet.

Group II : Diet containing 1g cholesterol / 100g of diet and 200mg vitamin E/kg diet.

Group III : Diet containing 1g cholesterol/100g of diet and 50mg atorvastatin/ 100g of diet.

Group IV : Diet containing 1g cholesterol/ 100g diet and 50 mg atorvastatin/100g of diet and 200mg vitamin E/ kg diet.

Group V : Diet was containing 1g cholesterol/ 100g diet and 50mg simvastatin/100g of diet.

Group VI : Diet containing 1g cholesterol/ 100g diet, 50mg simvastatin/100g diet and 200mg vitamin E/kg diet.

Group VII : Diet containing 1g cholesterol/ 100g diet and 50mg lovastatin/100g diet.

Group VIII : Diet containing 1g cholesterol/ 100g diet, 50mg lovastatin/100g diet and 200mg vitamin E/kg diet.

1- Blood parameters :

Significant increases in WBCs count and MCV value while decline in RBCs count, Hb content, Hct value, MCH concentration in group I in relation to control group.

After treatment the WBCs count showed significant decreases reached to the control value except group II and Group IV. Also, the MCV value showed significant decreases reached to the control value in group V. The RBCs count, Hb content, Hct value, MCH and MCHC values showed increases (reached to the control values) except group II , III , VI, VIII in Hb content, group II, III, IV, V, VII in Hct value and group II,III,IV,V in MCHC value, while MCH value showed increases (but not reached to the control values).

2- Respiratory functions of blood :

Blood gases and acid-base status parameters showed disturbance in change of gases which indicated the onset of respiratory acidosis that represented by increase of PCO_2 and decline in pH of group I. These respiratory acidosis may be partially compensated by metabolic alkalosis that indicated by increases in pH PCO_2, TCO_2 and BE. Statins with vitamin E treatment mainly acted for returning pH, PO_2, PCO_2, HCO^-_3, BE, TCO_2 to the control value i.e. statins improved blood vessels. The oxygen equilibrium curves of group I and treated groups were shifted to the right with increase in P_{50} values. Blood oxygen affinity showed non significant differences between each two groups that may due to the compensation occurred by the kidney.

3- Serum levels of some metabolities:

Serum total lipids, total cholesterol, LDL-C, VLDL-C, triglyceride and glucose levels showed significant increases in

group I in relation to control group. After treatment; these parameters showed reduction to be reached to the control value (group IV, VI, VIII serum total lipids, group IV serum total cholesterol, group III, IV, VI, VIII, in serum LDL-C, group II, III, IV, V, VII serum VLDL-C, group IV, VI serum triglyceride and group IV serum glucose level). While, serum HDL-C showed significant reduction in group I and increased after treatment to be reached to the control value in group IV. Serum total protein, albumin, globulin contents showed significant reduction in group I and increased after treatment to be reached to the control values (group II, III, V, VII, VIII serum total protein, group IV, VIII serum albumin, group IV, VI, VIII serum globulin).

4- Serum levels of electrolytes:

Serum sodium level showed non significant increases in group I and showed significant reductions in group II, IV, V, VI, VIII in relation to control group. Serum potassium and calcium levels showed significant reductions in group I and after treatment serum potassium level showed increases to be reached to the control value in group IV, VI and VIII, while serum calcium level showed increase to be reached to the control value in all treated groups. Serum phosphorus level showed significant increase in group I as compared to the control group and showed reduction after treatment to be reached to the control value in group IV.

5- Liver enzymes activity (AST, ALT, HMGR)

Serum AST and ALT showed significant increases in group I as compared to the control group and showed significant increases after treatment except group II serum AST and group II and group IV serum ALT which reached to the control values. Liver HMGR activity showed significant reduction in group I and increased after treatment to be reached to the control value in all treated groups.

6- Serum uric acid and creatinine:

Serum uric acid and creatinine contents showed significant increases in group I as compared to control group. After treatment serum uric acid showed decreases but not reached to the control value except in group IV, VI, VIII. Creatinine level showed reduction but not reached to the control value except in group II.

7- Serum progesterone and esterogene levels :

Serum progesterone and esterogene levels showed significant increases in group I as compared to the control group. After treatment serum progesterone showed reduction but not reached to the control value except in group VII and VIII, while serum esterogene showed reduction to be reached to the control value except in group II.

8- Some egg parameters :

Egg weight, yolk weight and albumin weight showed significant increases in group I in relation to control group. After treatment, egg weight showed reductions to be reached to the control value except group II and group VII. Also yolk weight showed reduction but not reached to the control value except in

group III and IV. Albumin weight showed reductions to be reached to the control value except group IV, VI, VIII. The shell weight and shell weight ratio (%) showed significant reductions in group II as compared to the control group and after treatment they showed increases but not reached to the control values except group II. Yolk cholesterol concentration showed significant increases in group II and showed reduction after treatment, which reached to the control value in group IV only. Calcium and phosphorus concentration of egg yolk showed significant increases in group II in relation to the control group and showed increases after treatment. Calcium concentrations of egg yolk of group VII and phosphorus concentration of group V and group VII reached to the control value after treatment.

In conclusion: Adding 1g cholesterol to 100g diet of laying hens caused hypercholesterolemia when administrated to laying hens at equal weight doses for 5 week. Adding 50mg/100g diet statin drugs (atorvastatin, simvastatin and lovastatin) with 200mg vitamin E/kg diet caused recovery the most of the physiological processes which altered due to the cholesterol administration, while the atorvastatin with vitamin E was more efficacious than simvastatin and lovastatin with vitamin E in reducing total serum cholesterol, LDL-C, VLDL-C, triglyceride levels and egg yolk cholesterol contents and in increasing liver HMGR activity. But, the adverse effects of statins may be elevations in serum AST and ALT activity enzymes.