Rev. Inst. Med. trop. São Paulo
27(3):145-149, *maio-junho*, 1985

UDC 616.988.21

CARDIAC INVOLVEMENT IN HUMAN RABIES

CASE REPORT

Carlos Floriano de MORAIS (1) and Raimunda Violante Campos de ASSIS (2)

SUMMARY

A case of human rabies with cardiac involvement and viral inclusion bodies in the heart is presented. The Negri bodies were found in the Schwann cells of the right epicardial atrium, with secondary mononuclear cells inflammation. In the myocardium, an interstitial edema, proliferation of Anitschkov and rare mononuclear inflammatory cells were seen. There was no relevant cardiovascular signs or symptoms. The rarity of histological descriptions of Negri bodies in the heart is stressed, as well as the importance of cardiac involvement as a potential complication for cases with life prolonged by intensive care units, or in the end-stages of the disease.

INTRODUCTION

Clinical and/or pathological heart involvement in human rabies has been already reported in few cases (revised by WARRELL[11]). The cause of death was not the cardiac lesions, but encephalitis; however, probably they play an important role in the end-stages of the disease, or in cases with a more prolonged evolution in intensive care units which may prolong life up to 133 days (ARAUJO et al.[1]; BHATT et al.[2]; CHEETHAN & HART[3]; EMMONS et al.[5]; RUBIN et al.[10]; WARRELL[11]). Furthermore, there are descriptions of human rabies cases with recovery, stressing the importance of occasional complications and their future prevention (HATTWICK et al.[6]).

Among the cases showing myocarditis, just one had Negri bodies in the heart; the viral inclusion bodies were in a parasympathetic cardiac neuron, associated with inflammatory cells (ARAUJO et al.[1]).

This paper reports another case of human rabies with cardiac involvement and the presence of viral inclusion bodies in the atrial nervous branches.

CASE DESCRIPTION

A.M.S., a 12 years-old white boy who came from Araguari, Minas Gerais State (M.G.), Brazil. Six days before admission he had a sudden episode of fever, malaise and psychomotor agitation treated symptomatically, without improvement. Two days after appeared dysphagia with refusal of fluids and food. He was first admitted in Hospital of the University of Uberlândia, M.G., where the clinical diagnosis of rabies was established. The cerebrospinal fluid examination demonstrated 100 cells, with absolute predominance of mononuclear cells. The clinical picture persisted together with intense excitation, psychic and behavioral disturbances, hydrophobia and aerophobia. In this occasion, six days after the first symptom, he was transferred to the "Hospital das Clínicas" of the São Paulo University, Medical School.

From the Department of Pathology, São Paulo University Medical School, São Paulo Brazil
(1) Resident in Pathology
(2) Assistant resident in medicine

The pulse was 70/min. and mean blood pressure 7x6 cm Hg; there was excessive salivation and dehydration. The neurological examination demonstrated somnolence, psychic confusion, blurred voice, dysarthria, stiff neck and generalised clonic moviments at the least stimulation; no motor deficits could be found. There was no cardiovascular abnormalities besides the hypotension.

In the next 48 hours the disease progressed to total areflexia, probably with brain stem damage, inferred by the appearing of apnea, and death. The family informed that the patient used to go to a farm in whose house lived bats; he had also been bitten by a dog two months earlier, without information on neither the animal health condition nor the injury site.

At autopsy, fragments of cerebellum were used both for rabies virus demonstration, through specific immunofluorescent (Instituto Pasteur of São Paulo) and biological assay in mice with positive results.

The brain weighed 1.574 g, was edematous and congested with flattened and broad convolutions in the right frontal side a perforating lesion was seen, due to trepanation for intracranial pressure control. The microscopical study showed a moderate degree of mononuclear inflammatory cells around vessels and necrotic or degenerating neurons, together with a few neutrophils. Many of these neurons had cytoplasmatic Negri bodies (Fig. 1). Such alterations were more intense in brain stem, basal ganglia and hypothalamus. The meninges were grossly whitish and the histopathological examination showed an intense neutrophilic inflammatory response, mainly around the trepanation area.

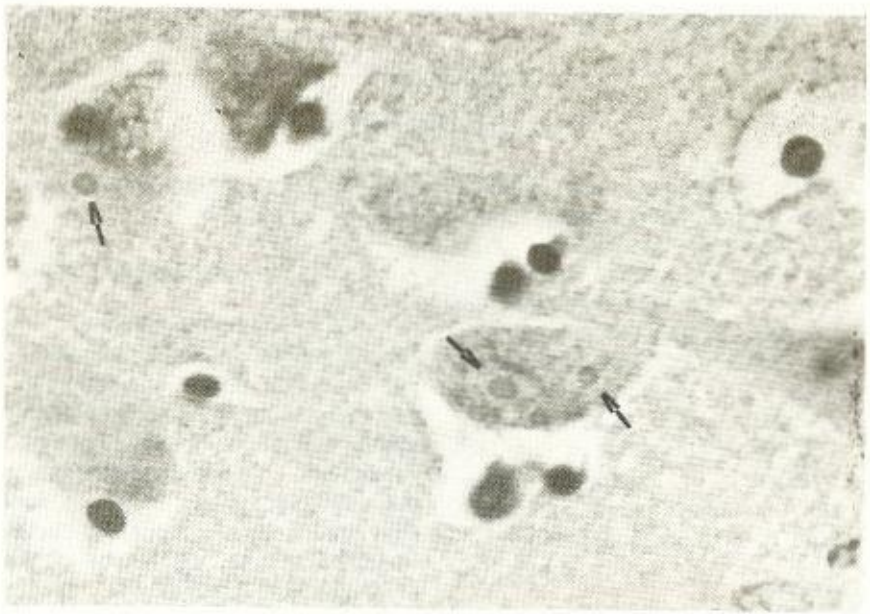

Fig. 1 — Negri bodies (arrows) in hippocampal neurons. HE, x 400

The heart and other organs were grossly normal. In the myocardial interstitium a moderate degree of edema, hyperplasia of Anitschkov cells, few mononuclear inflammatory cells, absence of cardiac fiber necrosis and a few neutrophils were seen (Fig. 2). Around the right atrial parasympathetic nervous branches mononuclear cells were numerous and the ganglionar cells showed retraction and picnotic nuclei (Fig. 3). In the cytoplasm of Schwann cells Negri bodies could be found (Fig. 4). In the adrenal medulla an intense mononuclear cell inflammatory response was also found, without necrosis or viral inclusion bodies.

DISCUSSION

There are few clinico-pathological reports of cardiac involvement in the course of human

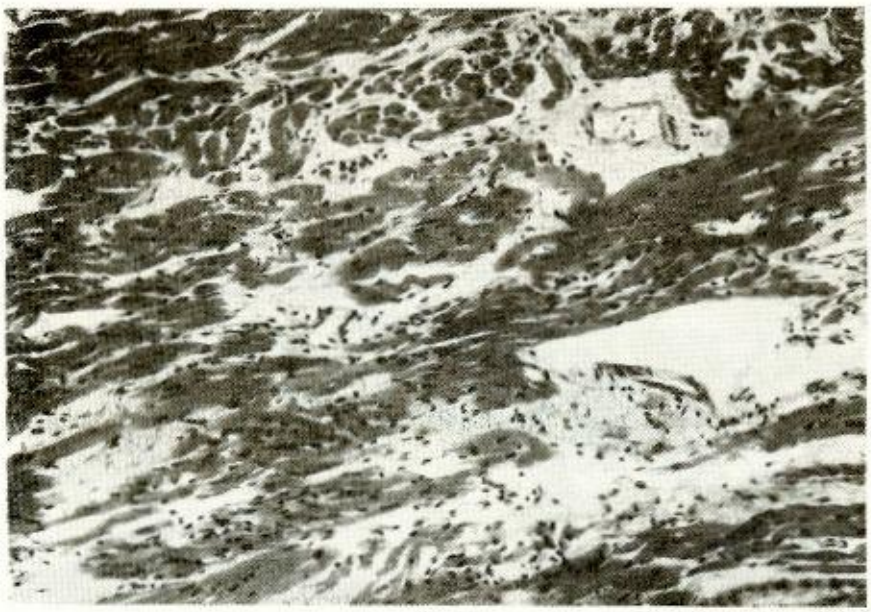

Fig. 2 — Myocardial interstitium with edema, hyperplasia of Anitschkov cell and a few mononuclear cells. HE, x 160

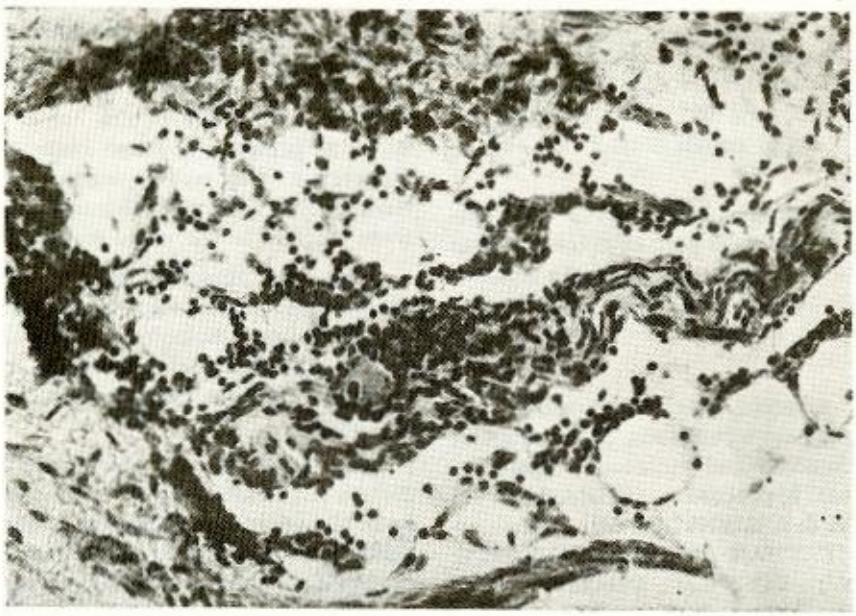

Fig. 3 — Mononuclear inflammatory cells in a small right atrial parasympathetic nervous branch. HE, x 160

rabies in patients without previous heart diseases (ARAUJO et al.[1]; CHEETHAN & HART[3]; ROSS & ARMENTROUT[8]; ROUX et al.[9]; WARRELL[11]).

The incidence of histopathological lesions is variable; ARAUJO et al.[2] found focal interstitial myocarditis in 43.5% of 23 human cases. On the other hand, ROUX et al.[9], studying 11

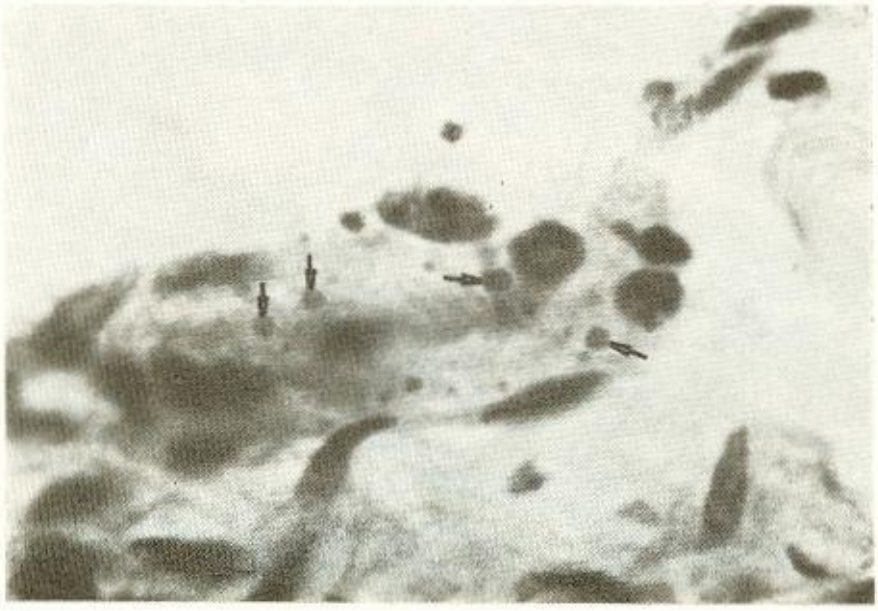

Fig. 4 — Negri bodies (arrows) in the cytoplasm of Schwann cells of right atrium. They have a peri-nuclear clear halo and show a dense core. Modified eosin, x 400

human cases, demonstrated cardiac involvement in all. However, from the microscopic standpoint, the lesions consisted of a variable association of degenerative, congestive and inflammatory alterations frequently mild and focal. A diagnosis of myocarditis could not always be done.

In some series the rabies virus were isolated in the heart or was seen in epicardial nervous cells, allowing the etiology of the myocardial lesions to be ascertained (ARAUJO et al.[1]; DUEÑAS et al.[4]; ROUX et al.[9]; WARRELL et al.[12]).

In many reported cases there were, besides the pathological alterations, cardiovascular signs and symptoms and pulmonary complications such as: hypotension (CHEETHAN & HART[3]; ROSS & ARMENTROUT[8]), cardiac arrhytmias (CHEETHAN & HART[3]; MILLER & NATHANSON[7]; ROSS & ARMENTROUT[8]; ROUX et al.[9]) and inespecific eletrocardiographic alterations (ROSS & ARMENTROUT[8]; WARRELL[11]).

In this case, besides the hypotension, no other clinical alterations were observed. However, an inflammatory response around atrial nervous branches, associated with myocardial interstitial alterations was found. If the patient had survived for a longer period these lesions would probably have became worse and a straighforward picture of myocarditis could possibly be seen. The microscopic cardiac picture was considered due to the rabies virus because of the presence of Negri bodies in the heart; however it was not discarded the possibility that, at least partially, the interstitial alterations were reactive to the acute meningitis.

The data presented reinforce the previous observations on the etiology of myocarditis (or of the histopathological alterations) in the course of human rabies and the rarity of pathological reports describing Negri bodies in the heart.

On the other hand, the finding of Negri bodies in the heart and the inflammatory response in the adrenal medulla are evidences for the dissemination by centrifugal passive transport of rabies genome in axoplasm of peripheral nerves from the central nervous system (MILLER & NATHANSON[7]).

RESUMO

Comprometimento cardíaco na raiva humana Relato de caso

Os Autores descrevem um caso humano de raiva sem dados clínicos que indicassem com-

prometimento cardíaco. No entanto, ao exame microscópico do coração, à necrópsia, foi evidenciado infiltrado inflamatório ao redor de ramúsculos nervosos do epicárdio do átrio direito, ao lado de corpúsculos de Negri intra-citoplasmáticos nas células de Schwann. No miocárdio foi verificado edema intersticial, reatividade das células pertencentes ao sistema monocítico-fagocitário e raras células inflamatórias mononucleares. É salientada a raridade de descrições semelhantes, bem como a importância do envolvimento cardíaco como potencial complicação para os casos submetidos a tratamento intensivo e, portanto, com evolução mais prolongada, ou nos estágios finais da doença.

ACKNOWLEDGEMENTS

The Authors thank Dr. Thales de Brito for the orientation and text review and Ms. Ivany Tavares da Silva for the photographic work.

REFERENCES

1. ARAUJO, M. F.; BRITO, T. & MACHADO, C. G. — Myocarditis in human rabies. **Rev. Inst. Med. trop. São Paulo 13:** 99-102, 1971.

2. BHATT, D. R.; HATTWICK, M. A. W.; GERDSEN, R.; EMMONS, R. W. & JOHNSON, H. N. — Human rabies. Diagnosis, complications and management. **Am. J. Dis. Child 127:** 862-869, 1974.

3. CHEETHAN, H. D. & HART, J. — Rabies with myocarditis. Two cases in England. **Lancet 1** (7653): 921-922, 1970.

4. DUEÑAS, A.; BELSEY, M. A.; ESCOBAR, J.; MEDINA, P. & SANMARTIN — Isolation of rabies outside the human central nervous system. **J. Infect. Dis. 127:** 702-704, 1972.

5. EMMONS, R. W.; LEONARD, L. L.; DE GENARO, F.; PROTAS, E. S.; BAZELEY, P. L.; GIAMMONA, S. T. & STURCKOW, K. — A case of human rabies with prolonged survival. **Intervirology 1:** 60-72, 1973.

6. HATTWICK, M. A. W.; WEIS, T. T.; STECHSCHULTE, C. J.; BAER, G. M. & GREGG, M. B. — Recovery from rabies: a case report. **Ann. Intern. Med. 76:** 931-942, 1972.

7. MILLER, A. & NATHANSON, N. — Rabies — Recent advances in pathogenesis and control. **Ann. Neurol. 2:** 511-519, 1977.

8. ROSS, E. & ARMENTROUT, S. A. — Myocarditis associated with rabies. Report of a case. **N. Engl. J. Med. 266:** 1087-1089, 1962.

9. ROUX, F.; BOURGEADE, A.; SALAUN, J. J.; BONDURAND, A.; ETTE, M. & BERTRAND, E. — L'atteinte cardiaque dans la rage humaine. **Coeur Med. Inter. 15:** 37-44, 1976.

10. RUBIN, R. H.; SULLIVAN, L.; SUMMERS, R.; GREGG, M. B. & SIKES, R. K. — A case of human rabies in Kansas: epidemiologic, clinical and laboratory considerations. **J. Infect. Dis. 122:** 318-322, 1970.

11. WARRELL, D. A. — The clinical picture of rabies in man. **Trans. Roy. Soc. Trop. Med. Hyg. 70:** 188-195, 1976.

12. WARRELL, D. A.; DAVIDSON, N. M.; POPE, H. M.; BAILIE, W. E.; LAWRIE, J. H.; ORMEROD, L. D.; KERTESZ, A. & LEWIS, P. — Pathophysiologic studies in human rabies. **Am. J. Med. 60:** 180-190, 1976.

Recebido para publicação em 5/9/1984.