Different Histopathological Response to Arenovirus Infection in Thymectomized Mice

By

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With 6 Figures

Received May 8, 1972

Summary

In this paper the survival and the histopathology of normal and thymectomized mice infected with some Arenoviruses is reported.

Normal newborn mice infected intracerebrally with Junin, Machupo, Tacaribe and Amapari virus showed similar histopathological changes in the central nervous system characterized by choroiditis, glial hyperplasia, vasculitis and perivasculitis with infiltration of lymphocytic cells.

In thymectomized mice infected with Junin, Machupo and Tacaribe virus, there was no evidence of disease, survival reached almost 100% and no pathological alterations were observed in the brain.

In contrast, thymectomized mice infected with Amapari virus showed the same percentage of mortality and similar histopathological changes as non-thymectomized animals.

1. Introduction

In view of the similarities among lymphocytic choriomeningitis (LCM) virus, and viruses of the Tacaribe complex (Junin, Machupo, Amapari, Tacaribe, Pichinde, Tamiami and Paraná) in morphological appearance (1), antigenic relationship, physicochemical characteristics (2) and mechanisms of pathogenesis (3—7), which requires the integrity of thymus-dependent immune system, all of

1 This research was supported by Grant No 4908/71 from “Consejo Nacional de Investigaciones Científicas y Técnicas”, República Argentina, and by funds from “Comisión Coordinadora para el estudio y lucha contra la Fiebre Hemorrágica Argentina” of the Subsecretaría de Salud Pública, República Argentina.

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them were included in a new taxonomic group called Arenoviruses (8). However, differences among the pathogenic activity of some viruses of this group in relation with the age of the host have been demonstrated: the pathogenicity of Junín (9), Amapari (10), and Tacaribe (6) viruses, decrease with increasing mouse age, in contrast LCM virus pathogenicity increases with increasing age (11). It was also demonstrated that newborn thymectomized mice infected i.c. with Junín, Machupo, Tacaribe or Pichindé virus survived without any symptoms of disease, while all control mice died between the second and third week after infection with neurological symptoms typical of virus infection. In contrast, all thymectomized and non-thymectomized mice infected with Amapari virus died before 20 days from infection. These findings suggested that the pathogenesis of Amapari virus infection in mice is independent on thymus (12).

We report here a comparative study between survival and histopathology of thymectomized and non-thymectomized mice infected with four viruses included in the Arenovirus group.

2. Materials and Methods

Rockland mice, a strain in which wasting disease following thymectomy is delayed, were thymectomized following DISCHELER and RUDALI'S (13) technique within 24 hours after birth. They were inoculated intracerebrally within 6 hours with 0.02 ml of mouse brain homogenate containing 1000 LD 50 of one of the following members of the Arenovirus group: Junín, RC strain; Machupo, Carvallo strain; Tacaribe, TRVL 11573 strain and Amapari Be An 70563, LTV 4876 strain. Non-thymectomized newborn Rockland mice of similar age were infected simultaneously by the same route with equal amounts of each virus.

Survival studies were made with at least 20 thymectomized and non-thymectomized mice infected with each of one of the above mentioned viruses. Mice were observed daily, apparition of neurological symptoms and number of deaths were recorded.

Histopathological studies were made with groups of thymectomized mice sacrificed at 12, 15, 30, and 40 days after virus inoculation. Ten animals were used per group. Similar number of infected non-thymectomized mice were sacrificed already 12 to 15 days after infection because of their shorter survival.

Brain, liver, kidney, spleen and occasionally lung and myocardial tissues of killed mice were fixed with formalin, sectioned and stained with hematoxylin and eosin. Thymectomized mice were examined both macroscopically and histologically to determine whether thymectomy was complete. Mice with remaining thymus were discarded.

3. Results

All of non-thymectomized mice infected with Junín, Tacaribe and Machupo viruses died with neurological symptoms between 12 to 17 days after inoculation. However, in thymectomized mice infected with the same viruses there was no evidence of disease, and survival reached almost 100% until the period of observation was over 40 days after inoculation. On the other hand, both thymectomized and non-thymectomized mice infected with Amapari virus all died with neurological symptoms between 10 to 18 days after inoculation.

No macroscopic lesions were seen in CNS, spleen, kidney, lung or liver of thymectomized and control mice.

The histopathological study showed that non-thymectomized mice infected with either virus and sacrificed 12 to 15 days after infection had almost similar