Brief Note

Effects of Transit Stress on White Blood Cells Count in the Peripheral Blood in Thoroughbred Race Horses

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In order to investigate whether transport does have influence on white blood cells count in the peripheral blood in racehorses, clinically healthy 337 thoroughbred racehorses were examined hematologically prior to and immediately after transportation.

There was a tendency to increase in the number of leukocyte after transportation. The increase was mainly due to neutrophilia. It would appear that leukocytosis might have originated from the stress associated with transportation. The causal factor of leukocytosis remains to be studied.

Key words. transit stress, shipping fever.

It is well recognized that equine transportation is occasionally associated with the development of equine shipping fever pneumonia¹). However, with the exception of some description²-⁴), its pathogenesis, especially the effects of equine transit stress remains obscure.

This short paper describes the alterations of peripheral white blood cells associated with equine transportation.

Three hundred and seventy seven clinically normal thoroughbred racehorses were used for this investigation. These horses were transported by truck in various routes and distances. The truck was in transit for approximately 200 to 1700 kilometers. The animals were divided into 4 groups taking the distance for transport in consideration, that is, the transport groups of short, middle, intermediate, and long distances (Table 1).

Blood was collected just before and im-

Table 1. Cases examined

<table>
<thead>
<tr>
<th>Group</th>
<th>3 years</th>
<th>4 years</th>
<th>5 years</th>
<th>Total no. of cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short distance transportation¹)</td>
<td>32</td>
<td>29</td>
<td>5</td>
<td>9</td>
</tr>
<tr>
<td>Middle distance transportation²)</td>
<td>30</td>
<td>11</td>
<td>10</td>
<td>6</td>
</tr>
<tr>
<td>Intermediate distance transportation³)</td>
<td>23</td>
<td>24</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>Long distance transportation⁴)</td>
<td>75</td>
<td>43</td>
<td>11</td>
<td>6</td>
</tr>
<tr>
<td>Total no. of cases</td>
<td>160</td>
<td>107</td>
<td>33</td>
<td>29</td>
</tr>
</tbody>
</table>

¹). Transit distance : 200km, Transit time : 6hours
²). Transit distance : 600km, Transit time : 10hours
³). Transit distance : 900km, Transit time : 20hours
⁴). Transit distance : 1700km, Transit time : 35hours

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Leukocyte changes caused by transit stress

Immediately after transportation. In several horses, blood collection was carried out once daily for a week at rest after transportation. For counting leukocyte, the Neubauer hemocytometer was used. Numbers of neutrophils and lymphocytes were calculated from the differential leukocyte count.

Fig. 1. Changes of white blood cell count in response to transit stress

Fig. 2. Changes of white blood cell count by transit in horses aged 3 years

Immediately after transportation. In several horses, blood collection was carried out once daily for a week at rest after transportation. For counting leukocyte, the Neubauer hemocytometer was used. Numbers of neutrophils and lymphocytes were calculated from the differential leukocyte count.

Fig. 1 shows the number of leukocytes in 377 horses increased after transportation. Differential cell counts showed that the leucocyte increase was mainly of neutrophils. There was a tendency to increase in the number of leucocyte as the transport distance becomes longer (Fig. 1). As to sex differences, increase of leucocyte was slightly higher in female horses (Fig. 2). As a result of observation on leucocyte count for a week, the number of leucocyte was noted to reach a peak immediately after transportation, and then decreased to the normal level about 2 days later.

The results obtained in the present study indicates the increase in leucocyte numbers following transportation. The same result has been reported by Abott and Leadon et al. The fact that such increasing trend of leukocytes, especially neutrophils, is enhanced by the longer transport distance suggests leukocytosis might originate from the stress associated with transportation. The causal factor of leukocytosis and the role in the pathogenesis of shipping fever were hardly clarified. Questions derived from the present study such as: (1) whether inflammations in the horse body exist or not, (2) whether leukocytosis are caused by epinephrine induced neutrophilia (transient physiologic neutrophilia or corticosteroid-induced neutrophilia), (3) whether neutrophils function is reduced or accelerated following transportation, (4) whether alteration of the neutrophils chemotactic factor or increase of the granulocyte colony stimulating factor (G-CSF) are involved or not, remain to be studied.

Literature Cited

要約
輸送が競走馬の末梢血中の白血球数に及ぼす影響：山内龍洋1)，及川正明2)，平賀 修3)（1）日本中央競馬会栗東トレーニングセンター競走馬診療所、2）競走馬総合研究所）——臨床的に健康なサラフレッド種競走馬377頭を用いて、種々の区間のトラック輸送が末梢血中の白血球数にどのような影響を及ぼすかについて観察した。その結果、サラフレッド種競走馬の生理基準値と比較して、輸送後の白血球数、ときに好中球数は増加すること、輸送距離が長くなる程、白血球数が増加傾向を示すことが判明した。これら白血球增多は輸送直後をピークとして、以後減少した。

白血球、ときに好中球が輸送距離の増大と共に増し傾向にあったことから輸送ストレスに起因したストレス性好中球增多であったことが示唆された。