Lupus Erythematosus Cell Phenomenon in a Guinea Pig
(Cavia porcellus): A Case Report

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ABSTRACT

The complete blood count of 5-year-old female guinea pig (Cavia porcellus) was evaluated prior surgical removal of facial tumor at Kasetsart Veterinary Teaching Hospital, Bangkok, Thailand. Many pink homogeneous inclusions were observed in cytoplasm of neutrophils, monocytes and lymphocytes on the blood smear. These findings were recognized as lupus erythematosus (LE) cells.

Key words: guinea pig, lupus erythematosus cell
INTRODUCTION

Lupus is a condition characterized by chronic inflammation of body tissues associated with the development of autoantibodies against DNA, RNA and nucleoproteins. The abnormal antibodies potentiate to affect multiple organs and cause tissue inflammation such as vasculitis, arthritis and glomerulonephritis. The condition is called discoid lupus erythematosus (DLE) when the disease is confined to the skin, and is called systemic lupus erythematosus (SLE) if multisystem is involved (Cruse and Lewis, 2004). SLE is considered an uncommon disease of the dog and is rarely reported in other animals. For diagnosis, at least two separate clinically and serologically defined manifestations of autoimmunity are the most universally accepted SLE in veterinary species (Day, 2000). However, the lupus erythematosus (LE) cell continues to serve as an important indicator of SLE (Jain, 1986).

LE cell is the cell containing a homogeneous mass of apparently phagocytosed material which stains pink or purple with Romanowsky dyes. It is the product of an autoimmune reaction involving the cell nucleus (Holman, 1960). Three ingredients are necessary for this reaction; the serum antinuclear antibody (ANA), the nuclei to be altered, and leukocytes capable of phagocytosis. Initially, the cellular nuclei are exposed to the serum antinuclear antibody (ANA) and become homogeneous. These opsonized nuclear materials are then extruded from the cell and are phagocytized by other viable leukocytes. The latter leukocytes are the LE cells (Day, 2000). In the present report, the natural phenomenon of LE cells in peripheral blood of a guinea pig is described.

PATIENT HISTORY

A 5 year-old, 965 g., female guinea pig was brought to the Veterinary Teaching Hospital, Kasetsart University, with a right facial mass, 3 cm. in diameter. The gross appearance of mass was soft, round with ulcerated surface. To evaluate the health status, the complete blood count (CBC) was performed by automated hematology analyzer (Cell-Dyn® 3500, Abbot Diagnostics; Illinois, USA) and manual differentials were determined by counting 200 cells from modified Wright’s stained smear. The results were normocytic-normochromic anemia, neutrophilia, eosinophilia, lymphopenia, basophilia and monocytosis (Table 1).

On blood smear, the pink homogeneous inclusions were seen in neutrophils (Fig. 1A, B & C), monocytes (Fig. 1D) and lymphocytes (Fig. 1E) occasionally. These findings were recognized as LE cells. Moreover, the pyknotic nuclei of eosinophils (Fig. 1F), the basophils (Fig. 1G), the mast cells (Fig. 1H) and many autoagglutination of polychromatophilic erythrocytes (Fig. 1I) were markedly observed.

The patient did not show any clinical manifestation whereas the abnormal findings were evaluated from hematology. Surgical removal of the mass was performed and histopathological section was diagnosed as trichoepithelioma.
Unfortunately, the patient was lost of contacted because the owner with her pet relocated to the countryside.

**DISCUSSION**

It is well known that LE cell formation typically involved neutrophils and monocytes, but in this case, LE cells were also found in lymphocytes. This finding supports the data of Ogryzlo (1956) which was reported that the LE formation may be found in other cells, including eosinophils, basophils and lymphocytes.

Though, the high titer of serum ANA is the one of significant criteria for SLE diagnosis, but it is less specific (Jain, 1993). ANA may be presented in the serum of animals with a chronic inflammatory, infectious, or neoplastic disease, presumably as a consequence of cellular breakdown and exposure to nuclear material (Day, 2000). It is unclear whether the tumor mass with its chronic inflammation has truly induced ANA in this patient yet, however, the autoagglutination of polychromatophilic erythrocytes related to immune mediated disease.

Nevertheless, the significance of the LE cells in this patient and its relationship to the SLE insult remains speculative. We found that LE cell is a characteristic feature of the case studied, to our knowledge it has never been reported previously in guinea pig. The findings of this case add up data regarding to the LE cell phenomenon in this species.

**Table 1** Hematologic results of the patient.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Results</th>
<th>Reference values†</th>
<th>Parameters</th>
<th>Results</th>
<th>Reference values†</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hb (g/dL)</td>
<td>9.07</td>
<td>10.5-15.3</td>
<td>Seg. neutrophils (/μL)</td>
<td>5,404</td>
<td>1,350-3,650</td>
</tr>
<tr>
<td>Hct (%)</td>
<td>26.3</td>
<td>35.9-48.3</td>
<td>Eosinophils (/μL)</td>
<td>922</td>
<td>0-690</td>
</tr>
<tr>
<td>RBC (10⁶/μL)</td>
<td>3.24</td>
<td>4.1-6.1</td>
<td>Basophils (/μL)</td>
<td>248</td>
<td>0-20</td>
</tr>
<tr>
<td>MCV (fL)</td>
<td>81.17</td>
<td>75-91</td>
<td>Monocytes (/μL)</td>
<td>818</td>
<td>60-560</td>
</tr>
<tr>
<td>MCHC (g/dL)</td>
<td>33</td>
<td>28.2-33.0</td>
<td>Lymphocytes (/μL)</td>
<td>4,884</td>
<td>5,470-10,550</td>
</tr>
<tr>
<td>WBC (10⁶/μL)</td>
<td>12,400</td>
<td>8,220-14,000</td>
<td>Mast cells (/μL)</td>
<td>124</td>
<td>-</td>
</tr>
<tr>
<td>PLT (10⁵/μL)</td>
<td>649</td>
<td>390-710</td>
<td>LE cells (/100WBC)</td>
<td>3</td>
<td>-</td>
</tr>
</tbody>
</table>

†Jain (1993)
Figure 1  Peripheral blood smear of guinea pig; LE cells showing a pink homogeneous inclusion in cytoplasm: the neutrophils (A, B & C), a monocyte (D) and a small lymphocyte (E). An eosinophil (F) with pyknotic nucleus and round to rod shaped granules that almost completely fill the cytoplasm (left) comparing to a normal eosinophil (right). A basophil (G) displays large lobed nucleus with closely packed varying sizes of reddish-purple rod shaped granules. A mast cell (H) with metachromatic granules obscured the nucleus. An autoagglutination of polychromatophilic erythrocytes (I). (Wright-Giemsa stain).
REFERENCES


Question

1. Which one is true about the Lupus?
   a. The condition of chronic inflammation
   b. The insult condition caused by autoimmunity
   c. The product of an autoimmune reaction
   d. Only a. and b.

2. These are all ingredients of LE cell, except?
   a. Antinuclear antibody
   b. Nuclear chromatin
   c. Leukocyte
   d. All of the above

3. which one is false?
   a. LE cell is the pathognomonic lesion of SLE
   b. Antinuclear antibody titer is the specific test for SLE
   c. Histone protein is the one of target sites which is attacked by autoimmune
   d. None is false

4. According to the report, which one is true?
   a. Trichoepithelioma causes of LE cell phenomena
   b. Autoagglutination indicates the immune mediated condition
   c. Mast cells and basophils implied the immunopathological insults
   d. All of the above

5. Which cells are commonly formed LE cells?
   a. Neutrophils and monocytes
   b. Neutrophils and eosinophils
   c. Monocytes and lymphocytes
   d. Monocytes and eosinophils

6. What is the most effective method for SLE diagnosis?
   a. Lupus test and clinical manifestations
   b. Serological test and clinical manifestations
   c. Serological test and complete blood count
   d. Physical exam and blood smear
7. Which one is the cause of antinuclear antibody product?
   a. Virus
   b. Bacteria
   c. Tumor
   d. All of the above

8. Which one is true about SLE?
   a. Multifactorial disease
   b. Idiopathic disease
   c. Systemic disease
   d. All of the above

9. According to the report, which one indicates the stress condition?
   a. Normocytic-normochromic anemia
   b. Neutrophilia and lymphopenia
   c. Eosinophilia and basophilia
   d. Monocytosis and mastocytosis

10. According to the report, which one implies the effective treatment of SLE?
    a. Steroid therapy
    b. Surgery
    c. Supportive therapy
    d. Pain control

Answer
1. d
2. d
3. a
4. b
5. a
6. b
7. d
8. d
9. b
10. a