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Epidemiological Aspects and Outcomes of Treatment in Patients with Cutaneous Leishmaniasis in Central Iran

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Background & Aims of the Study: Cutaneous leishmaniasis (CL) is one of the re-emerging diseases in many areas of the Eastern Mediterranean region such as Iran. This study was conducted in order to detect the epidemiological aspects and therapeutic outcomes of CL patients in Kahakcounty, Qom province of Iran.

Materials & Methods: In this cross sectional study, clinical diagnosis of the disease was performed, using microscopic observation of the leishmania genus parasite in the ulcer site during 2016. Patients' data of therapeutic outcomes was recorded in epidemiological form of CL. Statistical analysis was done, using SPSS Ver. 16. Chi square and Fisher's exact test were utilized for the assessment of the hypothesis.

Results: From 45 patients, 24 cases (53.3%) were men and 21 (46.7%) were women. Mean age of patients was 29.5 ±19.44. More than 28 % of samples were under 15 years old. The most common locations of ulcer in patient's bodies were hands and feet (78.7%). 20.6% of samples had 3 ulcers and more. The highest prevalence of CL was happened in autumn. All of treated patients fully recovered without delays in treatment, complication or treatment failure.

Conclusions: CL disease has an endemic cycle in villages of Kahak County of Qom province and recently, prevalence of disease has been developing in this region, therefore, we proposed provincial health center staffs must design and implement suitable prevention programs based on health ministry guidelines in order to control of disease. Also, it seems Glucantime is the best and available drug for treating of this disease.

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Background

Leishmaniasis is a human vector borne disease that transmitted by some female's species of phlebotominae sand flies (1). According to previous studies, CL is endemic disease in 98 countries, often developing ones, approximately 350 million humans are living in regions where at risk of acquiring CL. The prevalence of disease in the world is 12 million cases and the incidence of CL diseases is estimated to be two millions people yearly. Three most prevalent clinical forms of CL are Zoonotic Cutaneous Leishmaniasis (ZCL), Anthroponotic Cutaneous Leishmaniasis (ACL) and Visceral Leishmaniasis (VL). They are seen in 14 countries of Eastern Mediterranean Regional Office (EMRO) region (2). Zoonotic CL due to L. major as a causative agent of disease and Anthroponotic CL due to L. tropica parasite are

two known forms of CL which are distributed in the most endemic areas of Iran (3). In total, approximately 17 out of 31 provinces of Iran are considered as endemic foci of ZCL. Official reports of the ministry of health showed that the average incidence rate of the CL is usually between 20 to 40 cases per 1000000; therefore, the prevalence of this disease is increasing and new endemic foci of CL disease are forming in different areas of Iran (4). In recent years, the endemic regions in the central and south western areas of Iran including Yazd, Semnan, Bushehr, Khorasan, Fars, Ilam, Khoozestan and Isfahan with the incidence of more than 150/100000 have the highest rates of CL (4). Some of the CL cases have been reported from the villages of the central county of Qom province since 1999. The most important foci of CL in the province are villages of Qomrood and Ghanavat. In 1999, an outbreak of CL has been happened in Ghanavat region (5). Based on the reports, the prevalence of CL has been increasing in the province in recent years. Locating at the center of Iran, Qom is the passageway of more than 17 provinces. Each year more than 14 million passengers travel to or passing through this province; about 2 million of them are pilgrims who may stay for a while in the city. This traffic jam of people and huge number of passengers makes Qom an important area to study of CL.

Aims of the study:

This study was conducted to assess the epidemiological aspects and therapeutic outcomes of CL human cases in central Iran in order to control the possible risk factors of acquiring the disease.

Materials & Methods

Qom province is bounded by Tehran province in the north, Esfahan province in the south, Semnan province in the east and Markazi province in the west with an area of approximately 11240 square kilometers (0.68% of total area of the country) (Fig.1). This study was performed from April to November 2016 in Kahak county and 5 villages (Khorabad, Sarm, Ghobadbezan, Fordo and Abarjes) belonging to Kahak city of Qom province ($34^{o}09'–35^{o}11'$ N latitude and $50^{o}06'–51^{o}58'$ E longitude, with the elevation of almost 1500 m above sea level). Average annual minimum and maximum temperature is 16.5°c and 49°c in January and July, respectively. Total annual rainfall is about 150 mm. Relative Humidity is about 84% and 28% in December and June, respectively (6). This is a descriptive cross sectional study which was done during April to November 2016 in Kahak district of Qom province ($50-52^{o}$ E, $34-35^{o}$ N), 30 Km east of Qom city, the center of the province, central Iran. All suspected human cases with skin lesion(s) referred to communicable disease control unit of health centers of the province were investigated for CL, using clinical and parasitological examinations. Samples were taken from the borders of the suspected lesion(s), fixed with methanol, stained with Geimsa and survey under the microscope. The clinical examination and microscopic observation based on of the intracellular amastigotes of the parasite in the Geimsa stained smear was used to CL human cases detection. The information of samples such as demographic data and clinical history was taken in the standard epidemiological forms. The treatment responses of the cases who taken standard therapy was written.

Patients' data and information of therapeutic outcomes were recorded in epidemiological form of CL. Glucantime injection was used for healing the lesions. Firstly, the lesion size and duration of lesions were noted. After treatment, these indicators was monitored again. Some of patients treated with systemic Glucantime daily during 12 days and others received weekly intralesional injections of Glucantime for 12 weeks. At first, a permission letter from prevention and diseases control department of provincial health center was taken. It is necessary to mentioned that ere the beginning of the study, the purpose of the research was

explained and the participants were assured about the confidentiality of their personal data. The inclusion criteria for the study were as follows: diagnosis of CL based on clinical examination, the start of the CL infection is less than 4 weeks ago, completion of epidemiologic forms and being resident in Kahak county villages of Qom province. Not living permanently in the study region, taking any anti-leishmania drugs during the last four weeks, lactating and pregnant mothers, having large skin lesions with a diameter of 5 cm and ultimately the patients with lesions of more than three on their bodies were as the exclusion criteria of the study. SPSS, Ver. 16 was used for data processing and statistical analysis.

Results

Totally, 45 proven cases of CL who were infected with leishmania parasite clinically and parasitologically were reported from the villages of Kahak county during April to November 2016. In term of patient's gender, 24 (53.33%) and 21 (46.67%)of the CL cases were females and males, respectively.

Table 1) The prevalence of lesions by demographical characters in villages of Kahak county, Qom province, during 2016

Characteristics	Categories	Kahak
		Frequency (%)
Gender	Male	21 (46.67%)
	Female	24 (53.33%)
Age	lower than one year	0 (0%)
	1-6 years old	3 (6.67%)
	7-14 years old	10 (22.22%)
	More than 15 years old	32 (71.11%)
Job	Housekeeper	18 (40.00%)
	Farmer	7 (15.55%)
	Rancher	7 (15.55%)
	Student	10 (22.23%)
	Others	3 (6.67%)
History of travel to endemic area	Yes	4 (8.89%)
	No	41 (91.11%)
Location of the lesion(s)	Hand	27 (45.76%)
	Foot	19 (32.20%)
	Face	8 (13.56%)
	Trunk	4 (6.78%)
Number of lesions	One	29 (64.44%)
	Two	7 (15.56%)
	Three& more than three	9 (20.00%)
Season of onset	Spring	1 (2.22%)
	Summer	5 (11.11%)
	Autumn	39 (86.67%)
	Winter	0 (0%)
Chronic disease	Yes	11 (24.45%)
	No	34 (75.55%)
Type of treatment	Local MA*	20 (44.44%)
	Systemic MA	22 (48.89%)
	No having standard treatment	3 (6.67)
Total		45 (100%)

*Meglumineantimonate

Mean age of patients was 29.5±19.44. The most prevalent group of the cases was more than 15 years old with 71.11% of total recorded CL cases. Other groups are included lower than one

year 0 (0%), 1-6 (6.67%), and 7-14 (22.22%). More than 28% of cases were lower than 15 years old. According to this finding that majority of cases were above 15 years; regards to the classification of CL endemicity, this study area is considered hypo endemic of CL. The seasonal distribution of CL disease shows that the highest rate (86.67%) of infection was in autumn and other cases reported are included 5 cases (11.11%) in summer, one case (1.3%) in spring and no case in winter. While most of patients (64.44%) had only one skin lesion, 15.56% had two and about 20% of the cases developed more than 3. Hand and foot were the most common locations of lesion onset with 45.76% and 32.20% of total lesion locations, respectively. Other infected site of human's body is included face (13.56%), trunk (chest and abdomen) 6.78% and head & neck 1.70%. The most frequent type of treatment was local intralesional administration of meglumine antimonite (=MA; Glucantime) followed by systemic MA. All of treated patients fully recovered without delays in treatment, complication or treatment failure. Housekeepers more than other groups were suffering from CL (40%). 8.89% of the patients had travel to known endemic foci during the last year and 24.45% of the patients were suffering from one chronic non communicable disease. Mean weight of the patients was 54.14±20.52 kg. The mean size of CL lesion of the patients was 1.41±0.74 cm.

Discussion

The Kahak county is located in east of Qom province; among high risk areas in term of forming a CL focus, due to its neighborhood with other endemic areas such as Kashan and Semnan regions. The religious and political condition of Qom with high number of pilgrims have important roles in CL prevalence. Every year, many cases of CL are detected from villages of Kahak county located in east part of Qom province. This area is regarded as endemic foci of CL in Qom. All of 45 suspected cases that referred to health centers were infected to Leishmania major; the causative agent of CL and it confirmed with clinical and parasitological examinations. In previous studies in other regions of Iran such as Kalaleh in Golestan province and Damghan in Semnan province, the *L. major* was reported as the causative agent of CL (7,8). The incidence rate of the CL infection in the region is approximately 3.07% per thousand people. This is close to the lower limit of incidence rate of 20% per thousand people which is estimated for the country (4,9). Among 45 patients, over one half of the CL patients were females. Previous studies on endemic regions of the country had the same pattern as in Bäft, Kermän province, while in Dämghän, Semnän province, sex distribution was approximately equal (8,10). In the present study, the majority of the patients (71.11%) were more than 15 years old. Other previous studies from different areas of Iran recorded different age groups, as in Hamadan province (11) (15–44 years old), Damghan county (10-19 years old) (12), Haji-Abad county from Hormozgan province (10-14 years old) (13) and Esfahan (most of cases lower than one year) (14). According to the categorization of ZCL endemicity, given that a considerable percentage of the cases (71.11%) were above 10 years old, Kahak county of Qom province is considered with the hypo endemic focus of the disease (15). On the one hand, some species of phlebotominae sand flies are main vector of CL. On the other hand, inhabitants of endemic foci of CL with some jobs might be exposed more than others to sand fly bites. Based on these facts, housekeepers and students were affected more than other occupational groups. Similar findings were reported from Damghan and Kalaleh (12,7). In contrast, in Hamadan province 85.7% of the patients were worker (laborer). Hamadan itself is considered as a non-endemic area of CL, and these cases are composed of the young and adult people from other areas of Iran who is migrating to

Hamadan in search for job(11, 16). In present study, it is revealed that most lesions observed on the hand (45.76%) and foot (32.20%), this pattern of lesion development is prevalent in CL. It was recorded that 45% of CL cases in Yazd (17) and 29.8% of CL patients in Gonbad-e-Qabus (18) appeared lesions on hand. Lesion development on the limbs was reported from other endemic areas of CL in the country (3,11). However, in Haji-Abad, Esfahan province, it was earned that a substantial percentage (65.3%) of the lesions observed on the feet and only 8.7% were found on the hands (13). It is fascinating that no female presented with lesions on head and neck, possibly due to covering the head and neck with scarf (12). In this study, it was found that over one half of the CL cases had one lesion on their bodies. similarly, most of the CL cases from other endemic foci of Iran show with single lesion, as founded from Sabzevar county (38.9%) (19), Damghan (42.7%) (8), Kermanshah (54.5%) (20), Khatam (55%) (17) and Bafgh (66.6%) (9). In contrast, in Gonbad-e-Qabus only 2.9% of the cases presented one lesion and most of them displayed more than three lesions. Under usual conditions, in CL due to *L. major* multiplicity of skin lesions might be happened. In current study, about 20% of CL cases had three or more than three lesions (18). blood-sucking habit in phlebotominae sand flies occur at irregular intervals generally have a discontinuous and may bite several times on every attack and cause happening of several lesions on the human body (21). Many patients had no history of travel to endemic foci of CL, so the local transmission is occurring in this focus. The seasonal distribution of CL reveals that the highest frequency rate (more than 86 %) of cases was happened in autumn. In this region, the period during which phlebotominae sand flies have more activity from the second month of spring through the second month of autumn. In CL with L. major, the incubation period from sand flies' bite to nodule development in the skin body is around 6 months. So, according to the peak of sand fly's activity and incubation period for lesion development, increase of CL cases in the autumn are expected. Similar seasonal pattern was recorded from other CL endemic foci of Iran. In Sabzevar county, the highest percentage (73.1%) of the patients with CL was reported in summer and autumn and the lowest was in winter (19). In Damghan, 76.3% of the patients, in a period between 1999 to 2005, were affected in autumn; 33.1% in the first month and 29.5% in the second month of autumn (8). According to the guidelines of Ministry of Health, standard treatments had been chosen for each patient. In Kahak county, both treatment strategies; local injections of Glucantime and systemic injection were effective. This study was performed on registered data in health center of Qom province. The findings of this present study, can state just some epidemiological aspects and therapeutic outcomes of CL patients in Qom province. It seems, this point is one of the limitations of the study.

Conclusion

Cutaneous leishmaniasis has an endemic cycle in villages of Kahak county of Qom province and recently prevalence of CL disease has been developing. Although, according to the findings of this study, the total prevalence of CL among resident people in this county is not very high in comparison of other foci. therefore, we proposed provincial health center staffs must design and implement suitable prevention programs based on health ministry guidelines in order to control of disease. Also, it seems Glucantime is the best and available drug for treating of this disease.

Footnotes

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Conflict of Interest:

The Authors have no conflict of interest.

References

1. Hotez PJ, Savioli L, Fenwick A. Neglected Tropical Diseases of the Middle East and North Africa: Review of Their Prevalence, Distribution, and Opportunities for Control. PLoS Negl Trop Dis. 2012;6(2):e1475.

2. WHO. Working to overcome the global impact of neglected diseases. First WHO report on neglected tropical diseases. Geneva, Switzerland: WHO; 2010.

3. WHO. TDR Strategic Direction for Research: Leishmaniasis. Geneva, Switzerland: WHO; 2002.

4. Islamic Republic of Iran Ministry of Heath &Medical Education. Principles of disease prevention and surveillance. Tehran: Center for disease control; 2008. p. 249-255. (Text in Persian)

5. Akhavan AA, Yaghoobi-Ershadi MR, Mehdipour D, Abdoli H, Farzinnia B, Mohebali M, et al. Epidemic Outbreak of Cutaneous Leishmaniasis Due to Leishmania major in Ghanavat Rural District, Qom province, Central Iran. Iranian J Public Health 2003;32(4):35-41

6. Islamic Republic of Iran. Weather Meteorological Organization. Available from: http://www.weather.ir. Accessed 08 March 2016.

7. Rassi Y, Sofizadeh A, Abai MA, Oshaghi MA, Rafizadeh S, Moheba M, et al. Molecular Detection of Leishmania major in the Vectors and Reservoir Hosts of Cutaneous Leishmaniasis in Kalaleh District, Golestan province, Iran. J Arthropod-Borne Dis 2008;2(2):21-27.

8. Rafati N, Shaporimoghadem A, Ghorbani R. Epidemiological study of cutaneous leishmaniasis in Damghan (2000-2006). Koomesh 2007;24(4):250-51. (Full Text in Persian)

9. Jafari R, Mohebali M, Dehghan Dehnavi A, Soleimani H, Akhavan AA, Hajaran H, et al. Epidemiological Status of Cutaneous Leishmaniasis in Bafgh City,Yazd Province 2005. J Shahid Sadoughi Univ Med Sci 2007;15(2):76-83. (Full Text in Persian)

10. Sharifi I, Zamani F, Aflatoonian MR, Fekri AR. An Epidemic of Cutaneous Leishmaniasis in Baft District in Kerman province and its Probable Causative Risk Factors. Iranian J Epidemiol 2008;4(1):53-58. (Full Text in Persian)

11. Zahirnia AH, Moradi AR, Norozi NA, Bathaii JN, Erfani H, Moradi A. Epidemiological Survey of Cutaneous Leishmaniasis in Hamadan province (2002-2007). Avicenna J Clin Med 2009;16(1):43-44. (Full Text in Persian)

12. Mohammadi Azni S, Nokandeh Z, Khorsandi AA, Sanei Dehkordi AR. Epidemiology of cutaneous leishmaniasis in Damghan district. J Mil Med 2010;12(3):131-135. (Full Text in Persian)

13. Hanafi Bojd AA, Yaghoobi Ershadi MR, Zamani Gh, Barzekar A, Jafari R, Poor Abazari GhR. Epidemiologic aspects of cutaneaus Leishmaniasis Hajiabad, Hormozgan, Iran, 2003. J Hormozgan Uni Med Sci. 2006;10(1):64-5. (Full Text in Persian)

14. Yaghoobi-Ershadi MR. Study of current statue of cutaneous leishmanisis epidemiology in parts of Isfahan focuses for design and proposal control programme. [PhD Thesis]. Tehran: School of Public Health, Tehran University of Medical Sciences; 1994. (Text in Persian)

15. Saghafipour A. Study on some epidemiological characters of Cutaneous Leishmanianisis in Qomroud district. Qom province 2009-2010. [MSPH Thesis]. Tehran: School of Public Health, Tehran University of Medical Sciences; 2010. (Text in Persian)

16. Nazari M. Cutaneous leishmaniasis in Hamadan, Iran (2004-2010). J Zahedan Med Sci Res 2012;13(9):39-42. (Full Text in Persian)

17.Yaghoobi-Ershadi MR, MarviiMoghadam N, Akhavan AA, Solaimani H, Zahraei-Ramazani AR, Arandian MH, Deghani-Dehnavi AR. The epidemiology of cutaneous Leishmaniosis a new focus of Khatam city, Yazd province. J Yazd Uni Med Sci. 2007;15(4):47-52.

18. Mesgarian F, Rahbarian N, Mahmoudi Rad M, Hajaran H, Shahbaz F. Identification of Leishmania species isolated from human cutaneous Leishmaniasis in Gonbad-e-Qabus city using a PCR method during 2006-2007. Tehran Uni Med J 2010;68(4):250-256. (Full Text in Persian)

19. Mohajery M, Shamsian SA, Rezaee AR, Hassanpoor K, Shakeri MT, Farnoosh GH, et al. Evaluation of Mulecular Epidemiology of cutaneous leishmaniasis in Sabzevar. J Mashhad Univ Med Sci 2010;53(3):138-144. (Full Text in Persian)

20. Hamzavi Y, Sobhi SA, Rezaee M. Epidemiological factors of cutaneous lieshmaniasis in patients referred to health centers in Kermanshah Province (2001 – 2006). J Behbood 2009;13(2):155-56. (Full Text in Persian)

21. WHO. Control of the leishmaniasis, Report of a WHO Expert committee. Technical Report Series. 793. Geneva, Switzerland: WHO; 1990.