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Clinicodemographic characteristics of cutaneous larva migrans: A 10-year study in tertiary referral hospital-West Java Indonesia

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Abstract

Background: Cutaneous larva migrans (CLM) is the most common helminthic dermatosis caused by animal hookworm, commonly reported in tropical and subtropical regions. Most studies are on travellers returning from endemic areas, paradoxically very few reports in endemic countries, including Indonesia, where they mostly take place. This study aimed to describe the demographic and clinical characteristics of CLM patients for 10 years in a tertiary referral hospital in West Java, Indonesia

Methods: This was a descriptive retrospective cross-sectional study. The data were obtained from the medical record of patients who was diagnosed as CLM in Tropical Dermatology Clinic Hasan Sadikin Hospital Bandung from 1st January 2010 until 31st December 2019 using a total sampling method.

Results: Of the 21 data retrieved, males (52.4%), age group of 35-44 years (23.8%), senior high school graduated (23.8%), and had a history of vacation to the beach (9.5%) comprised the majority of the patients. The most common clinical characteristics were multiple itchy serpiginous track lesion, located on the arm and hand, and treated with albendazole at 400 mg per day for 3 days showed the cure rate of CLM patients was high (100%).

Conclusion: Patients with CLM have a variety characteristics based on clinico-demography. Although CLM is rare in this study, health information about this disease to community is important, especially those who frequently travelled to the endemic regions.

Keywords: *cutaneous larva migrans, clinic-demographic, endemic*

Background

Cutaneous larva migrans (CLM) is an infectious disease caused by hookworm larvae that migrate into the human epidermis, also known as creeping eruption.^{1,2,3} CLM is the most common helminthic dermatosis caused by *Ancylostoma braziliense*, *Ancylostoma caninum*, and *Uncinaria stenocephala*, which are found in dogs and cats.^{1,4} The disease can be found all over the world, such as in the Africa, Southeastern United States, the Caribbean, and Latin America.^{5,3} The total percentage of CLM in Brazil was 8.2% with the highest cases in the age group of 10-14 years.⁵ Although the Southeast Asia region mentioned as one of the endemic areas of CLM, the exact data still unclear. There has been no

publication concerning socio-demographic data of CLM in Southeast Asia as far as the author acknowledges.

The clinical diagnosis of CLM is based on the presence of typical serpiginous lesions, intense itching, and a history of contact with contaminated soil that contain larvae.⁶ Furthermore, because these larvae unable to penetrate the basal membrane of epidermis, thus they migrate in the epidermis and producing the elevated track.⁴ The mean incubation period is around 5-15 days, but may be prolonged into more than five months. These varying incubation periods are probably due to host factor and differences of helminth strain, which allow the larvae can be inactive within a few months and become reinfection later.⁶ Clinical features of CLM are erythematous

papule lesions which developed to form a track that is linear, raised, and progressive with a serpiginous pattern. The skin lesions can be single or multiple.^{1,3} In rare cases, skin lesions manifested as vesicles or bullae.⁷ Skin lesions are most often found in the body area that contact with the soil,⁸ such as on the foot, hand, and buttock.⁷

CLM is endemic in tropical and subtropical regions especially occur in the agricultural area, where the highest level of hookworm larvae contaminated.^{9,2} Consequently, farmers and other agricultural occupations are at the highest risk. Known risk factor due to the habits of farmers who do not use footwear, do not wash their feet and hands after working, or do not use mats when sitting on the ground.¹⁰ Despite CLM is the most common helminthic dermatosis, publication concerning demographic and clinical characteristics of CLM patients is still limited. Most studies are on travellers returning from endemic areas, paradoxically very few reports in endemic countries where they mostly take place.¹¹ Therefore, this study aimed to describe the demographic and clinical characteristics of CLM

patients in Tropical Dermatology Clinic Hasan Sadikin Hospital Bandung as a tertiary hospital in West Java, Indonesia from the period of 2010 – 2019.

Methods

A cross-sectional descriptive retrospective study was conducted on medical records of CLM patients in Tropical Dermatology Clinic and Medical Records Unit of Hasan Sadikin Hospital Bandung. Data collection using a total sampling method of CLM patients registered between January 2010 and December 2019. This study was approved by the Research Ethics Committee of Universitas Padjadjaran Bandung through approval letter Number 866/UN6.KEP/EC/2020 and also approved by the Medical Research Ethics Committee of Hasan Sadikin Hospital Bandung through approval letter Number LB.02.01/X.2.2.1/22550/2020. Data on the patient's demographic and clinical characteristics were reviewed and presented.

Table 1. Demographic Characteristics of CLM Patients

Characteristics		Total CLM Patients (n=21)	
		Frequency (n)	Percentage (%)
Gender	Males	11	52.4
	Females	10	47.6
Age	0 – 4 years old	0	0
	5 – 14 years old	3	14.3
	15 – 24 years old	3	14.3
	25 – 34 years old	4	19.0
	35 – 44 years old	5	23.8
	45 – 54 years old	3	14.3
	55 – 64 years old	2	9.5
	≥ 65 years old	1	4.8
Education	No formal education	0	0
	Primary school	1	4.8
	Junior high school	1	4.8
	Senior high school	5	23.8
	University graduates	2	9.5
	No data	12	57.1
Occupation	Student	6	28.5
	Laborer	1	4.8
	Entrepreneur	1	4.8
	Farmer	0	0
	Fisherman	0	0
	No data	13	61.9

Characteristics		Total CLM Patients (n=21)	
		Frequency (n)	Percentage (%)
Predisposing Factor	History travel to the beach	2	9.5
	Not using skin protection	1	4.8
	Often play on the ground	1	4.8
	Household kept dog or cat	1	4.8
	No data	16	76.2

Results

A total of 21 cases of CLM were included in this study. The percentage of cases was slightly higher on males compared to females with ratio 1.1: 1. Based on the age category, the highest prevalence occurred in the age group of 35-44 years. No cases found in the age category of 0-4 years. Based on the educational level, patients who graduated from high school were the predominant cases. Occupation did not significantly cause CLM, which among them were construction worker, entrepreneur, and student. Moreover, based on predisposing factors, most of the patients had a history of vacation to the beach, where there was direct contact of skin to the sandy ground. Demographic characteristics of CLM patients were summarized in Table 1.

The majority of patients complained of itching. Typical serpiginous eruptions occur in most cases, while vesiculobullous lesions also found. CLM mostly located on the hand and arm followed on the foot and leg. Rare cases of generalized distribution of skin lesions that affected the whole body except for the face, hand, and feet, also found in this study. The number of lesions were multiple in most cases. Drug of choice in the majority of cases was albendazole at 400 mg per day for 3 days showed that the cure rate of CLM patients was high. Cryotherapy also administered in severe cases. There were 16 out of 21 cases could not be processed due to incomplete or missing data as the data were obtained from a paper-based medical record. Clinical characteristics of CLM patients were summarized in Table 2.

Table 2. Clinical Characteristics of CLM Patients

Characteristics		Total CLM Patients (n=5)
Subjective symptom	Pruritus	4
	Pruritus + Painful	1
Type of skin lesion	Erythematous papules progressed to linear or serpiginous track	4
	Vesicle/ bullae	1
Location of skin lesion	Arm, hand	3
	Leg, foot	1
	Head	0
	Trunk	0
	Buttock	0
	Generalized	1
Number of skin lesions	Soliter	0
	Multiple	5
Management	Albendazole	4
	Albendazole+ Cryotherapy	1
	Thiabendazole	0
	Ivermectin	0

Discussion

Of the 21 cases analyzed in this study, the percentage of cases was slightly higher on males than females, 52.4% and 47.6% respectively. Male more susceptible to get infected due to gender-related behavioral patterns since males spend more time outdoor than females.¹² This was similar with a cross-sectional study in a resource-poor township in Manaus, Brazil conducted by Reichert F *et al.* showed that male predominated by 13.4% of all male sample, while the female was only 0.6%.⁵ In this study, the highest percentage of CLM was between the age of 35 and 44 years, as much as 23.8%. This finding is in contrast with a study in a rural community of Brazil conducted by J. Heukelbach *et al.* showed that CLM was higher in children than in other age-group. Only 0.7% of adult aged >20 years had CLM, while infant and children aged ≤ 4 years were 15%.¹³

Based on the educational level, the result of this study showed that patients who graduated from senior high school had the highest prevalence. The previous study conducted by J. Heukelbach *et al.* showed that the higher prevalence occurred in the illiterate than a literate group.¹³ Occupation which allowed prolonged contact with soil or sand had a greater risk of CLM than those who were not. This study revealed one case of occupational-related CLM who worked as a construction worker that frequently contact with the sandy ground without using hand protection. This was similar with a systematic review conducted by Ozgur Timurkaynak *et al.* in a publication period ranged from 1990 to 2016 showed that construction worker, dairy farm worker, and gardener were the most common occupational-related cases. History of vacation to the beach also reported as predisposing factor of CLM.¹⁴ Similar with the previous study, most of the patients in this study had a history of vacation to the beach and buried the body in the sand. Furthermore, many cases of CLM were reported in tourists who returned from tropical countries. Vanhaecke *et al.* reported that 73 out of 74 CLM patients had traveled to the tropical countries.¹⁵ Nevertheless, Del Giudice *et al.* reported a few cases of autochthonous CLM in not endemic area, such as Europe.¹⁶

Moreover, most of the patients in this study had a typical skin lesion characterized by erythematous papules then progressed to linear or serpiginous track. A rare type of skin lesion of vesiculobullous lesions was also reported in this study. This result was in accordance with a case report conducted by Eksomtramage *et al.* who presented

uncommon cases of vesiculobullous lesion and serpiginous track with some pustules, which might occur due to uncharacterized antigen and released enzymes from the larvae.¹⁸ However, the pulmonary and intestinal symptoms may also presented in unusual cases. Ya-Li Gao *et al.* reported unusual cases in China presented with itching creeping eruption, breathlessness, and cough which considered to be an immunologic reaction to the larvae, diagnosed as CLM leading to eosinophilic enteritis or Loeffler's syndrome.¹⁹

CLM may occur in any location of the body area in contact with infected soil. In this study, it was found that the most frequent primary sites were arm and hand with multiple number of lesions. This was in contrast with previous studies conducted by Reichert F *et al.* showed that the foot was the most affected body areas account for 62.4% with 54.5% had one lesion.⁵ Drug of choice for CLM management are oral albendazole, oral ivermectin, or topical tiabendazole.^{17,20} In multiple lesions or severe manifestation, albendazole 400 mg per day orally for 3-5 days is recommended for systemic pharmacologic therapy with high curation rate.³ In this study, albendazole used as the main anti-helminthic therapy. Similar to a retrospective study in Canada conducted by Kincaid *et al.* on 25 patients with travel-acquired CLM showed that 90% of patients were cure treated with a single course of albendazole, only 2 out of 25 patients required additional treatment duration.²⁰

The limitation of this study, there was some incomplete or missing data as the data were obtained from a paper-based medical record, therefore it could not be processed. Besides, similar studies are still rarely conducted, which causes difficulties in finding related literature. The sample size should be increased to present clearer data evidence as a suggestion for a further study.

Conclusion

In conclusion, adult males and history of vacation to the beach are the most common population group of CLM. Typical characteristics of skin lesions and location occur in the majority of cases. Although CLM is rare in this study, information about this disease to community is important, especially those who frequently travelled to the endemic regions.

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