A Profile of Serum Proteins, Albumin Globulin Ratio and Total Leucocytic Count in 6-10 Months Old Healthy and Diseased Buffalo Calves

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Abstract

One hundred and fifty samples were collected from 100 healthy and 50 diseased buffalo calves of 6 to 10 months of age. The samples were tested for total serum protein (TSP), serum albumin (SA), serum globulin (SG) and total leucocytic count (TLC). A gradual increase in TSP value was observed with an increase of age. The TSP values for diseased buffalo calves varied significantly as compared to healthy calves. There was a gradual increase in average values of SA, SG and TLC in both healthy and diseased calves with the increase of age from 6 to 10 months. Serum globulin and TLC values in diseased calves were significantly higher than healthy calves whereas SA values were significantly lower in diseased calves as compared to healthy calves. Increase in SG or TLC values and decrease in SA values in diseased calves were observed in those, which were suffering from diarrhea, fever, facioliasis and nematodiasis.

Key words: Total serum protein; serum albumin; serum globulin; total leucocytic count; Pre-pubertal buffalo calves

Introduction

Several factors may influence the concentration of serum globulins in healthy cows and thereby affect clinical interpretation; however, few studies have addressed sources of variation in globulin value¹. Protein level vary in many diseases such as liver dysfunction, terminal stages of cancer, parasitism and renal disorders. In convalescent phase of bacterial diseases, gamma globulin may increase, in contrast to facioliasis and nematodiasis, in which the globulin fraction is increased and the albumin decreased. In physiological state, of adult buffalos such as pregnancy, stage of lactation, protein values in blood & milk respectively particularly albumin varies², ³. Not much literature is available regarding the level of total serum protein (TSP), serum albumin (SA), serum globulin (SG) and total leucocytic count (TLC) in prepubertal buffalo calves. The present study was therefore designed to ascertain the profile of TSP, SA, SG and TLC in healthy and diseased buffalo calves between 6 and 10 months of age.

Materials and Methods

A total of 150 (100 healthy and 50 diseased) buffalo calves were selected randomly amongst animals of a livestock farm at Bahader Nagar, Okara, Pakistan. They were divided into five groups (A-E, according to their age) each group comprising of 20 healthy and 10 diseased buffalo calves. The calves in groups A, B, C, D and E were comprising of 6, 7, 8, 9 and 10 months old respectively.

The leucocytic count was made using the counting chamber technique as described by Coles⁴. The serum protein and serum albumin were determined by Biurit method with commercial kit (Proti) using a spectrophotometer as adopted by Douman⁵. Serum globulin was estimated by subtracting the serum albumin value from the total value of serum protein.
Results and Discussion

A gradual increase in the mean value of TSP, SA, SG and TLC was observed with the increase of age from 6 to 10 months in healthy and diseased buffalo calves (Table). The mean difference in TSP values was significantly lower in the diseased calves as compared to healthy calves in groups B and C (P<0.05). This is the weaning age when calves are fully fed on ration. Increase in TSP values with increase in age has also been reported by other workers. Higher TSP with the increase in age may be due to increase in the demand of protein for the tissues of growing animals exhibiting optimum metabolism. The decrease in TSP values in diseased calves may be due to anorexia as observed by many workers. In some diseased calves, an increase in TSP level (5.79 and 7.57 g/dl) were observed during 6th and 10th month of age as compared to healthy calves (5.41 and 7.46 g/dl). This false increase was observed in calves having dehydration which was also not significant.

Total leucocytic count was higher in diseased calves of all ages (Table).

Table: Mean Values of Total Serum Protein (TSP), Serum Globulin (SG), Serum Albumin (SA) and Total Leucocytic Count (TLC) in healthy and diseased buffalo calves of 6 to 10 months of age as compared to healthy calves.

<table>
<thead>
<tr>
<th>Test Parameters</th>
<th>Health Status of Calves</th>
<th>Age (Groups) in weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(Sample size)</td>
<td>6(A)</td>
</tr>
<tr>
<td>TSP (g/dl)</td>
<td>Healthy (n = 20)</td>
<td>5.41</td>
</tr>
<tr>
<td></td>
<td>Diseased (n = 10)</td>
<td>5.79</td>
</tr>
<tr>
<td>SA(g/dl)</td>
<td>Healthy (n = 20)</td>
<td>2.45</td>
</tr>
<tr>
<td></td>
<td>Diseased (n = 10)</td>
<td>2.01</td>
</tr>
<tr>
<td>SG(g/dl)</td>
<td>Healthy (n = 20)</td>
<td>3.21</td>
</tr>
<tr>
<td></td>
<td>Diseased (n = 10)</td>
<td>3.84</td>
</tr>
<tr>
<td>TLC(10^3)</td>
<td>Healthy (n = 20)</td>
<td>8.76</td>
</tr>
<tr>
<td></td>
<td>Diseased (n = 10)</td>
<td>10.02</td>
</tr>
</tbody>
</table>

The increase in TLC was observed in calves suffering from diarrhea and fever. This increase in TLC may be result of immediate mobilization of neutrophils. The increase in TLC in diseased animals has also been reported by other workers.

References


9. Benjamin, M.M., Outline of veterinary Clinical Pathology, 3rd Ed. 1978; Iowa State University Press, Iowa, USA.
