

MYOCARDITIS IN HUMAN RABIES

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SUMMARY

A focal interstitial myocarditis was seen in 43.5% of necropsied cases of human rabies. It is highly possible that such myocarditis is the result of the virus dissemination either through the blood or nerves to the heart, but the definite prove can be obtained only after virus recovery from the myocardium.

The importance of such myocarditis is secondary if one considers the intensity of the encephalitic process, but it could play an important and not clinically investigated role at the terminal stages of the disease.

INTRODUCTION

Previous papers on human rabies are mainly related to the central nervous system aspects of the disease^{1, 2, 4, 6, 8}.

In 1962, ROSS & ARMENTROUT⁷ for the first time described one case of human rabies with an associated myocarditis. Recently two other cases of myocarditis in rabies were reported by CHEETHAM et al.³.

The purpose of this paper is to report on the frequency and importance of this association in a larger series of cases of human rabies.

MATERIAL AND METHODS

Twenty three clinically typical cases of human rabies with complete post mortem examination at the "Hospital Emilio Ribas" were used in this study. In all of them fragments of spinal cord, bulb, cerebellum, Ammon's horn, basilar nuclei and cerebral cortical area were studied together with fragments of the heart and from the other organs.

The fragments of central nervous system were fixed both in buffered formalin and Carnoy's fluid and the other fragments were

formalin fixed only. After paraffin embedding they were cut and hematoxylin eosin was used as the routine stain. Negri bodies were demonstrated by the modified eosin technique of MASSIGNANI⁵.

Virus was isolated from the central nervous system in all cases. Attempts to isolate the virus from the heart were not successful.

In our material there were nineteen males and four females. Most of the cases were between the ages of 10 and 20, the youngest being 2 years and the oldest 56 years old.

RESULTS

The average incubation period of the disease was two months, the shortest being nine days and the longest one year. In four cases incubation period could not be ascertained.

The disease was transmitted by dog bite in 20 cases and by cat bite in one case. No reference of the animal could be obtained in two cases. Four patients had begun antirabic vaccine and one of them had almost completed the treatment. However, in this case, a child 5 years old, the dog bite was in the face and the incubation period lasted 25 days only (Tables I, II and III).

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TABLE I

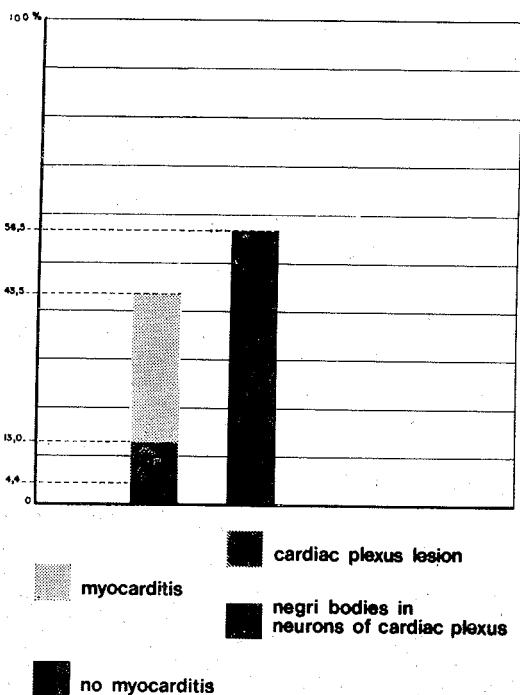


TABLE III

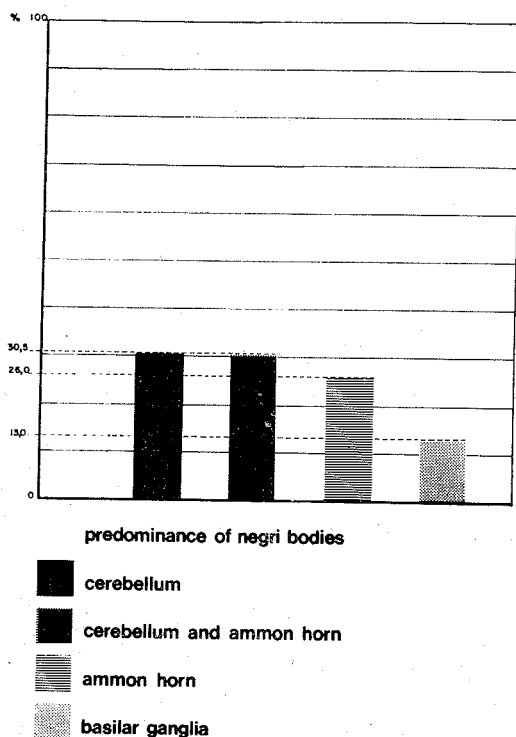
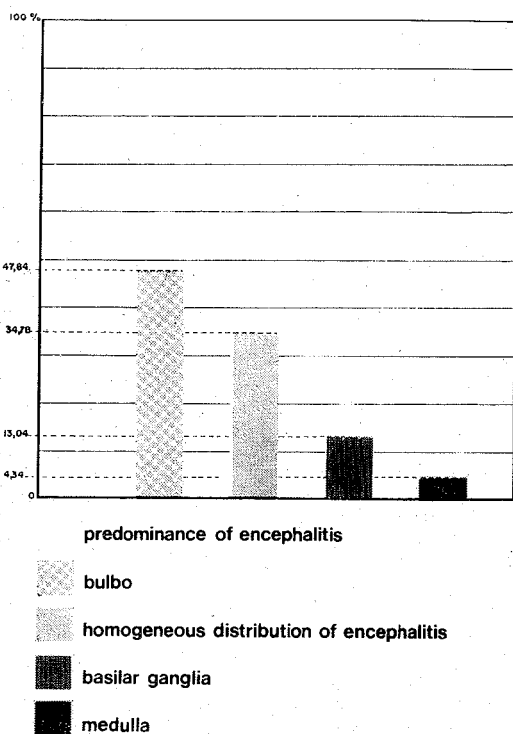


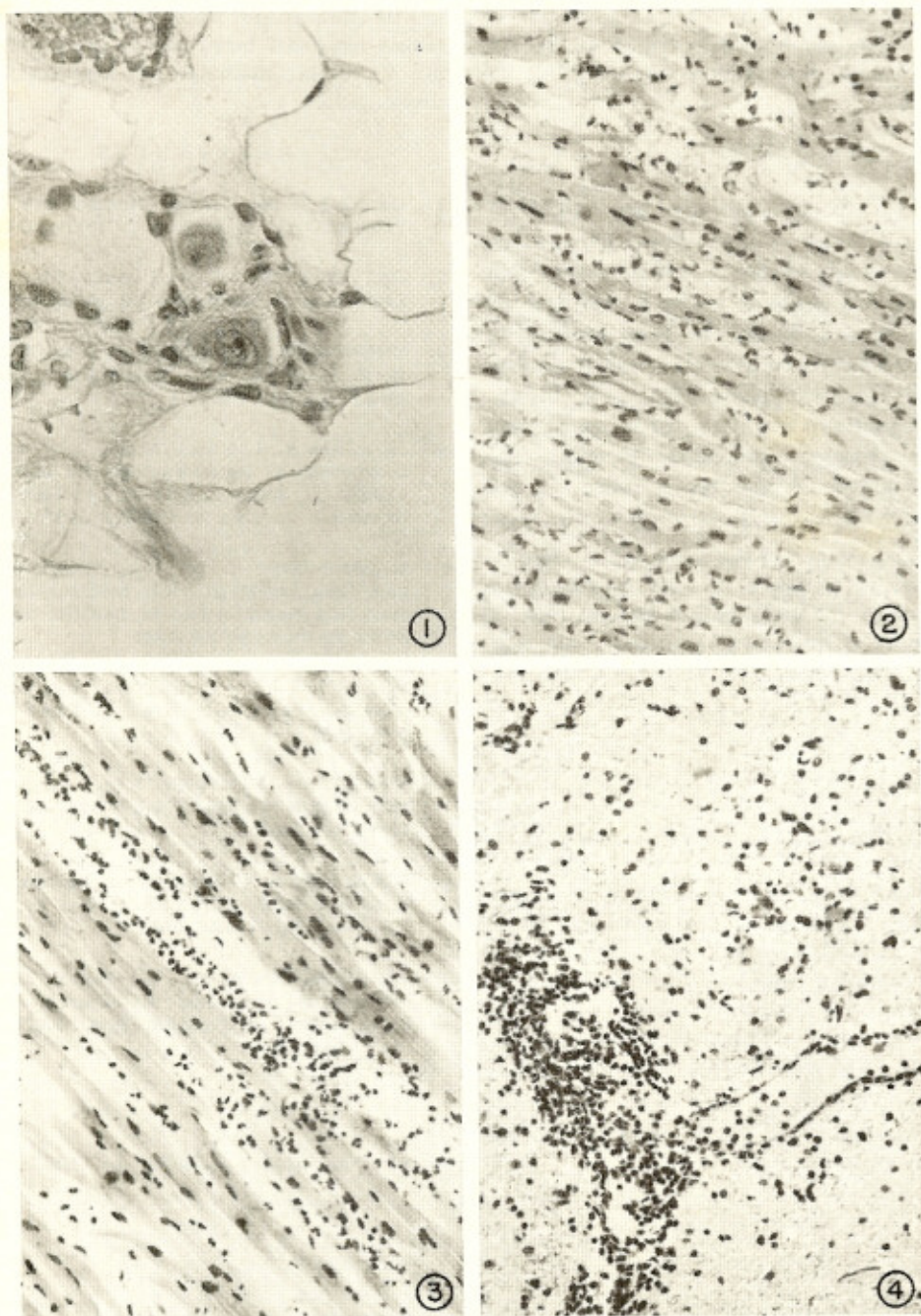
TABLE II



Myocarditis was seen in ten cases and in three of them was accompanied by an inflammatory involvement of the cardiac parasympathetic ganglia. In one of such cases Negri body was seen in one of the neurons (Fig. 1).

The myocarditis was focal and characterized by edema and collections of inflammatory cells, mostly mononuclear cells. Neutrophils were scarce in most of our cases (Fig. 1 and 2). There was focal evidence of acute degeneration of myocardial fibers, among the inflammatory infiltrate. Left ventricle was more commonly involved by the process.

The encephalitis, essentially as described by previous Authors ^(1, 2, 6, 8, 9) was predominant in the cerebral axis (Fig. 4). Negri bodies were well seen in neurons of the Ammon's horn and in Purkinje's cells. However, so called lyssa bodies, appearing as small eosinophilic granules were seen in the cytoplasm of neurons of the cerebral axis, basilar nuclei and even in the cerebral cortex.



- Fig. 1 — Human cardiac neurons, the lower one showing small Negri bodies in the cytoplasm. Modified eosin. 450 X
Fig. 2 — Myocarditis in human rabies. There is interstitial edema and mononuclear infiltrate. H.E., 250 X
Fig. 3 — Myocarditis in human rabies. The inflammatory infiltrate is made up by an admixture of mononuclear cells and neutrophils. Interstitial edema is also seen. H.E., 250 X
Fig. 4 — Encephalitis in rabies. Blood vessels are congested and with a cuff of inflammatory cells, made up of mononuclear cells and few neutrophils. H.E., 250 X

In one case encephalitis was accompanied by extensive cerebral hemorrhage in the left frontal lobe with secondary rupture inside the ventricles.

COMMENTS

In 10 of the 23 necropsied cases (43.5%) of human rabies an interstitial focal myocarditis made up mostly of mononuclear cells was seen. It is highly probable, but it is not proved beyond doubt, the viral etiology of such myocarditis because the virus was never isolated from the heart. However, in one case Negri body was observed in one neuron of the cardiac parasympathetic ganglia. The virus could reach the heart either via the vagus nerves or during the stage of viraemia.

The importance of the myocarditis must be regarded as secondary if one considers the intensity of the encephalitic process, but it could play an important and so far not adequately investigated role at the terminal stages of the disease.

RESUMO

Miocardite na raiva humana

Em 43,5% de casos de necropsia de raiva humana foi vista miocardite intersticial focal, provavelmente provocada pela disseminação do vírus para o coração. Entretanto, a prova definitiva só poderá ser obtida pelo isolamento do agente etiológico diretamente do coração, o que não foi conseguido até agora.

Em um dos casos, no entanto, foi encontrado corpúsculo de Negri em neurônio do plexo nervoso cardíaco.

Esta miocardite poderá ter certa importância nas fases terminais da raiva, um fato até o presente momento não adequadamente investigado.

REFERENCES

1. CASTRO, R. M. — Raiva humana. *Rev. Roche, Problemas de Saúde Pública* 19:248-255, 1958.
2. CASTRO, R. M. — Raiva humana. *Rev. Roche, Problemas de Saúde Pública* 19:281-286, 1959.
3. CHEETHAM, H. D.; HART, J. D. & COGHILL, N. F. — Rabies with myocarditis. *Lancet* 1 (7653):921-922, 1970.
4. HORGAN, E. S. & MCKINNON, J. R. M. — A comparison of the mesencephalon and hippocampus as sites of election for Negri bodies in rabies. *H. Hyg.* 37:340-344, 1937.
5. MASSIGNANI, A. M. — Phosphotungstic acid-eosin combined with hematoxylin as a stain for Negri bodies in paraffin sections. *Stain Technol.* 36:5-8, 1961.
6. ROJAS, L. — Ein Beitrag zur pathologischen anatomie der Lyssa. *Arch. f. Psychiat.* 96: 1-23, 1932.
7. ROSS, E. & AMENTROUT, S. A. — Myocarditis associated with rabies. *New Eng. J. Med.* 266: 1087-1089, 1962.
8. SCHAFFER, K. — Beitrage zur Pathologie der Menschlichen Lyssa. *Ztsch. f. Ges. Neurol. u. Psychiat.* 136:547-558, 1931.
9. SCHUCKRU-AKSEL, I. — Weitere untersuchungen zu Histologie des Gehirns bei der Lyssa. *Arch. f. Psychiat.* 104:469-472, 1935.

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