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Major Article

Epidemiological profile of patients co-infected with visceral leishmaniasis and HIV/AIDS in Northeast, Brazil

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Abstract

Introduction: Visceral leishmaniasis (VL) and human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS) co-infection has been a research topic of interest worldwide. In Brazil, it has been observed that there is a relative underreporting and failure in the understanding and management of this important association. The aim of this study was to analyze epidemiological and clinical aspects of patients with VL with and without HIV/AIDS. **Methods:** We conducted an observational and analytical study of patients with VL followed in a Reference Service in the State of Maranhão, Brazil from 2007-2013. **Results:** In total 126 patients were enrolled, of which 61 (48.4%) were co-infected with HIV/AIDS. There were more males among those with HIV/AIDS (85.2%, $P>0.05$) or with VL only (81.5%, $P>0.05$). These findings significantly differed based on age group ($P<0.003$); the majority of patients were aged 31-40 years (41.0%) and 21-30 years (32.3%) among those with and without HIV/AIDS co-infection, respectively. The incidence of diarrhea and splenomegaly significantly differed between the two groups ($P=0.0014$ and $P=0.019$, respectively). The myelogram parasitic examination was used most frequently among those with HIV/AIDS (91.8%), followed by those with VL only (69.2%). VL recurrences and mortality were significantly higher in the HIV/AIDS co-infected patients ($P<0.0001$ and $P=0.012$, respectively). **Conclusions:** Patients with VL with or without HIV/AIDS co-infection were mostly adult men. Diarrhea was more frequent in HIV/AIDS co-infected patients, whereas splenomegaly was more common in patients with VL only. In the group of HIV/AIDS co-infected patients, there was a higher rate of VL recurrence and mortality.

Keywords: Visceral Leishmaniasis. HIV/AIDS. State of Maranhão.

INTRODUCTION

Visceral leishmaniasis (VL), also known as kala-azar, is a serious public health problem affecting 65 countries worldwide, particularly Bangladesh, India, Sudan, Nepal, and Brazil[1]. VL is caused by protozoa of the genus *Leishmania; Leishmania chagasi* infection which is transmitted to men by infected female sandflies, is common in Brazil[2]. It has few therapeutic options[3], and is lethal in 90% of the untreated cases[4] and up to 5% of treated cases[1].

Since its emergence in Brazil in 1980 to the present day, the human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS), has undergone several changes in its epidemiological determinants. In particular there has been an increase in the number of cases among poor, heterosexual, female, suburban, and rural populations[5-7]. With the advent of highly active antiretroviral therapy, there has been a large increase in the survival of HIV-positive patients, although the efficacy of this therapy depends on the frequency of other co-infections in patients[8]. With the emergence of the HIV/AIDS pandemic, which has spread from big cities to small towns, in conjunction with the urbanization of VL, there have been several cases of VL/HIV co-infection reported globally[9,10]. The first case was recorded in 1985 in Europe, and thereafter cases have been reported in another 35 countries[11]. Studies have shown that infection with HIV has been a facilitating factor for the development of VL in residents of endemic areas[12,13]; HIV increases the risk of infection with VL from 100 to 2,320 times[12]. It has been noted that the proportion of patients with

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VL who are also HIV-infected is between 2-9% in recognized endemic countries, however, this rate may be much higher, given that this disease occurs in neglected populations and is not in the list of opportunistic diseases associated with HIV, thus it is rarely reported[11].

Visceral leishmaniasis and HIV/AIDS are associated and have serious repercussions on the affected patients. Both diseases tend to modify the immune response from Th1 to Th2 via a complex network of cytokines, thus reducing the cell-mediated immunity. This results in ineffective responses to drugs, changes in the diagnostic standards, recurrences, opportunistic infections, and increased mortality rates[2,14,15]. The clinical manifestations of this co-infection are variable, and patients may present classic symptoms, atypical conditions, or may present with opportunistic diseases associated with HIV/AIDS, making early diagnosis more difficult[10,11,15,16].

The most frequently used test for the diagnosis of VL in the presence of VL and HIV/AIDS co-infection has been a bone marrow aspirate (myelogram); this test has a sensitivity ranging between 67-94%[11]. Serological tests have also been used; however, one should take caution when analyzing their results, as the sensitivity might be reduced due to the immunosuppression as a result of both pathologies[15]. The sensitivity of the indirect immunofluorescence reaction (IIFR) for co-infection is 50-60%, which is lower than that for patients without co-infection (80-95%)[10]. The enzyme-linked immunosorbent assay (ELISA) has also been used, with a sensitivity of 76-89% among co-infected[11] patients, while the rapid immunochromatographic test (rk39) has a sensitivity and specificity above 93% in patients without HIV co-infection; in the context of the *Leishmania*-HIV co-infection, there is insufficient studies on the use of rk39[10].

The drug most widely used in the treatment of VL for those co-infected with HIV/AIDS is liposomal amphotericin B, given its improved tolerance, shorter treatment duration, and the lower incidence of adverse events reported in immunocompromised patients. However, the efficacy of liposomal amphotericin B is similar to other commonly used drugs, such as amphotericin B and pentavalent antimony[16-21]. The biggest obstacle in the use of liposomal amphotericin B, as well as other lipid treatment preparations, is the high price of treatment[16,17].

In Europe, it has been determined that the main risk factor for HIV/AIDS and VL co-infection is the sharing of syringes[1]. In Brazil, infection transmission via syringes has been reported, however, this association was not significant[2,22]. According to data from the Notifiable Diseases Information System [*Sistema de Informação de Agravos de Notificação* (SINAN)], from January 2007 to August 2013, Maranhão has the sixth highest number of HIV/AIDS and VL co-infected patients in Brazil, after Ceará, Minas Gerais, Piauí, Mato Grosso do Sul, and São Paulo[23]. Therefore, the Ministry of Health recommends that patients with a positive serology for HIV are screened for hepatomegaly or splenomegaly with or without fever and cytopenia. Additionally, they recommend that patients with visceral or cutaneous leishmaniasis should have serum testing for HIV performed regardless of age[10].

Although the VL/HIV/AIDS co-infection is increasingly present in Brazil, there is national shortage of studies on the clinical and epidemiological characteristics of the patients affected by these diseases[6]. This is particularly the case in the State of Maranhão, despite the high prevalence rate of co-infected patients and significant number of deaths compared to the other federal units. Thus, the aim of this study was to analyze epidemiological and clinical aspects of patients with VL with and without HIV/AIDS co-infection.

METHODS

We conducted an analytical observational study using medical records and notification forms of patients diagnosed with VL with and without HIV/AIDS, who were admitted in a Reference Hospital for Infectious and Parasitic Diseases in the State of Maranhão from January 2007 to November 2013.

The enrolled patients consisted of those with a concomitant diagnosis of VL and HIV/AIDS and those with VL only. The demographic and clinical characteristics of the two groups were compared, investigating the following variables: gender, age group, residence, occupation, initial treatment regimen, diagnostic methods for VL and HIV/AIDS, clinical manifestations (splenomegaly, hepatomegaly, asthenia, hemorrhagic phenomena, diarrhea, edema, jaundice, weight loss, and fever), recurrences, and deaths. Recurrences of VL were defined as cases in which there was return of VL signs and symptoms up to 12 months after treatment completion, according to the Brazilian Ministry of Health[24]. Anemia, leukopenia, and thrombocytopenia were defined as hemoglobin values below 10g/dL, 3,000/mm^3, and 120,000/mm^3, respectively.

There were only 38 HIV/AIDS co-infected patients with complete tests for blood counts, viral loads, and cluster of differentiation 4 (CD4) cell counts that were performed at the diagnosis of VL among patients co-infected with HIV/AIDS; thus, a sub-analysis was conducted for this subset of patients. As for the patients with VL only, there was no available biochemical or immunological records.

Visceral leishmaniasis was diagnosed using the following: bone marrow aspirate tests showing amastigote forms of the parasite (myelogram), indirect immunofluorescence reaction tests, and immunochromatographic tests using the recombinant antigen rK-39 (rapid test). The bone marrow aspirate tests were performed in an appropriate room in the Hospital in which the research was carried out and they were examined by the same medical professional. The serological test conducted for the diagnosis of VL was mostly IIFR, while the rapid test (rK39) was performed for a few patients. IIFR, manufactured by Manguinhos FIOCRUZ and the Brazilian Ministry of Health, was conducted by the Central Public Health Laboratory of the State of Maranhão [*Laboratório Central de Saúde Pública do Maranhão* (LACEN-MA)]. A positive test result was a dilution with title greater than or equal to 1:80; inconclusive test results were titles equal to 1:40. For inconclusive test results it was recommended that the test be repeated in 30 days[25]. The immunochromatographic test used (rK39, rapid test Kalazar Detected®, produced by InBios International, Seattle, WA, USA) was conducted at the Hospital by a responsible professional. A positive test result was determined by the

presence of two bands 10 minutes after mixing 20 microliters of serum from the patient with two drops of run buffer solution in the location indicated.

Patients were diagnosed with HIV using a screening test (ELISA) and a confirmatory test (Western Blot or Indirect Immunofluorescence Reaction), as was convention up to 2009. From 2009 onward, the Ordinance MS 151 went into effect, which brought the rapid test at a minimum flow chart, anticipating the diagnosis and treatment of patients[26].

Information obtained from medical records and reporting forms were encoded in an Excel database. The results were analyzed using the BioEstat 5.0 and compared using chi-square test (χ^2). *P*-values less than 0.05 were considered statistically significant.

Ethical considerations

This study was approved by the Research Ethics Committee of the University Hospital Presidente Dutra (33/07), and by the Internship and Research Coordination of the State Department of Health (process nº 180800/2013).

RESULTS

In total 126 patients were enrolled in the study, of which 61 (48.4%) subjects had VL with HIV/AIDS co-infection and 65 (51.6%) had VL only. There were no significant differences between the two groups based on sex (*P*=0.57), however there was a predominance of males in both groups (85.2% with HIV/AIDS and 81.5% with VL only) (**Table 1**). The age of those enrolled ranged from 15-69 years among the patients with VL; the median age was 36 years and the standard deviation (SD) was 11.6 years. Among the patients with VL and HIV/AIDS co-infection the age ranged from 3-73 years; the median age was 30 years and the SD was 15.5 years. The median of age was significantly higher in the co-infected group (*P*=0.008) (**Table 1**). Additionally, the age categories significantly differed between the two groups studied (*P*=0.03); the most prevalent age group among the co-infected group was 31-40 years (41%, 25/61), while in the VL only group the most prevalent age group was 21-30 years (32.3%, 21/65). The frequency of individuals below 30 years of age was of 24.6% (15/65) among VL only, and 50.8% (33/61) among VL and HIV/AIDS co-infection (**Table 2**).

There was no significant difference between the two groups (*P*=0.466), in terms of origin; the majority of patients in both groups came from the interior of Maranhão [65.6% and 70.8% of those with and without HIV/AIDS co-infection (**Table 1**)]. The two groups did however significantly differ (*P*=0.0029) based on their occupation; people co-infected with HIV/AIDS most commonly worked in the tertiary sector (services) (45.9%, 28/61), followed by the agricultural sector (19.7%, 12/61), which was the most frequent occupation among those with VL only (50.8%, 33/65) (**Table 1**).

The majority of co-infected patients were heterosexual (74%, 45/61), while 23% (14/61) and 3.3% (2/61) were homosexual and bisexual, respectively. Among those with only VL this information was not available.

The frequency of diarrhea and splenomegaly significantly differed between those with and without HIV/AIDS co-infection (*P*=0.019 and *P*=0.0014, respectively). Diarrhea was more frequent among the HIV/AIDS co-infected patients (67.2% and 41.5% among those with and without HIV/AIDS co-infection, respectively), yet splenomegaly was more frequent among the patients with VL only (78.7% and 95.4% among those with and without HIV/AIDS co-infection, respectively). The other variables studied (fever, paleness, asthenia, hemorrhage, weight loss and hepatomegaly) did not significantly differ between the groups (*P*>0.05) (**Table 3**).

For those co-infected with HIV/AIDS, 30 (49%) patients were tested for HIV/AIDS in the year prior to the diagnosis of VL; the remaining 51% of patients had the diagnosis of both diseases in the same year. There were no records regarding the use of injectable drugs among the co-infected patients. There was a significant difference in the diagnostic tests used for VL (*P*=0.0094) between the two groups. There was a positive myelogram test for 91.8% (56/61) and 69.2% (45/65) of those with and without HIV/AIDS co-infection, respectively. IIFR was positive in 26.1% (17/65) and 13.1% (8/61) of those with and without HIV/AIDS co-infection, respectively; the rapid test was positive in 21.5% (14/65) and 4.9% (3/61) of patients in the respective groups (**Table 1**).

There was a significant difference in the recurrence (*P*<0.0001) and mortality (*P*=0.012) rates between the two groups. The rate of confirmed recurrences was of 31.1% (19/61) among those co-infected with HIV/AIDS; however no patients with VL only experienced reoccurrences. The mortality rates were 13.1% (8/61) and 1.5% (1/65) among those with and without HIV/AIDS co-infection (**Table 1**). There was no significant difference in the recurrence rates for patients based on the types of medications used: amphotericin B deoxycholate, liposomal amphotericin B, lipid complex and glucantime (*P*= 0.922).

Medical records were located for 38 of the co-infected patients; the majority (86.8%) had CD4 count less than 200 cells/mm^3 (median CD4 count of 46 cells/mm^3 [range 2-240 cells/mm^3]), and the HIV-RNA count was above 10,000 copies/ml (92.5%). Anemia, leukopenia, and thrombocytopenia were present in 76.3%, 72%, and 60.5% of co-infected patients (**Table 4**).

DISCUSSION

In the immunocompetent population VL typically onsets during childhood, while for those co-infected with HIV/AIDS VL typically affects young adults, as described by Pintado et al.[27], Alvar et al.[11] and Catorze et al.[22]. However, in the current study we found that VL was prevalent among young adults in both groups analyzed. However, the median of age was significantly higher in the HIV/AIDS co-infected group, as supported by the findings from the studies conducted by Pintado et al.[27] and Hurissa et al.[28].

Men are more affected by both VL[29] and AIDS; however, the number of HIV-positive women is increasingly higher[5]. In the current study, there were more males in both groups; our findings are supported by those previously reported by Souza et al.[15] and Hurissa et al.[28]. Additionally, we found that there were a greater number of patients working in the agricultural

TABLE 1

Demographic and general characteristics of the patients diagnosed with visceral leishmaniasis with or with HIV/AIDS co-infection in São Luis, State of Maranhão, from January 2007 to November 2013.

Variables	**Visceral leishmaniasis**	**Visceral leishmaniasis + HIV/AIDS**			
	n(%)	**n(%)**	**total**	**χ^{2*}**	**p****
Age (years), median ± SD	30 ± 15.5 3 to 73 years	36 ± 11.6 15 to 69 years		7.025	0.0008
Gender				0.311	0.577
female	12(18.5)	9(14.8)	21		
male	53(81.5)	52(85.2)	105		
Occupation				21,97	0.0029
primary sector	33(50.8)	12(19.7)	45		
secondary sector	5(7.7)	8(13.1)	13		
tertiary sector	11(17.0)	28(45.9)	39		
retired	3(4.6)	6(9.8)	9		
Unemployed	1(1.5)	0(0.0)	1		
Student	6(9.2)	4(6.6)	10		
under age	1(1.5)	0(0.0)	1		
Ignored	5(7.7)	3(4.9)	8		
Residency				1,524	0.466
Capital	18(27.7)	21(34.4)	39		
Interior	46(70.8)	40(65.6)	86		
other states	1(1.5)	0(0.0)	1		
Diagnostic test +				11.49	0.0094
myelogram	45(69.2)	56(91.8)	101		
IIFR	17(26.1)	8(13.1)	25		
rapid test (rk39)	14(21.5)	3(4.9)	17		
ignored	1(1.5)	2(3.3)	3		
Initial medication				40.36	<0.0001
glucantime	39(60.0)	26(42.6)	65		
aqmphotericin B deoxycholate	2(3.1)	12(19.7)	14		
liposomal amphotericin B	5(7.7)	22(36.0)	27		
lipid complex	0(0.0)	1(1.7)	1		
ignored	19(29.2)	0(0.0)	19		
Declared recurrences				23,841	<0.0001
yes	0(0.0)	19(31.1)	19		
no	65(100.0)	42(68.9)	107		
Declared deaths				6,358	0.017
Yes	1(1.5)	8(13.1)	9		
no	64(98.5)	53(86.9)	117		
Total	**65(100.0)**	**61(100.0)**	**126**		

HIV/AIDS human immunodeficiency virus/acquired immunodeficiency syndrome; **SD:** standard deviation; **IIFR:** indirect immunofluorescence reaction. *Chi-square. **p-value.

TABLE 2

Distribution of patients diagnosed with visceral leishmaniasis with or without HIV/AIDS co-infection stratified by age group in São Luis, State of Maranhão, from January 2007 to November 2013.

	Visceral leishmaniasis	Visceral leishmaniasis + HIV/AIDS			
Age group (years)	**n(%)**	**n(%)**	**Total**	**χ^{2*}**	**p-value**
≤20	12(18.46)	5(8.2)	17		
21-30	21(32.31)	10(16.39)	31	15.97	0.003
31-40	15(23.08)	25(40.98)	40		
41-50	6(9.23)	16(26.23)	22		
≥51	11(16.92)	5(8.2)	16		
Total	**65(100.0)**	**61(100.0)**	**126**		

HIV/AIDS human immunodeficiency virus/acquired immunodeficiency syndrome. *Chi-square.

TABLE 3

Clinical characteristics of patients diagnosed with visceral leishmaniasis with and without HIV/AIDS co-infection in São Luis, State of Maranhão, from January 2007 to November 2013.

	Visceral leishmaniasis	Visceral leishmaniasis + HIV/AIDS			
Clinical characteristics	**n(%)**	**n(%)**	**Total**	**χ^{2*}**	**p****
Fever				5.188	0.075
yes	61(93.8)	49(80.4)	110		
no	2(3.1)	6(9.8)	8		
ignored	2(3.1)	6(9.8)	8		
Paleness				3.228	0.199
yes	55(84.6)	44(72.1)	99		
no	3(4.6)	7(11.5)	10		
ignored	7(10.8)	10(16.4)	17		
Weakness				4.355	0.113
yes	62(95.4)	52(85.3)	114		
no	1(1.5)	1(1.6)	2		
ignored	2(3.1)	8(13.1)	10		
Weight loss				2.009	0.366
yes	60(92.3)	54(88.5)	114		
no	1(1.5)	0(0.0)	1		
ignored	4(6.2)	7(11.5)	11		
Diarrhea				13.126	0.0014
yes	27(41.5)	41(67.2)	68		
no	27(41.5)	8(13.1)	35		
ignored	11(17.0)	12(19.7)	23		
Hemorrhage				3.632	0.163
yes	14(21.5)	11(18.0)	25		
no	41(63.1)	32(52.5)	73		
ignored	10(15.4)	18(29.5)	28		
Splenomegaly				7.929	0.019
yes	62(95.4)	48(78.7)	110		
no	2(3.1)	8(13.1)	10		
ignored	1(1.5)	5(8.2)	6		
Hepatomegaly				47.011	0.195
yes	52(80.0)	48(78.7)	100		
no	4(6.2)	6(9.8)	10		
ignored	9(13.8)	7(11.5)	16		
Total	**65(100.0)**	**61(100.0)**	**126**		

HIV/AIDS human immunodeficiency virus/acquired immunodeficiency syndrome. *Chi-square. **p-value.

TABLE 4

Completed laboratory tests for 38 patients with visceral leishmaniasis co-infected with HIV/AIDS in São Luis, State of Maranhão, from January 2007 to November 2013.

Laboratory findings	Number	Percentage
Hemoglobine		
≤10g/dL	29	76.3
>10g/dL	9	23.7
Leukocytes		
≤3,000/mm^3	11	28.9
>3,000/mm^3	27	71.1
Platelets		
≤120,000/mm^3	23	60.5
>120,000/mm^3	15	39.5
TCD4+		
≤200 cell/mm^3	33	86.8
>200 cell/mm^3	5	13.2
Viral load		
≤10,000 HIV RNA copies/mL	3	7.9
>10,000 HIV RNA copies/mL	35	92.1
Total	**38**	**100.0**

HIV/AIDS: human immunodeficiency virus/acquired immunodeficiency syndrome; **TCD4+:** cluster of differentiation; **HIV RNA:** human immunodeficiency virus ribonucleic acid

sector among those with VL only while there were a greater number of patients working in the service sector among those co-infected with HIV/AIDS. Our findings indicate a change in epidemiological trends for VL brought about by HIV/AIDS, as previous studies, such as the study by Dantas-Torres[30], showed that the main occupation of patients with VL was farmer.

Just over half (51%) of the co-infected subjects had VL as the first opportunistic infection; the diagnosis of HIV/AIDS was ascertained at the same time as the protozoan infection. Pintado et al.[27] and Souza et al.[15] also found that 46.4% and 55.6% of HIV/AIDS co-infected patients had VL as the first opportunistic infection. These findings reinforce the importance of the recommendation of the Brazilian Ministry of Health to conduct serologies for HIV among all VL patients[10].

The clinical manifestations of VL, including fever, asthenia, splenomegaly, hepatomegaly, hemorrhage, diarrhea and weight loss, were present in both study groups. However, diarrhea was more frequent in the group co-infected with HIV/AIDS and splenomegaly was more frequent among those with VL only. The lower frequency of splenomegaly in the group of co-infected individuals corresponds to the findings from previous studies[11,27]. These findings support the collapse of the macrophage response in these patients, denoting a symptomatology that extends beyond the classical pattern, presenting greater difficulty in the diagnosis of this protozoan infection. Diarrhea caused by gastrointestinal impairment of *Leishmania* is more common among HIV patients with severe immunosuppression; this is an atypical manifestation which occurs in less than 10% of cases based on the findings reported by Catorze et al.[22]. This type of diarrhea should be differentiated from chronic diarrhea caused by HIV; this can be determined using a gastro-intestinal biopsy, however we did not perform such biopsies in our patients.

The most commonly used methods for the diagnosis of VL in HIV/AIDS co-infected patients have been parasitic; this differs from the serological methods used for cases in which VL occurs in isolation[10]. In the current study, serological methods (Indirect Immunofluorescence Reaction and Rapid tests) were preformed less frequently among the HIV/AIDS co-infected patients than among those with VL only. Conversely, the method used most frequently among HIV/AIDS co-infected patients was parasitic confirmation using myelogram, as described in the literature[11].

The Brazilian Ministry of Health recommends the preferred usage of N-methyl-glucamine antimoniate (glucantime) for the treatment of VL; however the preferred treatment for VL among those co-infected with HIV/AIDS is amphotericin B deoxycholate[10]. In our study, the majority of patients in both groups were treated with glucantime, a finding similar to that reported by Gomes et al.[31]. Nonetheless, there was a predilection for treatment with liposomal amphotericin B from 2012, despite the Brazilian Ministry of Health[10] recommendations to use amphotericin B deoxycholate in VL cases co-infected with HIV/AIDS as highlighted in the Recommendations Manual

for patients with *Leishmania*-HIV co-infection. In our study, there was no record of injectable drug use among HIV/AIDS co-infected patients, which leads us to believe that patients contracted the VL vector via . Our findings therefore differ from the European[29] and the Brazilian Midwest[32] contexts in which 78.7% and 34.8% of patients contracted VL due to vector via, respectively.

Of the 38 complete blood tests available for HIV/AIDS co-infected patients at the time of VL diagnosis, the majority (86.8%) of patients had a CD4 cell count < 200 cells/mm^3. Our findings were similar to those reported by Alvar et al.[11], who described that 79-100% of patients had a CD4 count of < 200 cells/mm^3. The median CD4 count of patients enrolled in this study was of 46 cells/mm^3, a figure which is similar to that reported by Oliveira et al.[32] (44.5 cells/mm^3) but different from that reported by Pintado et al.[27] (90 cells/mm^3). Additionally, we found that the viral load was elevated in 92.5% (35/38) of patients, and that 76.3%, 72.0%, and 60.5% of patients had anemia, leukopenia, and thrombocytopenia, respectively. These findings were also common in the studies conducted by Cavalcanti et al.[33] and Hurissa et al.[28]. However, Pintado et al.[27], compared the activity of HIV/AIDS co-infected patients and patients with VL only and observed no significant differences in prevalence of thrombocytopenia, lymphopenia, and leukopenia, even though the data suggested that they were more common among co-infected individuals.

The high rate of immunosuppression among the HIV/AIDS co-infected patients is reflected by the higher failure rates in the treatment and recurrences of VL in co-infected patients[10], a finding which was also observed in the current study. The recurrence rate of VL in this study was significantly higher in the group of HIV/AIDS co-infected patients; it was higher than that reported by Marques et al.[34] (26%) but lower than that reported by Oliveira et al.[32] (56.5%). There was no significant association between the recurrence rates and the medications used including, amphotericin B deoxycholate, liposomal amphotericin B, lipid complex, and glucantime, as confirmed by the literature which has described similar efficacy between medications, although liposomal amphotericin B is associated with minor toxicities[9,18]. Mortality also significantly differed between the groups; there was a higher mortality rate among the HIV/AIDS co-infected patients as was found in the studies conducted by Souza et al.[15], Pintado el al.[27] and Hurissa et al.[28]. Our mortality rates were lower than those reported in a study conducted in Belo Horizonte[(15)] (17%) but higher than those reported by Oliveira et al.[32] (8.7%) and Soares et al.[35] (7.5%). The mortality and recurrence rates reflect the importance of the early detection and treatment of HIV in patients with VL, in order initiate appropriate treatment and prevent mortality.

Our study was subject to some limitations. Data were collected retrospectively from medical records at a Reference Hospital, thus some data were not available. Furthermore, there were only 38 complete blood tests available on blood cell counts, viral loads, and CD4 cell counts performed at the diagnosis of VL among patients co-infected with HIV/AIDS, making it difficult to analyze the data all of these patients.

In conclusion, we found that patients with VL with and without HIV/AIDS co-infection were mostly adult men and from the interior of the state. A majority of patients with and those without HIV/AIDS co-infection were employed in the tertiary and primary sector, respectively. Diarrhea was most common morbidity among the HIV/AIDS co-infected patients, whereas splenomegaly was more common in patients with VL only. Glucantime was the most commonly used medication in both groups. The diagnosis method most widely used for both groups was the myelogram, while the rapid test (rK39) and IIFR were more commonly used in the group with VL only. In the patients co-infected with HIV/AIDS, there was a higher rate of recurrence and mortality.

Conflict of interest

The authors declare that they have no conflicts of interest.

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