SOME PHYSIOLOGICAL AND BIOCHEMICAL STUDIES ON IMPORTED HORSES

H.A. ABDEL RAHMAN, S.A. HUSSEIN and OMAIMA A. RAGAB

Department of Physiology, Biochemistry and Pharmacology, Faculty of Veterinary Medicine, Mohshor, Zagazig University, (Derna Branch), Egypt.

ABSTRACT

Six mature male Thoroughbred horses were imported from Holland and transported by airline to Egypt. Serum thyroxine (T₄) and 3,3',5'-triiodothyronine (T₃), total proteins, albumin, triglycerides and total cholesterol levels were estimated on arrival of animals to Egypt and two weeks later. Blood haemogram including RBCs, WBCs, PCV and Hb was also estimated. T₄ concentration significantly decreased after two weeks of arrival but not reach the level of hypothyroidism (compared with basal values), while T₃, total proteins, albumin, triglycerides, total cholesterol concentrations and haemogram values did not show any significant change. Therefore transplantation and temperature differences between countries have an important role in thyroid activity.

INTRODUCTION

Domestic animals have been transferred from one climatic zone to another with varying degrees of success. cattle, sheep, poultry and horses have been taken from the low temperature regions of Europe and the U.S.A. to the tropics and subtropics including West Indies, Philippines and Egypt (Hammond, 1954 and Payne and Haacock, 1957). The transport of animals involves several potentially stressful factors; physiological factors, such as noise or vibrations, emotional factors; such as unfamiliar environment or social regrouping, and climatic factors, such as temperature, humidity or oxygen concentration (Stephens, 1982). Transport of horses has long been recognised as a stress predisposing to salmonellosis (SalmClintock, 1990) and increased the risk of respiratory diseases (Moberg, 1985). Moreover, the condition of "dry coat syndrome" is characterized by the loss of the ability to sweat in horses that have been imported into hot humid climates (such as exist in coastal areas..."
in Malaya and India) from cool less humid ones (Wright and Tull, 1925 and MacGregor, 1935).

The condition has been variously ascribed to infection with a specific organism (Wright and Tull, 1925), to use of arsenic as a tonic by trainers in India (Stewart, 1938) to thyroid deficiency (MacGregor, 1935) to lack of vitamin C or NaCl, to hypofunction of adrenal cortex (Wallace, 1938) and to disturbance of water balance (Arnold, 1950). The purpose of the present research was to determine the effect of transportation and adaptation of imported horses under local climatic condition on some of thyroid function tests, lipogram and haemogram.

MATERIAL AND METHODS
Six apparently healthy mature male Thoroughbred horses, aged from 4 to 6 years old and average body weight of 450.50 kgs. were imported from Holland. The horses were transported by airplane to Egypt at November, 1992 (Average atmospheric temperature 16.56 ± 3.98 °C and relative humidity 64.25 ± 4.86 %). The animals were gradually change their foods that previously accustomed to eat in Holland to feed barley and barely. Blood samples were taken by jugular venipuncture immediately after arrival of animals to quarantine (I) and 2 weeks later (II). No further blood samples at 4 weeks and 6 weeks would be taken where horses distributed in different localities in Egypt that made the sample were difficult to be obtained.

Blood samples were collected on EDTA for complete blood picture and other portion of blood was allowed to clot. The sera were separated by centrifugation and stored at -20 °C until analyzed for certain lipids parameters including (triglycerides and total cholesterol) and hormone analysis, including (T3 and T4) in addition to total proteins and albumin.

Haematological examination as RBCs and WBCs count, PCV were determined by microhematocrit method and haemoglobin was determined according to the method of (Schalm, 1975).

Serum T3 and T4 concentrations were determined by radioimmunologi-c assays with a commercially available kit. (Diagnostic products
corporation, Los Angeles, cat. No., TKT-31 and TKT-41, respectively). Serum triglycerides, total cholesterol, total proteins and albumin (Axiom, West Germany) were estimated. Statistical analysis of the obtained results were carried out using the method of Snedecor and Cochran (1967).

RESULTS

The value of serum $T_3$ concentration just arrival of horses quarentine (1) were decreased significantly ($P < 0.01$) in comparison with two weeks later level (II). While, the value of serum $T_4$ concentration showed a non-significant change in both of I and II periods (Table 1).

The mean values of serum total proteins, albumin, total cholesterol and triglycerides levels and haemogram values showed any significant change ($P > 0.05$) in I and II periods.

DISCUSSION

It was reported that, atmospheric temperature affect the thyroid gland activity, as cold produces clear-cut increases in circulating TSH in experimental animals and human infants and presumable decrease in hot (Ganong, 1983).

In the present study, the $T_3$ activity was decreased while $T_4$ was not changed during the experimental period. So, $T_3$ level seems to be more sensitive to climatic change under Egyptian condition. This agrees with other direct measurements of thyrotropin releasing hormone (TRH) induced TSH release in horses (Thompson et al., 1983 and Thompson and Netts, 1984). Apparently, there was a preferential secretion of $T_3$ after a frank stimulus with exogenous or endogenous TSH after TRH administration (Morris and Garcia, 1983; Lauberg, 1984 and Lothrop and Nolan, 1986). Although $T_3$ level recorded in this study (Table 1) was decreased significantly during the experimental period but not reach the level of hypothyroidism. The control value of $T_3$
Table (1): Effect of transportation and adaptation of imported horses on serum T4, T3, total proteins, albumin, triglycerides, total cholesterol and haemogram

<table>
<thead>
<tr>
<th>Horse</th>
<th>T3 ug/dl</th>
<th>Total proteins g/l</th>
<th>Albumin g/l</th>
<th>T.G. mmol/l</th>
<th>T.Ch. mmol/l</th>
<th>RBCs 10^12/L</th>
<th>WBCs 10^9/L</th>
<th>PCV %</th>
<th>Hb g/dl</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>4.37</td>
<td>97.58</td>
<td>30.80</td>
<td>0.95</td>
<td>3.16</td>
<td>7.33</td>
<td>7.18</td>
<td>35.41</td>
<td>13.59</td>
</tr>
<tr>
<td></td>
<td>±1.54</td>
<td>±7.18</td>
<td>±2.00</td>
<td>±0.26</td>
<td>±0.36</td>
<td>±2.54</td>
<td>±2.54</td>
<td>±2.18</td>
<td>±1.66</td>
</tr>
<tr>
<td>II</td>
<td>4.33</td>
<td>69.99**</td>
<td>28.50</td>
<td>1.06</td>
<td>2.65</td>
<td>6.32</td>
<td>3.20</td>
<td>40.21</td>
<td>12.75</td>
</tr>
<tr>
<td></td>
<td>±0.04</td>
<td>±8.17</td>
<td>±4.20</td>
<td>±0.31</td>
<td>±0.63</td>
<td>±2.05</td>
<td>±1.54</td>
<td>±7.18</td>
<td>±1.92</td>
</tr>
</tbody>
</table>

n=6; Mean ± S.D. **: Significant (P<0.01)
I. Immediately after arrival of horses to quarantine
II. After two weeks later.

T.G: = Triglycerides
T.Ch. = Total cholesterol
concentration was $44 \pm 18$ ng/dl in Equines of foreign breed as recorded by Lothrop and Nolan, (1986).

The non-significant change in haemogram, lipogram and protein levels (Table, 1) explain that the decrease in thyroid gland activity (due to climatic difference) not reach the level at which the previous parameter changed significantly. Results indicate that imported horses to Egypt especially from cooler area (Europe) must put under specific program for acclimitization under local conditions (nutrition, system of training, housing as controled temperature and humidity). This, to avoid atmospheric temperature differences especially during summer season. Further decrease of thyroid hormones which may lead to general depression as a case of dry-coat syndrome.

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بعض الدراسات الفسيولوجيّة والبيوكيبيدياً للخ镗ب المستورد

حسين عبد الوهيب إسماعيل - سالم عادل خليل - أمينه أحمد رجب
فس الخبر: جينوتورميك - تشكيك في النمو - الاقتراض

أسمح في هذا البحث الدور بين إثنية نمط السلامة المتناجسة على صحة صحيّة طارئة حيث تم
ال🌿 تطوير العلاج والطب البديل المعد والجبال العلاجية والممارسات المتعايشة بين مراكز
الفيروسات (T & T & I & T & I)، رسم الخصائص المدمج للجمجمة، نقل دى وتقيض، وفحص القد

لكن، فإن هذه النظرية تبين أن الخطير وآمن صبيه محدب بعد مساعد الخمير بأسور، ولكن قد نصل إلى:
التماثل المدهش بين تكوين وكميات الكالسيوم والفيتامين D، وضوء العظام والأمعاء، وتشخيص من هذ
في النهاية، أن البصريات نموه وقابلية ارتفاع التفاصيل في سلسلة محدد.
يفضل أن يتم فحص على خص صحيّة معاصرة وطموحه يمكن أخذ ذلك في الاعتبار عند استمرار جهاز معول من
الفحص لما تغذى النواة رسمية، هرمون (T & T & I) من أهمية كبيرة لصحة الحيوان.