Juvenile Pityriasis Rubra Pilaris in Chang Gung Memorial Hospital, Taipei and Linkou: A Retrospective Study in the Past Ten Years

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Pityriasis rubra pilaris (PRP) is an uncommon dermatosis in childhood. Only a few long-term studies to evaluate the course and prognosis of PRP in children have been done. In this study, we retrospectively reviewed the clinical manifestation, family history, course of the disease and response to treatment in 18 patients with PRP ages 18 years old or younger. These patients were seen at Chang Gung Memorial Hospital, Taipei and Linkou, between 1997 and 2006. Of the 18 patients, 11 were male and 7 were female. The most common sites of involvement were the palms and soles, knees, elbows, and buttock. According to Griffith’s classification, 4 patients were classified as type III PRP, and the other 14 patients were classified as type IV PRP. In our studies, we suggested that palmoplantar involvement could be a diagnostic feature in juvenile PRP and buttocks could be another common site of involvement in type IV PRP. All patients were treated in an outpatient setting with topical agents. In addition to topical treatment, a few patients took acitretin for short durations. In our studies, there is no conclusion on the treatment of choice for juvenile PRP, but generally speaking, the prognosis of juvenile PRP is good. (Dermatol Sinica 25: 248-255, 2007)

Key words: Juvenile pityriasis rubra pilaris

毛孔性紅糠疹在兒童並不常見。在文獻中，只有少數研究針對發生於兒童的毛孔性紅糠疹做長期追蹤以評估其病程與預後。此研究回溯台北與林口長庚紀念醫院1997年至2006年間，被診斷為毛孔性紅糠疹且小於18歲的青幼年，並分析這些病人的臨床表現、家族史、疾病病程與治療效果。我們一共蒐集了18個病例，有11位男性，7位女性。好發部位依序為手腳掌、膝蓋、肘部、及臀部。根據Griffith分類，4位病例為第三型毛孔性紅糠疹，另外14位為
INTRODUCTION

Pityriasis rubra pilaris (PRP) is an uncommon hyperkeratotic, papulo-squamaeous dermatosis with unknown aetiology. Griffiths proposed a classification that divides PRP into 5 classes, of which types III, IV and V are seen in juveniles. Type I (classic adult) and type III (classic juvenile) differ only in the age at onset and is characterized by follicular keratotic papules coalescing into orange-red, scaly plaques with cephalocaudal progression with or without palmoplantar hyperkeratosis. Type II is an adult-onset atypical PRP. Type IV (circumscribed juvenile) usually developed well-circumscribed erythematous hyperkeratotic plaques on the knees and elbows. Type V (atypical juvenile) shows scleroderma-like changes or ichthyosiform scaling in the first few years of life. Cases that have family history of PRP are usually type V. Recently, type VI PRP associated with HIV infection has been suggested. Only a few long-term studies to evaluate the course and prognosis of PRP in children have been done. This report describes our experience with the clinical manifestation and course of the disease of this dermatosis. We also try to evaluate the response to treatment and prognosis of these patients.

PATIENTS AND METHODS

A retrospective chart review was performed on all patients aged younger than 18 years with PRP who were seen at Chang Gung Memorial Hospital, Taipei and Linkou, from 1997 to 2006. Information was obtained from each patient’s chart about the patient’s age, sex, age and site of disease onset and other clinical manifestation, symptoms, course of disease, and response to treatment. Site of onset was recorded as scalp, face, trunk, elbows, knees, extremities other than elbows and knees, palmoplantar area including dorsal aspects of palms and soles. Telephone interviews with a parent were attempted to obtain the information about family history, past history, exacerbating factors of skin lesions, preceding infections, management that patients received and response to treatment. Patients with unknown or incomplete clinical manifestation were excluded. The improvement of skin lesions was defined as decreased thickness and sizes of plaques. Response to treatment was recorded as follows: excellent, 90% to 100% resolution; moderate, 30% to 90%; poor, less than 30%.

RESULTS

We retrieved 18 patients; 11 were male and 7 were female. Telephone interviews were successfully completed for 15 of the 18 identified patients, and the follow-up information was obtained only from the medical charts in the other 3 patients. The follow-up period ranged from 1 month to 112 months (mean: 43 months). Fig. 1 shows the distribution of our patients by age according to Griffith’s proposed classification. Four (22%) of our patients had type III classic juvenile PRP, fourteen (78%) had type IV circumscribed juvenile PRP. Most patients were first seen at the age of 7 years or earlier (Fig. 1). The youngest patient with onset of type III PRP was 10 months old, while the youngest patient with onset of type IV PRP was 11 months old.

The most common sites of involvement in all patients were the palms and soles (94%), knees (89%), elbows (67%), buttock (50%), face (39%), trunk (39%), extremities (39%), and scalp (33%) (Fig. 2). The comparisons of the sites of involvement between type III and type IV PRP...
cases are shown in Fig. 3, and the clinical features are shown in Fig. 4-9. The common sites of involvement in the patients with type III PRP were the palms and soles (100%), scalp (100%), face (100%), trunk (100%), knees (75%), extremities (75%), elbow (50%), and buttck (25%). The common sites in our patients with type IV PRP were the knees (100%), palms and soles (100%), elbows (71%), buttck (57%), extremities (29%), trunk (21%), face (21%), and scalp (14%).

Among these 18 cases, sixteen cases received the lesional skin biopsies and the pathologic reports were consistent with PRP. All patients developed skin lesions with a gradual onset. One patient with type IV PRP developed diarrhea before the onset of PRP. Another patient developed type IV PRP had upper respiratory tract symptoms before the onset of PRP. The skin lesions of two patients with type IV PRP became worse during infectious disease (one was upper respiratory tract infection, another was upper urinary tract infection). None of our patients had family history of PRP. Koebnerization of skin lesions was noted in one patient with type IV PRP. Exacerbation of PRP after sun exposure was demonstrated in two patients (1 with type III, 1 with type IV). Two of our patients had nail involvement (1 with type III, 1 with type IV). None of our patients had arthropathy, erythroderma or ectropion. None of our patients had atopic dermatitis or other skin disease.

Response to treatment was summarized in (Table 1). Follow-up of all patients revealed that 5 (28%) had 90% to 100% clearing, 13(72%) had partial clearing (30% - 90%). Of the patients with 90% to 100% clearing, 2 had type IV PRP, and 3 had type III PRP. Four of these five patients with 90% to 100% clearing were first seen at the age of 4 years or younger.

All patients were treated as outpatients with topical agents, including topical corticosteroids, keratolytics, and calcipotriol. Most patients were prescribed more than one kind of topical agents. Two patients with type III had excellent responses: one was treated with topical corticosteroid, a keratolytic, and the other one was treated with topical corticosteroids and calcipotriol. The other three patients with type IV had excellent response to topical corticosteroids.

In addition to topical treatment, five of our patients took acitretin with initial dose of approximately 0.5 to 1 mg/kg per day. Duration of acitretin treatments ranged from one week to three months, these five patients had moderate response to topical agents plus systemic acitretin.
Fig. 4
Hyperkeratotic erythematous papules and plaques mainly on the knuckles area.

Fig. 5
Desquamation, erythema, glistening of the palms with prominent creases and occasional fissures.

Fig. 6
Well-demarcated erythematous plaques with peripheral scales on the knees.

Fig. 7
Well-demarcated hyperkeratotic plaque with follicular hyperkeratosis on the elbow.

Fig. 8
Orange-red plaques with follicular hyperkeratosis on the abdomen. The lesions have sharp margins and islands of normal skin within them.

Fig. 9
Well-demarcated erythematous plaques with peripheral scales on the buttocks. Follicular erythematous papules on the posterior thighs.
DISCUSSION

The differences in the clinical presentations and clinical courses of our patients compared with those in the other two studies of juvenile PRP are shown in Table 2.

Gelmetti et al. reported no patients with onset younger than 2 years, whereas Allison et al. did (3 with type III PRP and 1 with type IV PRP). Two of our patients, 1 with type III PRP and 1 with type IV PRP, presented before the age of 1 year.

In Griffiths’ original description of classification in PRP patients, type III, IV and V consisted 25%, 62.5% and 12.5% of juvenile PRP cases, respectively. Gelmetti et al. also showed a predominance of type IV in the juvenile PRP patients. Nevertheless, Allison et al. reported more patients with type III than type IV. In our studies, there is a predominance of type IV in the juvenile PRP patients (78%). There is a discrepancy in these studies of the proportion of types of juvenile PRP. This might be due to the ethnic differences, the inconsistent judgements between clinicians, and the sample size of juvenile PRP patients.

In Gelmetti’s studies, the most commonly involved sites were the palms and soles, and they proposed that palmoplantar involvement is the second most diagnostic feature for classification. In Allison’s studies, the most common sites of involvement were elbows and knees in all juvenile PRP patients, whereas the most common sites of involvement were elbows and palmoplantar area in patients with type IV PRP. In our studies, palms and soles were the most common sites of involvement (Fig. 3) in both type III and type IV PRP patients. It seems that, in addition to the characteristic follicular hyperkeratotic papules and plaques, the palmoplantar hyperkeratosis could be a diagnostic feature in juvenile PRP. Whether palmoplantar involvement is more prevalent in type IV than type III PRP needs more observation.

Another unique finding in our studies is that 9 of 18 patients had buttock involvement, and 8 of these nine patients were with type IV PRP. The clinical manifestation varied from numerous erythematous follicular hyperkeratotic papules to orange-hued well-demarcated hyperkeratotic plaque, as the characteristic findings in the elbows and knees of patients with type IV PRP. This has never been described in previous reports. We suggested that, in addition to knees and elbows, buttock could be an another common site of involvement in type IV PRP.

Gelmetti et al. showed no cases of juvenile PRP with erythroderma or ectropion. But erythroderma (17%) and ectropion (13%) were seen in juvenile PRP patients in Allison’s series. Our studies showed no cases of juvenile PRP with erythroderma or ectropion.
Table 2 Comparison of the Clinical Presentation and Clinical Courses in Juvenile PRP Patients

<table>
<thead>
<tr>
<th></th>
<th>The present cases</th>
<th>Gelmetti <em>et al.</em> 5</th>
<th>Allison <em>et al.</em> 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case number</td>
<td>18</td>
<td>29</td>
<td>30*</td>
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<tr>
<td>Age at onset (years)</td>
<td>0-15</td>
<td>2-13</td>
<td>0-19</td>
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<tr>
<td>PRP type</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Type III</td>
<td>22%</td>
<td>34%</td>
<td>57%</td>
</tr>
<tr>
<td>Type IV</td>
<td>78%</td>
<td>66%</td>
<td>33%</td>
</tr>
<tr>
<td>Type V</td>
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<td>0%</td>
<td>3%</td>
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<tr>
<td>Distribution</td>
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<tr>
<td>Scalp</td>
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<td>63%</td>
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<td>Palms</td>
<td>94%***</td>
<td>84%**</td>
<td>47%**</td>
</tr>
<tr>
<td>Soles</td>
<td>94%***</td>
<td>84%**</td>
<td>47%**</td>
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<tr>
<td>Nails</td>
<td>11%</td>
<td>13%</td>
<td>33%</td>
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<tr>
<td>Response to treatment</td>
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<tr>
<td>Excellent</td>
<td>22%</td>
<td>83%</td>
<td>52%</td>
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<tr>
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<td>78%</td>
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<tr>
<td>Poor</td>
<td>0%</td>
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<td>20%</td>
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<td>Follow-up period</td>
<td>1 month to 9 years</td>
<td>1-20 years</td>
<td>NA</td>
</tr>
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</table>

PRP: pityriasis rubra pilaris
NA: not available
*one patient presented with mixed type III-IV, one presented with type IV that progressed to type III.
**data obtained in the forms of “palmoplantar” and “elbows and knees”.
***all patients had palmoplantar lesions with extension to the dorsal aspects of hands and feet.
& response to treatment was recorded as follows: excellent, 90% to 100% resolution; moderate, 30% to 90%; poor, less than 30%.
and our studies (11%) had similar percentage of nail involvement in juvenile cases, while Allison et al. (33%) had higher percentage.

Gelmetti et al. had no patients with a family history of PRP, but Allison et al. had 2 patients had a family history of PRP. None of our patients had family history of PRP or psoriasis.

The etiology of PRP remains unclear. Previously, vitamin A deficiency, infections, inoculations and minor traumas to the skin were proposed to be the causes, but these have not been proven. Upper respiratory tract infection and diarrhea preceded the onset of PRP in 6% of our patients, respectively. The skin lesions became aggravated during infectious diseases in another two patients. It suggested that infection might play a part in the pathogenesis of juvenile PRP. More recently, some authors proposed that immune dysregulation may play a role in the pathogenesis of PRP due to the association with autoimmune diseases, HIV infection, hypogammaglobulinemia and other immunologic abnormalities. Furthermore, it is clear that sunlight and phototherapy can affect PRP. There are many reports of disease exacerbations by sun light, but few reports of PRP presenting in a photosensitive distribution. Exacerbation of PRP after sun exposure was observed in two of our patients without distinct photosensitive distribution.

All patients were treated in an outpatient setting with topical agents, including topical corticosteroids, keratolytics, and calcipotriol. Most patients (56%) were prescribed more than one kind of topical agent. In addition to topical treatment, five patients took acitretin for short durations. Systemic retinoids isotretinoin and etretinate have been reported to show excellent therapeutic response in 75%~80 juvenile PRP patients. Nevertheless, in our five cases who received acitretin, they only showed moderate response to treatment. The duration of treatment might affect the response. One patient took acitretin for one week with some improvement, but he shifted to use topical agents alone due to the intolerable side effect of acitretin. Furthermore, in some patients treated with acitretin, the cutaneous manifestation became more severe.

Among five patients with excellent response to treatment, none of them receive systemic therapeutic approaches. Two of them were first seen before the age of 1 year, and another two patients were diagnosed at the age of 4 years, and the other one developed PRP at the age of 6 years. Whether age of onset is a good prognostic factor needs more observation. There is no conclusion on the treatment of choice for juvenile PRP from our studies, and it seems that juvenile PRP cases might have self-limited nature.

In conclusion, we herein present 18 juvenile PRP cases in the past 10 years in our department. The common sites of involvement were the palms and soles, knees, elbows, and buttock. Palmoplantar area is the most common site of involvement in both type III and type IV PRP cases. There is no family history or associated disease demonstrated in our patients. Infectious process and sun light could exacerbate the disease. The prognosis of juvenile PRP is generally good. There should be a standard for quantification of PRP severity, such as psoriasis area and severity index (PASI) score for psoriasis; thus it can be more objective to evaluate the patients. Further studies are needed to determine the pathogenesis of juvenile PRP.

Because this study is a retrospective chart review and follow-up information was obtained by telephone interviews with parents, there may have been some investigator, interviewer, and memory recall biases. No case controls for this study and a relatively small sample size are potential limitations of this study. No gold standard exists for severity assessment of PRP, thus there was difficult objective assessment for response to treatment. Therefore, subjective assessment by patient’s parents has greater influence. A prospective study and randomized controlled trial would better elucidate the most effective treatments for juvenile PRP.

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