A study on some normal hematological values in foals and arabian horses at different ages

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Summary
Hematological values of twenty normal male foals at 1-6 months, 7-12 months and sixty Arabian horses at 1-5 years old were estimated respectively. Red blood cell count (RBCS), hemoglobin concentration (Hb), packed cell volume (PCV%), mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH), mean corpuscular hemoglobin concentration (MCHC), differential leukocyte count, total serum protein were determined using several laboratory techniques. These changes of these parameters were presented in tables in relation to the ages of these animals.

Introduction
The estimation of normal hematological values are valuable as an assessment for physiological fitness and diagnosis of the disease (1,2).

In equine practice it is often difficult to interpret the results of hematological and biochemical examination of foals because there are few standard values for comparison, particularly in relation to age after birth (3).

In recent years there has been greater awareness of the changes that can occur in hematological results due to excitement of the horses during venipuncture and collection of the sample (4,5).

The present work was performed in order to determine a number of some hematological parameters in the foals of Arabian horses at different ages and also in the adult horses.
Materials and methods

The study was conducted on twenty Arabian foals their ages were 1-6 and 7-12 months respectively. Twenty five Arabian horses there ages ranged between 1-2 years. The other group included 35 horses between 3-5 years old at the Military Academic and Al-Furusiya Club West of Baghdad province. All the animals were males.

Every effort was made to take the blood samples without excitement.

2ml of blood sample was collected from the jugular vein of each animal with anticoagulant tubes (EDTA). Total red blood cell counts (RBCs) and white blood cell counts (WBCS) were determined using a haemocytometer technique, hemoglobin concentration (gm / dl) by Sahil method, packed cell volume (PCV%) using micro haemocrit centrifuge.

Mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH) and mean corpuscular hemoglobin concentration (MCHC) were calculated (6).

Differential leukocyte counts were determined on at least 200 cells from thin blood smears stained with Wright stain.

The total plasma protein (gm / L) were determined by refractometer (4). Analysis of data T test was performed (7).

Results

The results of the hematological values were summarized in the table 1 and 2; which showed the mean and standard deviation (SD) of the blood values for the horses at different ages. Analysis of the data revealed that there were significant (P> 0.05) differences in the RBCs counts, Hb, PCV, MCV, MHC and MCHC in the foals at 7-12 months and in the horses at 1-2 year.
old. Total Plasma protein was comparable (P>0.05) in all animals.

The WBCs counts were lower (P< 0.05) in the foals at 7-12 months and in horses at 1-2 years old. There was a significant (P<0.05) decrease in the Neutrophils in 7-12 months and the horses at 1-2 year old.

The Lymphocyte and Eosinophils counts were lower (P<0.05) in foals at 1-6 months and in horses at 3-5 years old.

Table (1)
Erythrocytes parameters and total plasma protein using SI units (Mean ± SD)

<table>
<thead>
<tr>
<th>Age of horses</th>
<th>Number examined</th>
<th>RBCs × 10¹² / L</th>
<th>Hb gm / L</th>
<th>PCV L / L</th>
<th>MCV Ft</th>
<th>MCH Pg</th>
<th>MCHC %</th>
<th>Total l.p.p. gm/ L</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-6 months</td>
<td>10</td>
<td>6.22 ± 0.97</td>
<td>124 ± 25.1</td>
<td>0.368 ± 0.026</td>
<td>60.8 ± 3.97</td>
<td>19.76 ± 1.22</td>
<td>33.72 ± 0.57</td>
<td>70.6 ± 7.3</td>
</tr>
<tr>
<td>7-12 months</td>
<td>10</td>
<td>5.6 ± 0.56</td>
<td>109 ± 12.7</td>
<td>0.325 ± 0.0153</td>
<td>54.1 ± 5.89</td>
<td>19.44 ± 0.30</td>
<td>33.51 ± 0.26</td>
<td>69 ± 1.4</td>
</tr>
<tr>
<td>1-2 years</td>
<td>25</td>
<td>5.43 ± 0.37</td>
<td>96.2 ± 10.5</td>
<td>0.321 ± 0.016</td>
<td>53.44 ± 4.19</td>
<td>17.71 ± 1.13</td>
<td>33.06 ± 1.50</td>
<td>70.8 ± 6.7</td>
</tr>
<tr>
<td>3-5 years</td>
<td>35</td>
<td>6.42 ± 0.64</td>
<td>126 ± 13.3</td>
<td>0.377 ± 0.021</td>
<td>58.67 ± 1.64</td>
<td>19.59 ± 0.52</td>
<td>33.5 ± 0.37</td>
<td>77 ± 4</td>
</tr>
</tbody>
</table>

* P< 0.05
Table (2)
Total and differential and Absolute leukocytic counts
(Mean ± SD )

<table>
<thead>
<tr>
<th>Age of horses</th>
<th>Number examined</th>
<th>Total WBC S X10^9/ L</th>
<th>Differential leukocytic counts %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Neutrophils</td>
<td>Lymphocytes</td>
</tr>
<tr>
<td>1-6 months</td>
<td>10</td>
<td>56.2±13</td>
<td>39.8±12</td>
</tr>
<tr>
<td></td>
<td>± 2.19</td>
<td>5.91±1.38</td>
<td>1.07±0.48*</td>
</tr>
<tr>
<td>7-12 months</td>
<td>10</td>
<td>37±4.2</td>
<td>56±4.2</td>
</tr>
<tr>
<td></td>
<td>± 0.70</td>
<td>3.20±0.57</td>
<td>4.26±0.08</td>
</tr>
<tr>
<td>1-2 years</td>
<td>25</td>
<td>37±8.34</td>
<td>57±9.25</td>
</tr>
<tr>
<td></td>
<td>± 1.18</td>
<td>2.88±1.01</td>
<td>4.24±0.798</td>
</tr>
<tr>
<td>3-5 years</td>
<td>35</td>
<td>59±19.9</td>
<td>37±19.4</td>
</tr>
<tr>
<td></td>
<td>± 2.06</td>
<td>5.89±0.218</td>
<td>3.54±0.535</td>
</tr>
</tbody>
</table>

* P<0.05

Discussion

1-Foals at 1-6 months old The RBCs in this age were lower in comparison in the Thoroughbred foals (3); but the PCV and Hb were similar (36.8 V.S 38%; 12.4 V.S 12.8 gm / d1 ) respectively (3). The reduction in RBCs count may be due to breed difference. The MCV was higher than that recorded by (3 and 8); and this increase may be related to the lower RBCs count in our results. Ralston et al., (9) recorded that the MCV is increased from birth to three years old.

2-Foals at 7-12 months old. The RBCs, Hb, PCV, MCV, MCH and MCHC were in agreement with that reported by (8).

3-Yearlings horses (1-2 years) The RBCs count and the PCV were lower but the MCV, MCH and MCHC were comparable as reported by (8). These parameters were lower in that recorded in Thoroughbred horses (10).
4-Horses at 3-5 years old.
The hematological values were comparable as reported by (8,11), but the RBCs count was less as recorded in sixty clinically normal Arabian horses (12) (6-42 V.S. 8.71).
Al-Izzi (13) reported similar hematological parameters in thirty clinically normal Arabian horses at 2-6 years old.
The leukolytic count:
The WBCs counts in foals at 1-6 months were comparable with that reported by (3), but less than recorded by (8). In horses 1-2 years old the result were comparable (7.5×10⁹/L V.S 8.1×10⁹/L) as reported by (5). In the horses 3-5 years old the counts were (9.75×10⁹/L) and were comparable in that reported by (12,13).
The T.S.P. in foals at 1-6 months was higher (70.6 gm/L) than that reported in Thoroughbred foals (3). In 7-12 months old was comparable with (8) and at yearling horses was (70.8 gm/L) comparable with (14 and 15).
Finally in the horses at 3-5 years the T.S.P. was similar to that reported by (13;16 and 17).
References


دراسة بعض أقياس الصورة الدموية الطبيعية في الأمهار والخيول العربية في أعمار مختلفة

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الخلاصة

لقد تم قياس الأقیاس الدموية لعشرين مهرًا طبيعيًا تراوحت أعمارهم بين (1-6) شهراً و (7-12) شهراً وستون حصاناً عربياً تراوحت أعمارهم بين (1-5) سنوات، على التوالي.

شملت الفحوصات: حساب عدد كريات الدم الحمر، الهيموكلورين، حجم كريات الدم الحمر المرصوسة، معدل الحجم الكروي، معدل خضاب الدم الكلوي ومعدل تركيز خضاب الدم الكلوي. حساب عدد كريات الدم البيض، والعدد الفارق لها، حساب تركيز البروتينات مصل الدم الكلي. وذلك باستعمال عدة تقنيات مختبرية.

وإن هذه التغييرات لهذه المعايير الدموية عرضت بشكل جداول وذلك بالعلاقة مع الأعمار المختلفة لهذه الحيوانات.

132