Pathological changes in mountain gazelles challenged with FMD virus, with special reference to pancreatic lesions

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Summary: This communication describes the pathological findings in mountain gazelles that died after challenge with the FMD virus strain isolated from naturally-infected gazelles in Israel. Severe pancreatic lesions were present in two chronic cases.

KEYWORDS: Experimental infection - Foot and mouth disease - Gazella gazella - Israel - Pancreas - Pathology - Wild animals.

INTRODUCTION

An outbreak of foot and mouth disease (FMD) in mountain gazelles (Gazella gazella) in Israel was reported in April 1985 (4), during which approximately 2,000 animals of all age groups died. Experimental infection was carried out at the Kimron Veterinary Institute between March and July 1988 to study the course of the disease, including virological and clinico-pathological changes which occurred in this species following infection with the FMD virus (FMDV) isolated during the field outbreak.

There are a few reports in the literature describing pancreatic lesions in experimentally-infected animals, such as unweaned mice (2), adult guinea pigs (3) and cattle (1).

MATERIALS AND METHODS

The FMD virus used was type O₁ strain ISR 1/85, isolated from naturally-infected gazelles in Ramot-Yissakhar, north-eastern Israel, in April 1985, and typed by the World Reference Laboratory in Pirbright. Eight gazelles were infected (15 March 1988), four by intradermolingual inoculation and four by contact infection.

Necropsies of the dead animals were performed. Organs were fixed in 10% neutral buffered formation (NBF) and examined histologically.

RESULTS

The clinical course of the disease was typical for FMD and similar to natural outbreaks (4). No difference in the course of the disease was observed between the
animals in the two infection modes. Four gazelles died during the first 15 days after inoculation. Two other animals developed chronic disease characterised by loss of weight, inappetence and weakness later followed by severe cachexia, and died after 114 and 117 days. The two surviving gazelles are still alive (14 August 1988).

The results of pathological-histopathological studies are summarised in Table I.

**TABLE I**

*Pathological-histopathological findings in gazelles experimentally-infected with O₁ ISR 1/85*

<table>
<thead>
<tr>
<th>Gazelle no.</th>
<th>Mortality: days after infection</th>
<th>Pathological and histopathological findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>27</td>
<td>3</td>
<td>Aphthae and erosions on lips and tongue. Necrotising pneumonia with multiple abscesses.</td>
</tr>
<tr>
<td>28</td>
<td>6</td>
<td>Erosions on lips, hard palate, dorsum of the tongue, interdigital spaces, loss of both horns, pale foci in the ventricles with myocarditis and hyaline degeneration and necrosis of fibres.</td>
</tr>
<tr>
<td>32</td>
<td>8</td>
<td>Erosions on lips, hard palate, dorsum of the tongue, interdigital spaces, loss of hooves.</td>
</tr>
<tr>
<td>26</td>
<td>15</td>
<td>Necrotic lesions on lips, dorsum of the tongue, serous fluid with some fibrine in pericardial cavity, pale foci in right ventricle and apex of heart with myocarditis.</td>
</tr>
<tr>
<td>29</td>
<td>114</td>
<td>Severe cachexia, muscular atrophy, pancreatic atrophy, several ulcers in rumen, serous atrophy of epicardial fat.</td>
</tr>
<tr>
<td>31</td>
<td>117</td>
<td>Severe cachexia, muscular atrophy, decubital lesions, pancreatic atrophy, serous atrophy of epicardial fat.</td>
</tr>
</tbody>
</table>

The most striking P.M. changes, not previously described in gazelles, were found in the pancreas of animals nos. 29 and 31. These two gazelles had severe cachexia with pronounced muscular atrophy. A large amount of serous fluid was present in the pericardial cavity, with serous atrophy of epicardial fat.

Remarkable changes were observed in the pancreas, consisting of islets of tissue embedded in a gelatinous-like matrix. Histopathological examination revealed atrophic changes in both exocrine and endocrine tissue, interlobular oedema and acinar necrosis (Fig. 1). There were small separated groups of cells in a glandular arrangement and the acinar lumen was absent. Acinar cells with loss of zymogen granules and shrinkage of cytoplasm were present in areas of acinar necrosis.

In most of the areas, there was proliferation of tubular structures and slight regeneration (Fig. 2). Proliferation of interstitial connective tissue with a sprinkling of lymphocytes in the interstitial tissue was noted.

In both animals the exocrine part of the pancreas was severely affected and in one of them the islets of Langerhans were completely absent.

No significant histopathological lesions were present in other internal organs.
DISCUSSION

The histopathological findings described above indicate that gazelles might have been affected by and died from diabetes mellitus as previously described in bovines (1).

It is known that damage to the pancreas in guinea pigs (3) can later be reduced by regeneration. In the present cases, the regeneration of the pancreas of the gazelles was very slight. The fact that pancreatic lesions were not evident at necropsy in acute, natural or experimental cases of FMD in mountain gazelles may be explained by the very malignant course of disease.

It is highly probable that the pancreatic lesions were a result of the chronicity of the disease. We were not able to show the absence of these lesions in noninfected control gazelles, since it was impossible to keep such animals in the FMD containment facility without their being infected at some time. However, we have previously examined many gazelles that died due to FMD without finding pancreatic lesions.

To the best of our knowledge this is the first report of pancreatic lesions in gazelles infected with FMD virus.

In order to understand the pathogenic effect of FMD virus on the pancreas of mountain gazelles, this topic needs to be studied more extensively.
Regenerative area, proliferation of tubular structures and interstitial connective tissue × 200


Résumé : Cette communication décrit les lésions anatomo-pathologiques observées chez des gazelles des montagnes mortes après avoir subi l'inoculation d'épreuve de la souche du virus aphteux isolée chez les gazelles infectées naturellement en Israël. Des lésions pancréatiques graves ont été constatées chez deux animaux atteints de maladie chronique.

MOTS-CLÉS : Anatomo-pathologie - Animaux sauvages - Fièvre aphtéuse - Gazella gazella - Infection expérimentale - Israël - Pancréas.

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LESIONES ANATOMOPATOLOGICAS, ESPECIALMENTE EN EL PANCREAS, EN GACELAS DE MONTAÑA INOCULADAS CON VIRUS AFTOSO. — S. Perl, H. Yadin, B. Yakobson, E. Zuckerman y U. Orgad.

Resumen: El presente artículo describe las lesiones anatomopatológicas observadas en gacelas de montaña muertas después de haber sido inoculadas experimentalmente con la cepa del virus aftoso aislada en gacelas infectadas
naturalmente en Israel. Se comprobaron lesiones pancreáticas graves en dos animales afectados de enfermedad crónica.

PALABRAS CLAVE: Anatomopatología - Animales salvajes - Fiebre aftosa - Gazella gazella - Infección experimental - Israel - Pancreas.

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REFERENCES


