The Possible Relation between Pityriasis Alba and Intestinal Parasitic Infestation Among Children in Tikrit City, A Case Control Study

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Abstract

Background: There is a solid belief stated that the appearance of hypopigmented patches on children face is a sign of their helminthic or parasitic intestinal infestation despite the constant health education about the absence of such relation. Pityriasis Alba (PA) is common benign skin lesion characterized by fine scaly hypopigmented patches (HP) or macules [(1)] mostly in the face and upper body parts. [(2-4)] PA may be atopic dermatitis related or endemic PA. PA occurs mostly in 3-16 years old children and accounts of 5% of pediatric population worldwide. Prevalence rate in Iraq is high (38.2%). No specific cause of PA has been identified. Diagnosis of PA depends on the clinical picture and treatment may implicate sunscreen and topical corticosteroids despite its self-limiting privilege. Helminthiasis (worm infestation) is the hosting of parasitic worms after invading humans and other animals necessarily to complete their lifecycle. *Enterobius vermicularis* is the most common helminthic intestinal infestation among children in Iraq. The main complaint of helminthiasis is the perianal itching, especially at bed time. The study aims to determine the relation of intestinal helminths with PA. Study Design: This prospective and a case-control study had consisted of 43 males (53.5%) and females (46.5%) children of 5-15 years of age presented with HP. Results and Discussion: 4 (9.3%) cases presented with *Enterobius vermicularis* given antihelminthic drugs and had their infestation eradicated completely after a week. 39 (90.7%) children presented with no infestation, regarded as control group, and so given placebo treatment. Number and size of HP varied after the 6 weeks of treatment. Although cases shown more numerous (6.0 ± 2.9) HP and larger size (120.0 ± 72.2) than control group (4.9 ± 3.6 and 90.0 ± 58.3 respectively), but the difference was not significant for both groups (cases and control) and between them for both HP number and sizes ($p>0.6$). Conclusion: There is no enough prove of the relationship between children intestinal parasitic infestation and the appearance of hypopigmented patches.

Keywords: *pityriasis alba, erythema streptogenes, pityriasis streptogenes, impetigo furfuracea, pityriasis simplex, parasites, Enterobius vermicularis, pinworm, threadworm, seat worm, nematode, roundworm.*

Introduction

Pityriasis Alba (PA) is common benign skin lesion or dermatological disorder characterized by the appearance of fine scaly hypopigmented patches (HP) or macules [(1)] that are most commonly seen in the face, neck, shoulders, trunk, [(2)] and to a lesser extent, in extremities[(2-4)]. There are two main (typical) types of pityriasis alba and two atypical types:

1. Atopic Dermatitis Related PA, is mostly related with postinflammatory hypopigmentation. Most of the patients were cases or have a history of atopy, and PA in this case regarded as an atopic dermatitis minor manifestation.

2. Endemic PA, Endemic PA is usually occurring among infants to children of low socioeconomic condition. [(6)]

3. Pigmented Pityriasis Alba, mostly described as a central darker patch surrounded by a lighter

colored scaly zone of PA. Pigmented PA lesion have a bluish hue in the center that is surrounded by a halo of hypopigmentation.

4. Extensive PA (Progressive Macular Hypomelanosis). The lower part of the trunk is the most common site of involvement symmetrically and usually in a relapsing attitude. Extensive PA patches are widespread and have more persistent course. Lesions aren't favoring the face. Females are more often affected than male. [7-8]

There is no gender difference for the disease. There is a global distribution of PA, though its prevalence may differ among different countries. The most prevalent countries were Iraq (38.2%), India (31%), Mali (20%), and Egypt (18%); while lower prevalence was in developed countries like United states (5%) and Hong Kong (1%)[9]. PA occurs more predominantly in children between the ages of 3-16 years. PA is noninfectious and there is no identified peculiar aetiology. Many cases with PA are presented with iron and copper deficiency. Possible triggering factors that may cause PA are deficiency of vitamins & calcium, temperature variations, humidity, excessive sunlight exposure, frequent bathing, usage ofharsh detergents and soaps, dry and itching skin, hypopigmentation, worms and parasites, stress, deficiency of copper and atopic diseases and/or a family history of eczema[2-3]. The diagnosis in most cases of pityriasis alba is straightforward and depending on the clinical picture[3]. PA most frequently seen as 2 or 3 macules or patches in different stages. Vargas *et al* described 3 stages of PA:

1. The **early** stage, also called **papular erythematous stage**, begins as faint pink to red elevated bordered round to oval macule or patch that may last for weeks. In most cases this erythematous stage may run unnoticed.

2. The next **intermediate** stage, **papular hypochromic stage,** or **follicular pityriasis alba.** The patch is converted into a smooth scaly layer.

3. The **final** stage, the **smooth hypochromic stage** presented as a visible, round and hypopigmented macule with mostly well-defined borders. In this stage, the patient usually or his/her parents will seek medical assistance[10].

Telling the patients and/or their parents about the PA benign nature and self-limited course is mandatory. They should be informed about its slow resolution that may exceed a one year[1]. Patients can be informed to follow some lifestyle modification with support use of sunscreens, skin moisturizers, and skin hygiene. Topical steroids (low-potency) appear to be more widely prescribed.

Intestinal Parasites:

According to the given hypothesis, this study emphasizes on helminthic infestation. Among the most common modes of transmitting these organisms is through contaminated water, food, soil, as well as contact. Helminthiasis (worm infestation) is the hosting of parasitic worms after invading humans and other animals necessarily to complete their lifecycle and either causing clinical manifestation or hide as an asymptomatic carrier status. In third world countries, including Iraq, the majority of helminths infections are associated with poor sanitary facilities, indiscriminate disposal of human waste, inadequacy and lack of quality drinking water. It is also potentiated by poverty and low socioeconomic status. *Enterobius vermicularis* or the so-called pinworm, threadworm, or seatworm, is a nematode (roundworm) that is common in human children transmitted by feco-oral route. It hosts humans only[11].

Night perianal itching grew the suspicion of the worm infestation. Eggs can be recovered using the "Scotch Tape" technique in the morning before a bowel movement. Transparent Scotch Tape is applied directly to the perianal area, and then placed on a microscope slide for examination. Eggs are football shaped and have an outer shell. Infectious larvae are often visible inside the egg. The small adult worms may be seen in a stool test (ova and parasites). Because the eggs are lightweight and highly infectious, it is important for bed linens, towels, and clothing to be washed in hot water to prevent reinfection[5].

Patients and Methods

This was a prospective and a case-control study conducted in the department of dermatology of Salahuldin-General Hospital in Tikrit city, Salahuldin province, Iraq. The study was conducted during the

period from Nov 2019 to May 2020. The study targeted children aged between 5 and 15 years. A total of 43 children were enrolled in the study. The intestinal parasite infested attendant children presented with skin hypopigmented patches were regarded as the case group. The non-infested children with PA were the control group. All participants passed a medical examination by a dermatologist and consolidated by taking opinions of two or more dermatologists. Three separated (2-days apart) stool samples were taken for parasitological examination from all the participants. Additionally, stool samples and sticker tapes were taken from PA children with parasitic infestation a week after treatment completion to confirm parasite elimination. No local drug applications, sunblock, or soothing agents were given for HP. Therapy was given to PA patients infected with *Enterobius vermicularis* with mebendazole (a single 100 mg chew tablet that can be repeated 3 weeks later if infestation had not been eradicated) [12]; while parasite free PA children were given placebo made of starch pills of the same size and shape of the mebendazole tablet, and given to the control group in the same amount and frequency. Both treatment and placebo were well tolerated, and no side effects were complained. All patients were examined for the pityriasis alba at the first visit. After a one week another contact with the patient to evaluate the state of helminthic eradication. After 6 week patients were contacted to observe the changes in skin hypopigmentation. Clinical efficiency of parasite elimination was evaluated one week after the completion of antiparasitic therapy. A positive clinical response included: complete HP disappearance and reduction of intensity, size and/or hue of HP. A negative clinical response included: the absence of visual changes of HP or enlargement of size and hue of HP[13].

Results

The forty-three studied children ages were ranged from 5 to 15 years. Their mean age was 9.2 years (Table 1). It was consisted of 23 (53.5%) males and 20 (46.5%) females. Twenty-eight of them were living in urban districts (65.1%) whereas 15 were living in rural areas (34.9%). The HP presented in different numbers, sizes, and various body regions (Table 2). Four (9.3%) children were shown to have parasitic intestinal infestation, while 39 (90.7%) children with HP were free of infestation. All infesting parasites were the helminths *Enterobius vermicularis* that were symptomatic and had been isolated and observed microscopically (Figure 1).

Table 1. Demography of the studied sample.

Age (years)	**Range**	**5-15**
	Mean ± SD	**9.2 ± 2.6**
Gender Number (%)	Males	23 (53.5%)
	Females	20 (46.5%)
Residence Number (%)	Urban	28 (65.1%)
	Rural	15 (34.9%)

SD: Standard Deviation

Table 2. Hypopigmented patch distribution and sun exposure.

Hypopigmented Patch	Range	Mean ± SD
Number	1-18	5.0 ± 3.5
Sum of size (mm)	20-325	92.8 ± 59.3
Average size (mm)	12-50	20.7 ± 6.5
Duration (months)	1-36	10.7 ± 8.7
Sun exposure (hour/day)	1-8	4.5 ± 2.4
Family members	1-4	Median = 2

SD: Standard Deviation

HP distributed in different parts of the body. Ninety-three percent of children had HP in the cheeks and to a lesser extent in forehead and neck 70% and 67% respectively. This study had shown HP presented in shoulders in 19%, upper extremities in 33%, and in the trunk in 9% of cases.

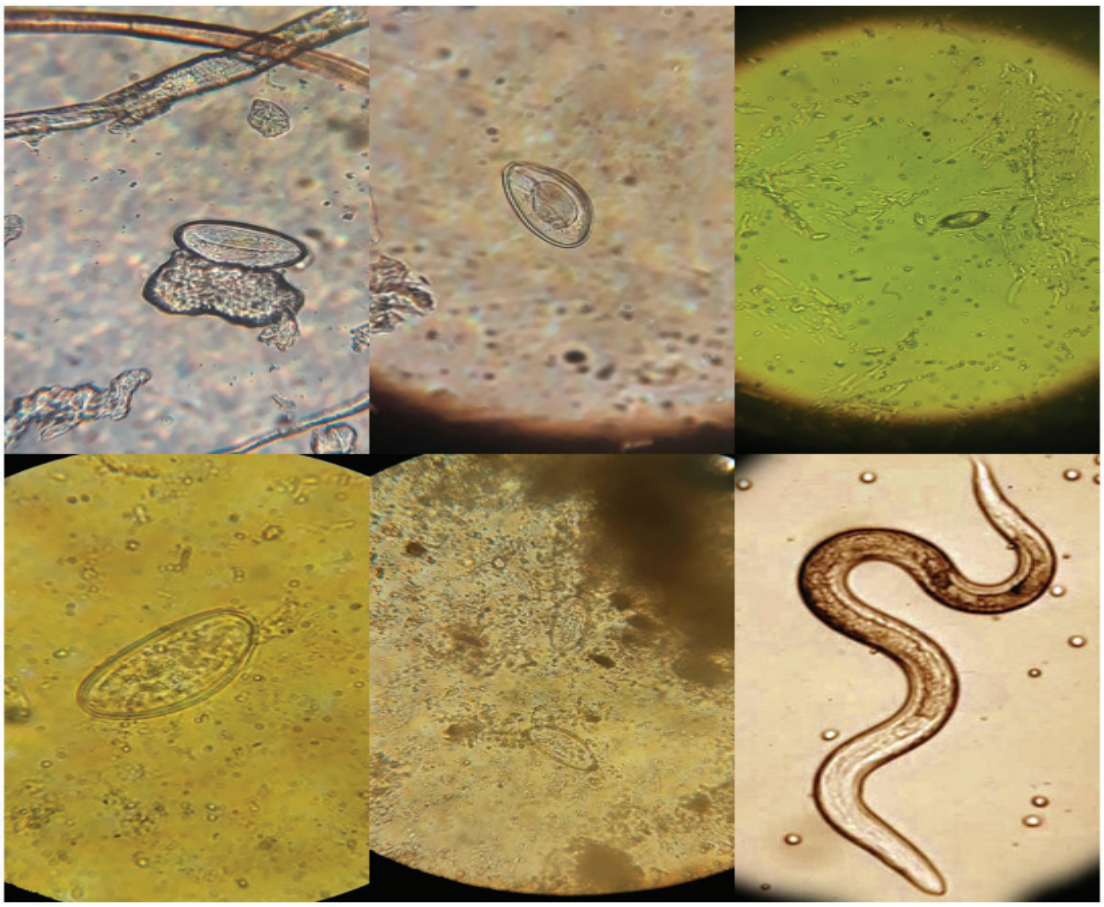

Figure 1. Ova and a helminth of *Enterobius vermicularis* as shown under light microscope in the positive infested studied cases.

None of cases observed in the study had their HP eliminated completely after 6 weeks of treatment (Figure 2). The study shown 14 (32.56%) children of fixed size HP after this period and the rest were underwent change in their HP size as shown in Table 3.

Table 3. Destiny of HP change after six weeks of treatment or placebo.

HP Size Change	Infested	Non-infested	Total
Disappear	0%	0%	0%
Reduced	75%	46.15%	48.84%
Fixed	0%	35.90%	32.56%
Enlarge	25%	17.95%	18.60%

HP: hypopigmented patch

Figure 2. Children with HP at first visit (left) and 6 weeks after treatment (right), there is no marked changes in the size, number, or distribution of PA.

Cases present with an average of 6 hypopigmented patches in the first visit as well as in six weeks after treatment, while control group shown HP average number of 4.9 in the first visit and 4.8 six weeks after placebo (Table 4). The HP size in infested and control groups were summarized in Table 4.

Table 4. Hypopigmented patch number and size in infested compared to non-infested children in the first visit (V1) and six weeks after treatment (V2).

HP		Infested (Mean ± SD)	Non-infested (Mean ± SD)	Total (Mean ± SD)	p-value
Number	V1	6.0 ± 2.9	4.9 ± 3.6	5.0 ± 3.5	0.7642
	V2	6.0 ± 3.6	4.8 ± 4.1	4.9 ± 4.0	0.7718
	change	0.0 ± 2.8	-0.1 ± 1.9	-0.1 ± 2.0	0.9602
	p-value	1	0.976		
Size	sum (mm) in V1	120.0 ± 72.2	90.0 ± 58.3	92.8 ± 59.3	0.61
	sum (mm) in V2	111.3 ± 89.2	86.8 ± 78.9	89.1 ± 79.0	0.7566
	change (mm)	-8.8 ± 69.8	-3.2 ± 39.7	-3.7 ± 42.2	0.8886
	p-value	0.9044	0.9522		

HP: hypopigmented patch, SD: Standard Deviation, p: probability (p>0.05: not significant), mm: millimeter.

Discussion

In Iraq, there is a common belief among society regarding the presence of white patches in the face of the child as a sign of intestinal infestation.

Lower than a tenth (9.3%) of children with hypopigmented patch complaining of intestinal parasitic infestation is not enough evidence as a causation for the majority (90.7%) of HP incorporated in the study were found to be free infestation. A near finding was obtained by Vinod *et al* (2012) whom microscopic examination of the stool shown ova presented in 15.5% of the sample, and concluded no significant relationship between intestinal parasitic infestation and HP[14]. Unlikely, Osipova (2017) founded 43.4% out of 30 children with HP had helminthic intestinal infestation and concluded a positive significant relationship between infestation and HP[15]. Three out of the four infested children in this study were living in rural area. This may be due to the lower hygiene, lower sanitation, habitual longer contact with soil, or eating unclean vegetables or fruits.

Similar to what found by Vinod *et al* [14] and Toychiev *et al* [16], the majority of children in this study had HP in the head especially in cheeks (93%), forehead (70%), and in the neck (67%). [14, 16]

The study shown those children with intestinal infestation had slightly more numerous HP compared with control group (mean = 6.0 and 4.9 respectively) (Table 4). This difference was not statistically significant (p=0.7642); nor significant was the difference between the number of HP observed after 6 weeks of taking antihelminthic vs placebo treatment (p=0.7718). This was agreeing with Vinod *et al*[14] whom found a similar non-significant relation; but disagreeing with both Toychiev *et al* and Osipova. This study shown no significant change in number of HP after 6 weeks of the treatment or placebo for both intestinally infested children (p=1) and control group (p=0.976). This was disagreeing with what was found by Toychiev *et al* whom declared that 33.3% of children with enterobiasis had complete disappearance of their HP after 6 weeks of treatment and had their parasitic infestation eliminated. It is also disagreeing with Osipova whom founded 69.2%

of cases underwent complete disappearance of their HP after 6 weeks of antihelminthic treatment (compared to 0% in this study (Table 3).

In this study, children with intestinal helminthic infestation shown larger HP size (measured by mean of the summation of diameters of patches for each child) compared with control group (120 and 90 mm respectively) (Table 4). This difference was not statistically significant (p=0.61). Similar insignificant difference was found between case vs control after treatment and placebo (p=0.7566). Although there was some decline in the HP size of the group of cases after treatment (averaged 8.8 mm reduction), it was also statistically not significant (p=0.9044). A lesser (3.2mm) (but also insignificant p=0.9522) decline in the average of HP size of control group after 6 weeks of placebo intake. This decline was observed in 21 (48.84%) (i.e. nearly a half) of the total 43 observations. These finding were disagreeing with Toychiev *et al* whom founded 20.3% of patients had reduced HP size significantly.

Conclusions

1. Despite the familiarity of the relation between intestinal helminthic infestation and HP among the society, there is no significant relationship between the two.

2. Despite the frequently observed cases of intestinal infestation attending pediatrics consultation as well as children with HP attending dermatology's one; there is no prove stating the former as an aetiology of the latter.

Conflict of Interest: None

Funding: Self

Ethical Clearance: Not required

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