Morphological and biochemical indexes of trematodos in cattle’s blood

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Abstract
In the article is presented the analysis of blood research results to erythrocytes, leucocytes, hemoglobin, general protein, glucose, bilirubin and also the activation of AsAT (aspartate-aminotransferaza) and AIAT (alanin-aminotranspheraza) Ferments in cattle infection by lever and stomach- intestinal system trematodos.

Keywords: leverand stomach- intestinal system trematodoz, fasciolioz, parafistomator, eritrocytes, leucocytes, hemoglobin, general protein, glucose, bilirubin, AsAT (aspartate-aminotransferaza) and AIAT (alanin-aminotransferaza) ferments activation.

1. Introduction
1.1 Significance of the problem
Invasive disease of domestic animals as well as trematodes of cattle limit the development of livestock farming and causes to implementation of target reforms in agrarian sector. In this regards, the investigation of trematodes of cattle occurring in liver as well as in the gastro-intestinal trucks and main clinic, hematologic, immunologic and other changes in different biogeocenoses of Uzbekistan has important significance

1.2 The level of investigation of problem
Investigation of immune status of organism caused by trematodos demands analyses of several indexes of blood such as morphological and biochemical, as well as erythrocytes, leucocytes, hemoglobin, content, T and B leucocytes, phagocytes, activity, general protein content enzimes wich gives significant information [3].

In case of cattle spontaneous fascilles the activities of cholinesterase, AsAt, AIAT a caline phosphatase is increased, but albumin, vitamin C and carotene contents decreased [5].

During fascilles of cattle it was stated the increase of content of eosinophil for 3 times, leucocytes content up to 56% as well as erythrocytes content for 32%, hemoglobin – 18,5% and the number of infuzoria content decreased for 16% [6].

During prolonged fascilliose of animals, the content of eosinophilia in blood was increased for 3 times, leucocytes content was increased up to 50% decreased, ketone bodies in urine, presence of pigments in the pancreatic liquid [8], as well as total number of erythrocytes, hemoglobin, total protein and albumin contents decrease was observed, α, β, γ globulin content increase, leucocytes and eosinophilia was also observed [2].

In the body of sheep infected by Fasciola hepatica, at the 19 days of experiment, it was detected the decrease of the content of erythrocytes, at the end of the experiment this index was 7,2 x 10⁶ mm³ [9].

According to another author, in the body of Fasciola hepatica caused sheep, it was observed a decrease of the ratio of albumin to globulin, as well as hyperglobulinemia and hypoalbuminemia.

The increase of some eurmes activities such as glutamate dehydrogenase and sorbitoldehydrogenasa in the serum of the blood of infected animals shows the presence of parenhumatoses. [10]
In condition of Uzbekistan, it was observed of increase of bilirubin content, decrease of the activity of catalase, acetylcolinesterases, total protein and sugar content in the blood of fasciola gigantic caused animals.

During the fascicelles of animals, the amino-acids of protein such as lysine, arginine, tyrosine was increased, the asparagine’s and carotene content was decreased. AsAT, AIAT enzymes activities was increased, but the total content of protein was decreased. \[1\]

In the serum of blood content of infected animals, it was identified the decrease of total protein and its fractions significantly changed sharp intensive disease form of fascicelles showed increase of the content of total protein, alpha and gamma globulin as well as the decrease of albumin and beta globulin (p-globulin), and decrease of total content of protein in the blood during this disease \[7\].

The review of available publications showed that in the different biogeocenoses of Uzbekistan it was not worked out the hematologic, biochemical and immunologic basics of trematodes of the livestock.

We started the investigation of this problem, to study to influence of F. gigantic during sharp and prolonged forms, as well as the morph biochemical indicators of blood in the gastrointestinal trematodes of animals.

1.3 The goals of experiment

The investigation of the total content of erythrocytes, leucocytes, hemoglobin, total protein, glucose and bilirubin, as well as the activities of enzymes AsAT, AIAT in the liver and gastro-intestinal trematodes (paramfistome) \[4\].

2. Materials and Methods

The experiments were conducted in the different region of Samarkand provinces during August, September of 2014, and May-June of 2015. The experimental sites were choose in the different livestock farms with severe manifestations of fascicelles (F. gigantic) in the Past-Dargom district (private

<table>
<thead>
<tr>
<th>№</th>
<th>Indicators</th>
<th>amount</th>
<th>Time of analyses</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>During infection</td>
<td>2014 X</td>
</tr>
<tr>
<td>1</td>
<td>Hemoglobin g/l</td>
<td>99-129</td>
<td>94,83±4,5</td>
<td>87,66±4,1</td>
</tr>
<tr>
<td>2</td>
<td>Erythrocytes mln/mkl</td>
<td>5-7,5</td>
<td>4,45±0,10</td>
<td>4,16±0,07</td>
</tr>
<tr>
<td>3</td>
<td>Leucocytes oo/mkl</td>
<td>4,5-7,0</td>
<td>6,60±0,75</td>
<td>6,61±0,8</td>
</tr>
<tr>
<td>4</td>
<td>Total protein g/l</td>
<td>72-86</td>
<td>67,8±1,4</td>
<td>66,0±1,5</td>
</tr>
<tr>
<td>5</td>
<td>Glucose Mmole/l</td>
<td>2,22-3,33</td>
<td>1,88±0,1</td>
<td>1,71±0,1</td>
</tr>
<tr>
<td>6</td>
<td>Bilirubin mkmole/L</td>
<td>0,7-5,13</td>
<td>3,85±0,12</td>
<td>4,30±0,13</td>
</tr>
<tr>
<td>7</td>
<td>AcAT, Mmole/l</td>
<td>0,4-0,6</td>
<td>1,0±0,05</td>
<td>1,16±0,05</td>
</tr>
<tr>
<td>8</td>
<td>AIAT, Mmole/l</td>
<td>0,1-0,2</td>
<td>0,3±0,02</td>
<td>0,47±0,02</td>
</tr>
</tbody>
</table>

We can see from this table, that the animals caused by F. gigantic at the age 3-6 years at the initial stage of infection showed following blood composition: the number of erythrocytes was 4,45±0,10 thousand/ml, leucocytes were 6,60±0,75 thousand/ml, hemoglobin 94,83±4,5 total protein 67,8: 1,4g/l, glucose 1,88±0,1 Mmole/l, bilirubin 3,85±0,12 mkmole/L activity of AcAT 1,0±0,05 Mmole/l S. L and AIAT activity 0,30±0,02 Mmole/l S.L.

The analyses conducted at the beginning of September on gelmintovoscopic type showed that, F. gigantic infection level was higher, the intensity of invasion was 196, 3±15,5 (from 141 to 277) numbers in average. In the sharp form of trematodes the number of erythrocytes were 0,29 mln/mkl from 4,45±0,10 to 4,16±0,07/mln/mlk) or 7,0%, hemoglobin 7,17g/l (94,83±4,5 up to 87,66±1,4 up to 66,0±1,5g/l) or 3,8% glucose content 0,17mmole/l (1,88±0,1up to 1,71±0,1 mmole/l) or 10,0% decrease, bilirubine 0,45 mkmole/l (3,85±0,12 up to 4,30±0,13 mkmole/l) or 11,6%, AsAT activity- 0,16mmole s.l (1,0±0,05 up to 1,16±0,05mmole. S. I) or 16%, AIAT activity- 0, 17 m mole s. l (0,3±0,02 up to 0,47±0,02 mmole. S.l.) or 56.0% decrease were shown.

In the prolonged form of disease there were more clear results. Especially, the number of erythrocytes was 0,37 mln/ml. Or 9.0%, hemoglobin 8,83g/l, or 10.3%, total protein 4,4 g/l, or 7,0%, glucose- 0,28 Mmole/l, or 18.2% decrease compared to initial content was detected. The bilirubine – 1,58 mkmole/l, or 38.4%, AsAT activity-0,487 mmole. S.l or...
We can see from this table, that animals at the age of 3-6 years caused by F. gigantic at the initial stage of infection, had the following blood content: average erythrocytes numbers was 4.48±0.08 mln/mlk, leucocytes 5.43±0.3 thousands/mln, hemoglobin content- 87.1±0.95 g/l, total protein-86.6±1.75 g/l, glucose-1.83±0.08 mmole/l, bilirubine-3.63±0.17 mmole/L. S.L. Helminthooovoscopic analyses showed that intensity of invasion was in highest level, the average identified eggs number were 193.7±6. 9 (171 up to 219).

In the sharp form of disease the average numbers of erythrocytes in the blood were decreased up to 0.42 mln/mkl (4.9±0.24 up to 4.00±0.17) or 11.4% decrease, bilirubine-0.36±0.003 mmole/l (3.63±0.17 up to 5.0±0.4 mmole/l) or 38%, AsAT activity-0.20 mmole for S. l. (0.57 up to 0.77±0.08 mmole, or 35.1%, and AIAT activity 0.11 mmole s.l (0.30±0.015 up to 0.41±0.03 mmole/s l or 37% increase were observed. Prolonged form of disease caused too many changes of blood content compared to initial stage. The decrease in some indexes were documented: for the average number of erythrocytes 0.42 mln/mlk, or 11.4% hemoglobin 99 g/l, or 12.8%, total protein 8.17 g/l or 12.8% total protein 8.17 g/l or 13.5%glukose 0.29 mmole/l or 18.8% (p<0.001). At the same time some increase was obtained for the following indicators: bilirubin- 1.81 mmole/l, or 50%, AsAT activity- 0.45 mmole or 80% AIAT activity 0.22 mmole or 73% (p<0.05 up to p<0.001). Morphological and biochemical indicators of blood of animals caused by F. gigantic grown in the “Bobur” farm shown in the Table 3.

We can see from this table this table that animals at age 3-6 years censed by F. gigantic at the initial stage of infection the average numbers of erythrocytes in the blood were 4.9±0.24 mln/mlk, leucocytes 5.43±0.31 thousands/mln, hemoglobin 92.9±2.98 g/l, glucose 1.8±0.03 mmole/l, bilirubine-3.96±1.13 mmole/L, AsAT activity -0.56±0.011 mmole. S.L. Gelminthooovoscopic analyses of the same group of animals, caused by, F. gigantic, showed higher level of invasion, and parasitic numbers of eggs were in average 217.5±13. 6 (174 up to 271).

In the sharp form of disease the average number of erythrocytes decreased up to 0.42 mln/mlk (4.9±0.24 up to 4.48±0.21) or 9.4% hemoglobin 3.7 g/l (92.0±2.98 up to 88.3±2.66 g/l) or 4.2%, total protein -0.86 g/l (62.0±0.71 up to 61.14±0.73 g/l) or 1.5, glucose-0.12 mmole (1.8±0.03 up to 1.68±0.07 mmole/l) decrease, bilirubine-0.71 mmole/l (3.96±0.13 up to 4.67±0.12 mmole) or 18% AsAT activity-0.34 mmole, s.l (0.56±0.04 up to 0.9±0.015 mmole/s.l) or 60.7% and AIAT activity 0.08 mmole s.l (0.28±0.02 up to 0.36±0.003 mmole/s.l or 28% decrease were observed. In the prolonged form of disease the average numbers of erythrocytes in the blood compared to initial stage decreased for 0.9 mln/mlk, or 22.5% hemoglobin -8.0 g/l, or 9.5%, total protein content 3.6 g/l or 6.0%, glucose-0.17 mmole/l or 10.5% decrease was observed, (p<0.001) as well as bilirubin -1.85 mmole/l, or 47% (p<0.001) AsAT activity-0.68 mmole s.l, or 22.4%, (p<0.01), AIAT activity-0.19 mmole s.l or 20.2% (p<0.05) increase was observed. Some parts of experiments were conducted in Taylak district, in the “Chubot” and “Elipok” private farms. The obtained results on morphological and biochemical blood content of animals caused by gastro-intestinal trematodos shown in the table 4.
We can see from this table, that the animals at the age 3-6 years caused by gastro-intestine trematodoses infection at early stage had a flowing blood content: average erythrocytes number 4,41±0,20 mln/ml, leucocytes- 6,83±0,36 thousands/ml, hemoglobin-90,7±1,82 g/l total protein 65,1±1,21g/l, glucose 1,85±0,01 mmole/l, bilirubin 2,31±0,1 mmkole, AsAT activity- 0,66± 0,33 mmole/ s l and AIAT activity – 0,23±0,03 mmole/s.l. Gelmintronoscopy analis was showed, that animals from private farms had higher invasive level of gastro-intestinal trematodos (paramphistomum). In each case the number of isolated eggs in average was 1667, 7±26,4(65 up to 264).

In the form of prolonged disease erythrocytes number in blood was in average 0,21mln/ml( 4,41±0,20 up to 4,20±0,23 mln/ml) or 5% lower to initial stage, hemoglobin-2,6g/l(90,7± 1,82 up to 88,1±2,53g/l)or 14,3% of decrease, total protein -0,8g/l (65,1±1,21 up to 64,3±1,42 g/l) or 1,3% of decrease, glucose - 0,19 mmole (1,85±0,01 up to 1,66±0,07 mmole/l) or 11,4% of decrease, bilirubin-0,23mmkole/l (2,31±0,1 up to 2,5±0,08mmkole/l) or 7,2% of increase, AsAT activity-0,66±0,33 mmole/s.l (0,66±0,13 up to 0,71±0,06mmole/s.l) or 7,5% and AIAT activity-0,23±0,03 up to 0,31±0,07 mmole s/l or 35%pf increase can be seen.

In the form of prolonged disease erythrocytes content was decreased 0,55mln/ml or 14,2% hemoglobin -9,1 g/l (p<0,001) or 11,2%, total protein -4,5g/l, or 7,5%, glucose -0,31 mmole/l, or 21% of decrease, (p<0,001) as well as bilirubin -1,06 mmkole/l (p<0,01) or 46%, AsAT activity - 0,20 mmole/s.l (p<0,05) or 30,3%, AIAT activity 0,16 mmole/s.l (p<0,01) or 70% of increase were detected.

The causes of such changes during influence of trematodoses can be explained by effect of parasitic trematodoses living in liver and gastro-intestinal tracks of host organisms, and consequently, taking part homophobes, as well as the function of liver to synthesize a protein, glycogen, bilirubin conjugation and production of enzymes.

All above mentioned changes were consequences of negative effect of trematodoses.

3. Conclusion

1. The infection level of the animals by F. gigantic from livestock farm from Past Dargom district was as higher as 193± 6, 9 -2,17,5±13,6), in Taylak district private farms this index was equal to 167,7±26,4.

2. the blood content of the animals caused by F. gigantic had changed: for example some decrease was detected for average number of erythrocytes -6,6-9,4%, hemoglobin, 4,2-10,4%, total protein 1,5-6,5% and glucose 10-15,1% at the same time some increase was detected for bilirubin 11,6-38,0% AsAT activity 16,0-60,7%, AIAT activity 28-56%. In the prolonged form of disease the average number of erythrocytes decreased to 9,0-22,5%, hemoglobin 9,5-12,8% total protein 6,0-13,5% glucose 10,5-18,8% as compared to initial stage of experiment. At the same time bilirubin 38,4-50,0%, AsAT activity 48-221,4% and AsAT activity 73-202% increase were detected.

3. Animals caused by paramfistom during sharp period of disease had a follow in blood content: average erythrocytes number 5% hemoglobin 14,3%, total protein 1,3% and glucose 11,4% of decrease as well as bilirubin 7,2%, AsAT activity 7,5%, AIAT activity, 35% increase. In the prologues form of disease the number of erythrocytes 14,2% hemoglobin 11,2% total protein 7,5% glucose 21% decrease were detected, as well bilirubin increased up to 70% AsAT activity for 30,3%, and AIAT activity for 70%.

4. Reference