The Effect of Age on the Blood Proteinogram of Chinese Goose (*Anser cygnoides*)

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Abstract: The influences of age on serum protein values were investigated in juvenile Chinese goose. Statistical comparisons were made for differences in values among different ages. These samples were used to determine baseline data on serum total protein, albumin, globulins and albumin/globulin ratio. Significant variations were not observed in the analyses in relation to the age of birds for serum total protein, albumin and globulins. The albumin/globulin ratio showed significant difference among 21 and 49 day-old Chinese geese.

Key words: *Anser cygnoides*; blood proteinogram; total serum protein, albumin

Introduction

The Chinese goose (*Anser cygnoides* Linnaeus, 1758, Anseriformes: Anatidae) is a large sized domesticated breed of goose, also known as Blue goose or Swan goose and are thought to have been domesticated in China about three thousand years ago. These geese are identified by the frontal knob at the base of the bill. Not only do they provide protein but also a large amount of fat and feather and its commercial production is extensively distributed in several countries around the world (Buckland and Guy, 2002). Blood proteins are important complementary constituents in the diagnosis of gastrointestinal, hepatic, renal and/or infectious diseases. Determination of serum or plasma proteins seldom leads to a specific diagnosis, but will help to evaluate the nature, severity and progress of the disease (Lumeij, 1997). Although blood analyses have been used to assess the health status of several domestic bird species, limited information is available for young Chinese geese. Thus, this work was conducted to investigate serum protein values (total protein, albumin and globulins) of juvenile Chinese goose to establish data on them presenting the effect of age on blood protein values.

Materials and Methods

Chinese geese were allocated in experimental floor-pen housed, receiving water and feed *ad libitum*. The feed was formulated with corn and soybean according with NRC (1994) recommendations. Fifteen young Chinese geese were used in this study. Blood samples were obtained from these birds on days 7, 21, 28, 35, 42 and 49. Blood samples were collected from the ulnar superficial vein. Total serum protein, albumin, globulins and albumin/globulin ratio values were determined on days 7, 21, 28, 35, 42 and 49. Aliquots of each blood sample were transferred immediately to a 10-ml plain glass tube containing no anticoagulant for serum chemistry analyses.

The serum chemistry parameters: Total serum protein and albumin were determined with an automated chemistry analyzer. The globulin value was determined by difference between serum total protein and albumin. The ratio albumin/globulin was determined by the difference between albumin and globulin concentrations. The control of the chemical analysis was made using Qualitrol-N. The dates were analyzed by ANOVA and those with statistical differences were submitted to the Tukey’s test at 0.05% using Statistics for Windows®.

Results and Discussion

The relation of age to blood proteinogram values in juvenile Chinese geese is presented in Table 1. Clinical biochemistry is increasingly being used as an aid to diagnosis in avian species, but for many of them reference values have not been established; as a result the interpretation of the findings can often be difficult. Also, it is well known that blood proteins in birds depend on age and sex and they may vary due to season (Fudge, 2000). The present study showed that there were no significant differences in serum total protein, albumin and globulin among different ages of juvenile Chinese geese. Significant difference in albumin/globulin ratio was found...
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Table 1: Serum proteinogram values in juvenile Chinese geese (Anser cygnoides) (Mean ± SD)

<table>
<thead>
<tr>
<th>Age (days)</th>
<th>Total serum protein (g/dL)</th>
<th>Albumin (g/dL)</th>
<th>Globulins (g/dL)</th>
<th>Albumin/Globulin ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>4.01 ± 0.52</td>
<td>1.33 ± 0.23</td>
<td>2.69 ± 0.61</td>
<td>0.53 ± 0.24ab</td>
</tr>
<tr>
<td>21</td>
<td>4.18 ± 0.29</td>
<td>1.76 ± 0.27</td>
<td>2.41 ± 0.45</td>
<td>0.76 ± 0.24a</td>
</tr>
<tr>
<td>28</td>
<td>4.02 ± 0.81</td>
<td>1.44 ± 0.27</td>
<td>2.57 ± 0.54</td>
<td>0.56 ± 0.02ab</td>
</tr>
<tr>
<td>35</td>
<td>4.39 ± 0.41</td>
<td>1.47 ± 0.45</td>
<td>2.93 ± 0.39</td>
<td>0.52 ± 0.23ab</td>
</tr>
<tr>
<td>42</td>
<td>4.35 ± 0.54</td>
<td>1.46 ± 0.39</td>
<td>2.89 ± 0.44</td>
<td>0.52 ± 0.16ab</td>
</tr>
<tr>
<td>49</td>
<td>4.21 ± 0.61</td>
<td>1.22 ± 0.31</td>
<td>2.99 ± 0.42</td>
<td>0.42 ± 0.08b</td>
</tr>
</tbody>
</table>

Means followed by different letters in the same column are significantly different (p < 0.05).

among 21 and 49 day-old Chinese geese. Young Nigerian ducks (Anas platyrhynchos), have higher values for albumin/globulin ratio (Olayemi et al., 2002). In acute or chronic conditions a rise in total protein caused by elevated globulin fraction may occur. Often albumin concentrations are decreased in these situations. The combined effect of these changes is a decrease in the albumin/globulin ratio. Often the total protein concentration is within the reference range, while the albumin/globulin ratio is decreased; therefore the albumin/globulin ratio is often or greater clinical significance than the total protein (Lumeij, 1997).

The total serum protein values in this study were similar to those reported for juvenile, 26-53 day-old, wild Canvasback duck (Aythya valisineria) (Kocan and Pitts, 1976). The total serum protein, albumin and globulins concentrations in this study were also similar to those found for Pekin ducks (Anas platyrhynchos), Canada goose (Branta canadensis) and Mute swan (Cygnus olor) (Grespan, 2007). However, young Nigerian ducks showed higher values for total serum proteins, albumin and globulins (Olayemi et al., 2002). Young Sudanese geese (Anser anser) had similar values for total serum proteins but higher values for albumin and lower values for globulin concentrations (Bakhiet et al., 2006). These differences may reflect the fact that age and state of development strongly influences the concentration of blood proteins in birds (Hochleithner, 1994). Nutrition and bird species are also responsible for differences in protein concentrations (Thrall, 2004). Otherwise, there is no information available on total serum protein, albumin and globulin values for the Chinese goose to compare with our results.

Conclusion: The serum total protein, albumin, globulin and albumin/globulin ratio values obtained in this study can be considered baseline information on healthy juvenile Chinese geese, thereby providing disease investigators with a standard of comparison.

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References


