Clinical and epidemiological characteristics of visceral leishmaniasis in children hospitalized at a reference university hospital in the north of Minas Gerais, Brazil

Características clínicas e epidemiológicas da leishmaniose visceral em crianças internadas em um hospital universitário de referência no norte de Minas Gerais, Brasil

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Abstract

Objective: To describe the clinical and epidemiological characteristics and treatment of children admitted with visceral leishmaniasis (VL) to a reference university hospital in the northern part of Minas Gerais, Brazil. **Methods:** Retrospective study and documentation of children aged 0 to 12 years admitted with a diagnosis of VL at the University Hospital Clemente de Faria, Montes Claros, MG. Records for the period between January 2006 and December 2007 were analyzed. **Results:** We identified 51 children with VL, of which 51% were female, and 74.5% were under 5 years of age. Children came from Montes Claros (31%), 20 municipalities in the north of the state of Minas Gerais (69%), urban areas (72.5%), and rural areas (21.6%). The main clinical manifestation was fever (96.1%) and major clinical findings at admission were splenomegaly (98%) and hepatomegaly (94%). The treatment of choice was Glucantime (70.6%), Conventional Amphotericin B (13.7%), Liposomal Amphotericin B (2%), and Glucantime associated with Amphotericin B (15.7%). Infections developed during hospitalization in 35.4% of cases, and of those, 11.8% were skin infections. The average length of hospitalization was 19 days (SD = ± 5.4); 96.1% children received medical discharge and 3.9% progressed to death. **Conclusions:** From the clinical and epidemiological characteristics identified in the study, more effective monitoring by healthcare workers is recommended, aiming at early recognition and appropriate treatment of the disease and its complications.

Keywords: Leishmaniasis. Epidemiology. Child.

Resumo

Objetivo: Descrever as características clínicas e epidemiológicas e o tratamento das crianças internadas com leishmaniose visceral (LV) em hospital universitário de referência no norte de Minas Gerais, Brasil. **Métodos:** Estudo retrospectivo e documental de crianças de 0 a 12 anos internadas com diagnóstico de LV no Hospital Universitário Clemente de Faria, Montes Claros, MG. Foram analisados os prontuários referentes ao período de janeiro de 2006 a dezembro de 2007. **Resultados:** Foram identificadas 51 crianças com LV, sendo 51% do sexo feminino e a faixa etária de maior incidência da doença foi em menores de 5 anos (74,5% dos casos). Verificou-se que 31% dessas crianças residiam em Montes Claros e 69% procediam de 20 municípios do norte de Minas Gerais, dos quais 72,5% eram originárias da zona urbana e 21,6% da zona rural. A principal manifestação clínica foi a febre (96,1%) e os principais achados clínicos na admissão foram esplenomegalia (98%) e hepatomegalia (94%). O tratamento de escolha foi Glucantime (70,6%), Anfotericina B convencional (13,7%), Anfotericina B lipossomal (2%) e Glucantime associado a Anfotericina B (15,7%). 35,4% dos casos Desenvolveram processos infecciosos durante o período da internação, destacando-se as infecções de pele em 11,8%. O tempo de permanência hospitalar médio foi de 19 dias (DP = ±5,4), 96,1% receberam alta médica e 3,9% evoluíram para óbito. **Conclusões:** A partir das características clínicas e epidemiológicas identificadas no estudo, sugere-se uma observação mais eficaz por parte dos profissionais de saúde, visando ao reconhecimento precoce e tratamento adequado da doença e suas complicações.

Palavras-chave: Leishmaniose. Epidemiologia. Criança.

Introduction

Visceral leishmaniasis (VL) is an endemic parasitic disease from America which is among the seven priorities of the World Health Organization (WHO)[1]. It is estimated to have 500,000 new cases e 50,000 deaths a year in the world, with increasing numbers[2]. In America, Brazil represents the country with the biggest endemy, responsible for about 97% of all cases in the continent[3]. The disease shows endemic cases notified in at least 19 Brazilian states, distributed in four of the five regions, only the South region with no cases.

It is a systemic disease caused by a protozoan of the gender *Leishmania,* which reproduces itself inside the mononuclear phagocyte system of host susceptible mammals. In Brazil, the main vector is *Lutzomia Longipalpis*. In residence environments, the domestic dog is the most important host, and the man is the final host[4].

An important change on the epidemiologic pattern of VL has been verified: taken as a rural disease, it has been shown an urbanization process, being expanded to medium sized and big cities, mainly in Southeast and Middle West regions[5].

The susceptibility is universal, reaching people with any age or sex. Although in Brazil the disease reaches specially children mainly in the first six years of their lives[3]. The importance of VL in our country is due to its high incidence, wide distribution and the potential to cause serious injury and death when it is combined with malnutrition and simultaneous infections[4].

The University Hospital Clemente Faria (HUCF) is the only reference public hospital for the Public Health System (Sistema Único de Saúde) on the treatment of VL, attending patients from the whole North area of Minas Gerais. On this context, it was proposed as the objective of this study to describe the clinical and epidemiologic characteristics of hospitalized children diagnosed with VL.

Materials and Methods

This paper is an exploratory, descriptive

and transversal study of quantitative approach. The research was submitted to the Comitê de Ética e Pesquisa da Universidade Estadual de Montes Claros, being approved by the permission (Parecer Consubstanciado) n° 745/07.

The data about 51 patients from zero to twelve years old hospitalized and diagnosed with VL at HUCF from January 2006 to December 2007 were studied. The data were obtained from records available by the Medical and Statistical File Service (Serviço de Arquivo Médico e de Estatística) and the compulsory notification records from Epidemiologic Surveillance Center (Núcleo de Vigilância Epidemiológica) from HUCF. The instrument to collect data was made by researchers, using a standard form, with the following information: age, sex, kind of hospital admittance, reason, basic infrastructure, symptoms related, clinical data, laboratory exams and treatment.

To interpret the data, leucopenia was considered when the amount of white blood cells was below 5,000/mm^3 and thrombocytopenia when the amount of platelets was below 150,000/mm^3. Anemia was defined with quantity of hemoglobin bellow 11g/dl for patients between 6 months and 5 years old, bellow 11.5g/dl between 5 and 9 years old, bellow 12 g/dl for female teenagers and 12.5 g/dl for male teenagers[6].

The data were consolidated using the program Statistical Package of Social of Science (SPSS) 13.0 version, which allowed a descriptive statistical analysis of the study.

Results

Data from 51 patients were analyzed, 17 (33,3%) of them hospitalized in 2006 and 34 (66,7%) in 2007, and 47 (92.2%) were pro-infection cases and 4 (7.8%) relapse. The age with more cases of VL was bellow 5 years old (78.4%), in which 51% were female children (Table 1).

Among the house characteristics, the absence of line water and sanitary sewage were noticed in 23.5% and 31.4%, respectively. Verifying the city where the person got the disease, it was noticed that 31% of children lived in Montes Claros and 69% came from other 20 towns from the north of Minas Gerais. Furthermore, it was noticed that 72.5% of the cases were originated in the urban area, 21.6% from the rural area, and 5.9% didn't have this information in the records.

Among the clinical manifestations shown by the children in the study, fever was the main reason to make the people in charge of the children look for medical assistance (96.1%). Beyond fever, the increase in the abdominal area (49%) and loss of appetite (33.3%) were the most frequent symptoms, followed by cough (21.6%) pallor (15.7%), pain in the abdomen (17.6%), loss of weight (19.6%) and asthenia (11.8%). The main findings on the clinical exams for admission were splenomegaly in 98% of cases, hepatomegaly (94.1%), pale skin (2%) edema (15.7%), jaundice (3.9%) and shortness of breath (2%).

According to the hematological data at the moment of the admission, the average level of hemoglobins was 7.12g/dl, varying from 2.30 to 12.80 g/dl. The average quantity of white blood cells was 4,668/mm^3, varying from 1,100 to 17,000/mm^3. The average quantity of platelets was 82,578/mm^3, varying from 14,000 to 274,000/mm^3.

It was noticed that direct microscope exam from collected stem cells was made in 36 patients, however it was possible to obtain a result only in 25 cases, in which 56% were considered positive, 44% negative. The method of immunofluorescence assay (RIFI), considered positive para títulos acima de 80, was made in 34 (67%) of cases – 59% positive and 41% negative. The test with the tape with the antigen rK39, known as Teste Rápido Anticorpo Anti-*Leishmania Donovani* – TRALd, was made in 48 (94%) of the cases in the research. 100% were considered positive.

The chosen treatment for VL was Antimoniato de N-metil glucamina (Glucantime) in 70.6% of cases, having one of the patients shown cardiotoxicity to the drug, taken lipossomal Amphotericin B as a second choice. Conventional Amphotericin

Table 1 - Socio-demographic characteristics of children hospitalized with a diagnosis of visceral leishmaniasis in HUCF, from january 2006 to december 2007.

Socio-demographic characteristics	n	%
Admission type		
Pro-infection	47	92,2
Relapse	4	7,8
Sex		
Female	26	51,0
Male	25	49,0
Age		
≤5 years	40	78,4
>5 years	11	21,6
Origin		
Urban Área	37	72,5
Rural Area	11	21,6
Uninformed	3	5,9
Basic Infrastructure		
Sanitary sewage		
Yes	31	60,8
No	16	31,4
Uninformed	4	7,8
Piped water		
Yes	34	66,7
No	12	23,5
Uninformed	5	9,8

Note: Absolute values and percentages of each variable of the table are, respectively, 51 and 100%.

B was taken as the first choice in 13.7% of cases. We used Glucantime associated with Amphotericin B in 15.7% of the hospitalized children.

During the period in the hospital, 35.4% developed infectious processes. Among them, the skin infections were highlighted in 11.8%, followed by infections in the urinary system (9.8%), pneumonia (7.8%), oral cavity infection (2%), and sepsis (2%) and not identified infections (2%). Furthermore, it was noticed that one patient had intestinal hemorrhaging, progressing to septicemia and death.

Discussion

The frequency of the disease in children bellow 5 years old verified in this study was also noticed in Cardoso[7], in which 78% of children with VL were under 6 years old and Brustolini[5], in which the disease prevailed in 69.9% of children with 5 years old or less.

In this part, both male and female children were equally affected by the disease, which disagrees with most of the literature findings, where male is shown as more susceptible to the disease [5, 8, 9], reason not absolutely clear, affirming an existence of a hormonal factor linked to sex or exposition[10].

The number of towns with records of VL confirms that, taking other cities as example, it is a disease in expansion in the north of Minas Gerais and also presents a strong tendency to urbanization, fact already hi-

ghlighted by many authors [4,9,11].

According to Monteiro et al[12], in Montes Claros we find a typical and adequate environment for cases of VL. The houses are, most of them, extremely poor, with poor trash collect service and basic sanitation. In some areas, many people have low income and social level, live with domestic animals, resulting in accumulated organic substances, making favorable conditions for the transmission and occurrence of the disease. These aspects are also quoted in Sherlock[13] studies, who observed, in Bahia and other regions of the country, that poverty, malnutrition, the great number of infected dogs and the big density of phlebotominae inside the house and in the periphery of the house, they are associated with the big number of domestic animals, very bad sanitary conditions and low income and social level.

The clinical manifestations presented by the children in the study were not different from the ones usually found in the literature, for the symptoms related by the ones in charge of the child and for the physical signs in the admittance. In our sample, the fever was the biggest reason to look for medical assistance, similar data found by Pedrosa, Da Rocha[14], Rey et al[15], Oliveira et al[16].

The findings in the clinical exams in the admittance showed that the increase in the liver and spleen, and pale skin were the most frequent signs, also related in other studies[3, 6, 17].

The analysis of the blood count showed evidence that in the admittance of 98% of children showed anemia, 96% thrombocytopenia, 74% leucopenia. Similar findings were documented in other studies about children with VL by Cardoso[7], in which was shown that 100% of children had anemia at the moment of the admittance, 96% thrombocytopenia, 78% leucopenia, and by Brustolini[5], in which anemia was diagnosed in more than 90% of cases of children with Kala-azar, more than 90% had thrombocytopenia, and 80% showed leucopenia.

Related to the parasitological diagnose, it must be taken into consideration that more than 31% of results of the collected stem cells were not registered in the studied records, factor that shows the need of the valorization of the records by the health professionals, becoming available the data for future researches, and consequently, more reliable results. In Brazil, the positivity of direct microscope exam in pediatric patients has been related varying from 69.3% to 81.2% [6].

Among the serology tests done, we verified that in 17 cases records on the usage of RIFI were not found, being it the most used serology reaction used on the diagnose of VL, which sensitivity varies from 55 to 96% and the specificity is related around 70 to 98% [19]. The results found in the usage of TRALd, approached by some authors as the most potent and promising serologic test[20], were similar to those found in other literatures, reaching the sensitivity from 95% to 100%.

The infectious processes identified reflect the susceptibility of the child to infections[21]. For Santos et al[20], the bacteria co-infection is associated to the immunodepression caused by VL, thus as low is the cellular answer of the patient lower will be the specific therapeutic answer and higher will appear other infections.

The pentavalent antimonial was the most used drug in the treatment of children of this study and continues the most suitable for the usage in children, because they cause not so aggressive effects, usually reversible, and they are very efficient[5].

Conclusion

The obtained results suggest that VL is widely distributed in the North of Minas Gerais, showing the region as an important endemic area. Thus, the production of data or information about the clinical and epidemiologic characteristics identified in the study suggests a more efficient observation by the health professionals, aiming at early recognition and appropriate treatment of the disease and its complications, aiming at decreasing the infantile death and hospitalization of children because of VL.

Furthermore, the results found demand from the affected towns an epidemiologic analysis in the areas where it happens, so the right controlling measures can be done by the respective organization. Among these measures, we recommend: active search of sick people and send them to diagnostic and treatment; canine serologic inquiry; collection and elimination of infected dogs; systematic insecticide sprinkling in the houses and peripheral areas and communitarian educational programs[4].

There must also be specialization for the health professionals to make the community be aware of the importance of preserving the environment and how to avoid the proliferation of the vector, aiming at decreasing the transmission of VL in these regions.

Referências

1. Duarte MIS. Leishmaniose visceral. In: Filho GB. *Patologia*. 6ª ed. Rio de Janeiro: Guanabara Koogan; 2000. p. 1215-1227.

2. Desjeux P. Leishmaniasis: current situation and new perspectives. *Comp Immunol Microbiol Infect Dis* 2004; 27: 305-18.

3. Pastorino AC, Jacob CMA, Oselka G, Carneiro-Sampaio MMS. Leishmaniose visceral: aspectos clínicos e laboratoriais. *J Pediatr* 2002; 78(2): 120-7.

4. Brasil, Ministério da Saúde. Secretaria de Vigilância em Saúde. *Manual de Vigilância e controle da Leishmaniose visceral*. Brasília, DF: Ministério da Saúde; 2006.

5. Brustoloni YM. *Leishmaniose visceral em crianças no Estado de Mato Grosso do Sul, Brasil: contribuição ao diagnóstico e ao tratamento* [tese de doutorado]. Campo Grande: Universidade Federal de Mato Grosso do Sul; 2006.

6. Queiroz MJA, Alves JGB, Correia JB. Leishmaniose visceral: características clínico-epidemiológicas em crianças de área endêmica. *J Pediatr* 2004; 80: 141-6.

7. Cardoso VV. *Manifestações clínicas, laboratoriais, e a função dos fagócitos em crianças com leishmaniose visceral tratadas com glucantime* [dissertação de mestrado]. Brasília: Universidade de Brasília; 2007.

8. Correa JB. *Epidemioly of Visceral Leishmaniasis in Pernambuco, Northeast of Brazil and the use of a Latex Agglutination Test in Urine for its Diagnosis* [thesis for the Degree of Master of Tropical Pediátricas] Liverpool School of Tropical Medicine: Liverpool; 1998.

9. Brasil. Ministério Nacional de Saúde. Fundação Nacional de Saúde (FUNASA). *Controle, diagnóstico e tratamento da leishmaniose visceral (calazar): Normas Técnicas*. Brasília: Ministério Nacional da Saúde; 1999.

10. Costa HNC, Pereira HF, Araújo MV. Epidemia de leishmaniose visceral no estado do Piauí, Brasil 1980-1986. *Rev Saúde Púb*lica 1990; 24(5): 361-72.

11. Miranda, Gabriella Morais Duarte. *Leishmaniose visceral em Pernambuco: a influência da urbanização e da desigualdade social.* [dissertação de mestrado]. Recife: Fundação Oswaldo Cruz; 2008.

12. Monteiro EM, França-Silva JC, Costa RT, Costa DC, Barata RA, Paula EV et al. Leishmaniose visceral: estudo de flebotomíneos e infecção canina em Montes Claros, Minas Gerais. *Rev Soc Bras Med Trop* 2005; 38 (2): 147-52.

13. Sherlock IA. Ecological interactions of visceral leishmaniasis in the State of Bahia. *Memórias do Instituto Oswaldo Cruz* 1996; 91: 671- 83.

14. Pedrosa CM, Da Rocha EM. Aspectos clínico-epidemológicos da leishmaniose visceral em menores de 15 anos procedentes de Alagoas, Brasil. *Rev Soc Bras Med Trop* 2004; 37(4): 300-4.

15. Rey LC, Martins CV, Ribeiro HB, Lima AAM. American visceral leishmaniasis (kalazar) in hospitalized children from an endemic area. *J Pediatr* 2005; 81: 73-84.

16. Oliveira AL, Paniago AMM, Dorval MEC, Oshiro ET, Leal CR, Sanches M, et al et al. Foco emergente de leishmaniose visceral em Mato Grosso do Sul. *Rev Soc Bras Med Trop* 2006; 39(5): 446-50.

17. Silva AO, Silva PB, Silva OV, Melo AA, Leite JA, Pinheiro AJ, et al. Leishmaniose visceral no agreste Pernambucano: casos humanos. *Rev Soc Bras Med Trop* 2001; 34(S1): 224.

18. Santos MA, Marques RC, Farias CA, Vasconcelos DM. Indicadores de reposta insatisfatória ao antimônio pentavalente no tratamento da leishmaniose visceral americana. *Rev Soc Bras Med Trop* 2002; 35: 629-33.

19. Tamayo, CO. *Avaliação da co-infecção por Leishmania em pessoas vivendo com HIV/AIDS acompanhadas no Hospital Universitário de Brasília* [dissertação de mestrado]. Brasília: Universidade de Brasília; 2006.

20. Alves WA, Bevilacqua PD. Reflexões sobre a qualidade do diagnóstico da leishmaniose visceral canina em inquéritos epidemiológicos: o caso da epidemia de Belo Horizonte, Minas Gerais, Brasil, 1993-1997. *Cad Saúde Pública* 2004; 20 (1): 259-65.

21. Cladas AJ, Costa J, Aquino D, Silva AA, Barral A. Are there differences in clinical and laboratory parameters between children and adults with American visceral leishmaniases? *Acta Trop* 2006; 97 (3): 525-8.