

Original Research Article

An original study on Blaschkoid pityriasis rosea – one of the rarest atypical variants of this paraviral exanthem

Abstract

Background: Blaschko's lines are believed to be originated from the migration of mosaic populations of epidermal cells and tissues. Pityriasis rosea (PR) is an exanthem which might be associated with human herpesvirus-7 and -6 infections.

Objective: To evaluate the risk factors, clinical manifestations, co-morbid associations, and complications of patients with Blaschkoid PR, and to determine its relative incidence among all patients with PR.

Methods: Our setting was a skin clinic served by a consultant dermatologist. We searched for and retrieved records of all patients with Blaschkoid PR presented to us during an eight-year period.

Results: Out of 507 patients with PR seen by us, three (0.59%) patients had Blaschkoid PR. All three patients exhibited strictly unilateral distribution of one single group of lesions along Blaschko's lines, as linear or slight curved stripes. All three patients had prodromal symptoms, herald patches, secondary eruptions, peripheral collarette scaling for some lesions, and spontaneous clinical remission in two to six weeks. We found no risk factor, co-morbidity, and no complications for patients with Blaschkoid PR.

Conclusions: Blaschkoid PR is indeed rare. Apart from the rash distribution, clinical manifestations of this variant are in line with classical PR.

26 Keywords: atypical, Blaschkitis, Blaschkoid, classification of pityriasis
27 rosea, dermatome, mosaicism, variant

28

29 Introduction

30 Pityriasis rosea (PR) is an exanthem suspected to be related to primary infection or
31 endogenous reactivation of herpesviruses including human herpesvirus-7 and -6 [1,2].
32 Blaschko's lines are believed to be due to migration of mosaic populations of
33 epidermal cells and tissues [3]. Apart from congenital skin diseases, acquired skin
34 diseases conforming to these lines are increasingly being reported. The underlying
35 mechanisms for such associations are still largely unknown.

36 Only one patient with Blaschkoid PR has been reported [4]. We report here the first
37 systematic study for patients with Blaschkoid PR.

38 **Aim**

39 Our aim is to evaluate the clinical features of patients with Blaschkoid PR and to
40 determine its relative incidence among all patients with PR.

41 **Materials and Methods**

42 Our setting was a skin clinic serviced by a board-certified dermatologist. Patients
43 attended our clinics with or without referrals. We searched with the entrez *Blaschko*,
44 *Blaschko's*, *Blaschkoid*, and *pityriasis rosea* for patients who had consulted us over an
45 eight-year period (1 January 2006 - 31 December 2013), and retrieved records of all
46 patients with Blaschkoid PR seen by us during this period. We also searched for all
47 patients with PR seen by us during this period.

48 For each patient with Blaschkoid PR identified, we hand-reviewed the risk factors,
 49 clinical manifestations, co-morbid associations, and complications. Risk factors
 50 included demography, family history, congenital abnormalities, neonatal problems,
 51 immunisations, hospitalisations, history of pityriasis rosea, history of other viral
 52 exanthems and paraviral exanthems, congenital or acquired immunodeficiencies, drug
 53 history, travel history, contact history with other people with viral or paraviral
 54 exanthems, smoking, alcohol intake, and sexual history. Co-morbid conditions
 55 included atopy, other skin diseases, and chronic diseases. Complications included
 56 hyper- or hypo-pigmentations, systemic complications, and adverse effects due to
 57 treatments.

58 We then assessed whether clinical photographs were available to us, and whether
 59 consent of the patient or parents/guardians of children under the age of 16 had been
 60 given for us to publish the photographs.

61 If any risk factors, clinical manifestations, co-morbid associations, and complications
 62 were found, we would look for such in all patients with PR, and assess the association
 63 with the Fisher Exact Probability Test where applicable. Otherwise, we would
 64 employ the Chi-square Test. Risk ratios with 95% confidence intervals would also be
 65 calculated where applicable.

66 **Results**

67 507 patients with PR were seen by us during these eight years. All patients fulfilled
 68 the diagnostic criteria of PR [5]. Clinical records of three (0.59%) patients with
 69 Blaschkoid PR were retrieved. Their clinical manifestations are listed in Table 1. We
 70 noted no predisposing factor, co-morbid condition, and no complication.

71 Clinical photographs were available for one patient, with written informed consents to
72 publish his clinical photographs. We hereby present the clinical histories and findings
73 of these patients.

74 **Patient 1**

75 An 18-year old male student endured coryzal symptoms with no fever. One week
76 later, a skin patch was noted by him on the medial surface of his left thigh. Moderate
77 pruritus was noted. Six days later, daughter lesions appeared on either sides of the
78 herald patch. The secondary lesions stopped progressing five days later.

79 The patient enjoyed excellent past health. He had no history of allergic or irritant
80 contact dermatitis. Drug history including traditional topical or systemic remedies
81 was unremarkable over the previous month. His family members including his
82 girlfriend had no skin rash known to him.

83 We saw the patient two weeks after appearance of the herald patch. Examination
84 revealed no pallor and no jaundice. One large oval lesion around 4.5 cm at its longest
85 diameter was noted at the junction of the upper one-third and low two-thirds of the his
86 left thigh, in the medial aspect (Figure 1, arrowed). Peripheral collarette scaling
87 configuration with central clearance was noted. Smaller lesions with very similar
88 configurations were noted proximal and distal to the herald patch, in a linear
89 distribution.

90 Other body surface areas including the palmoplantar surfaces were unaffected.
91 Mucosal surfaces were normal. We noted no inguinal and other regional
92 lymphadenitis. Abdominal examination revealed no hepatosplenomegaly.

93 His complete blood picture, fasting glucose, and liver and renal function tests were
94 normal. HIV antibodies and VDRL were negative. ASOT was not elevated.
95 Lesional scrapping from the herald patch and several secondary lesions for potassium
96 hydroxide smear and for fungal culture later came back to be negative for yeasts and
97 for dermatophytes.

98 Lesional biopsy revealed parakeratosis, epidermal spongiosis, occasional dyskeratotic
99 cells and interface dermatitis with upper dermal lymphocytic infiltrates, involving the
100 perivascular areas. Extravasation of erythrocytes was noted at some places.

101 We diagnosed PR clinically. As the distribution of lesions was entirely unilateral and
102 along Blaschko's lines for this region (Figure 2), we diagnosed Blaschkoid PR. We
103 prescribed fluticasone cream to be applied twice daily and oral levocetirizine 5 mg
104 nocte for one week. Complete rash resolution with postinflammatory pigmentation
105 was noted when he attended us for follow-up 19 days after the appearance of the
106 herald patch. There was no recurrence for the next one year.

107 **Patients 2 and 3**

108 The clinical features of Patients 2 and 3 are summarised in Table 1. Lesional
109 histopathologies for both patients were non-specific spongiotic dermatitis with
110 inflammatory lymphocytic infiltrates in the epidermis.

111 We examined the clinical reports of these three patients meticulously. We noted no
112 predisposing factor,

113 Discussion

114 Blaschkoid PR was found by us to be extremely rare. The proportion of this variant
115 was only 0.59% for our patients with definite diagnoses of PR in these eight years.

116 For these three patients, the prodromal symptoms, herald patch, secondary eruption of
117 multiple lesions, collarette scaling, and remission without active treatment all
118 substantiated a diagnosis of PR. The histopathological changes were fairly specific
119 for PR for Patients 1, and less specific for PR for Patients 2 and 3. However, lesional
120 histopathological features for PR are non-specific, and are mainly used to exclude
121 important differential diagnoses only. Histopathological changes of all three patients
122 are therefore compatible with diagnoses of PR.

123 There has only been one report on Blaschkoid PR as indexed in *PubMed* [4]. That
124 female aged 42 years, and the authors stated that her eruption fulfilled the diagnostic
125 criteria of PR [4,5].

126 We have previously proposed a new classification for typical and atypical PR [6].
127 Despite Blaschkoid PR having been reported for one patient only [4], we incorporated
128 *Blaschkoid pityriasis rosea* in the classification. At that time, we were unsure about
129 whether this variant was singular only, with no further reports in the future. To the
130 best of our knowledge, this article is thus the first reported systematic study on
131 Blaschkoid PR.

132 Blaschko's lines originate from physiological development of the skin during
133 embryogenesis [3]. It is postulated that mutation leads to the formation of mosaic cell
134 populations. Migration of these cell populations causes these lines. These lines are
135 "V" shaped on the back, inverted "U" shaped on the upper anterior chest and breasts,
136 "S" shaped with whirls on the lower anterior chest and abdomen, as complicated

137 curves on the face, wavy on the head, and longitudinal on the upper and lower limbs
138 (Figure 2). These lines do not cross the midline, and thus skin diseases along these
139 lines are characteristically asymmetrical or unilateral [3,7,8]. When a skin disease is
140 said to be *Blaschkoid*, usually only one group of lesions is seen, with multiple lesions
141 being involved along these lines, in linear or curved manner.

142 We believe that our three patients demonstrated Blaschkoid PR due to four reasons.
143 Firstly, there was only one group of lesions present for all three patients. Other skin
144 surfaces were not affected. These were definitely not classical PR for which the
145 distribution of the secondary lesions should be on the trunk and proximal aspects of
146 limbs.

147 Secondly, the distributions were strictly unilateral for all three patients, a feature
148 shared by many other skin diseases with distribution along Blaschko's lines.

149 Thirdly, the distribution of the lesions was linear or as curved stripes for all three
150 patients, which is the pattern of Blaschko's lines for the corresponding body regions.
151 For patient 1, the distributions were vertical down on the thighs, directly
152 corresponding to Blaschko's lines on the thigh. For Patient 2, the lesions were at the
153 posterior and superior aspect of the right thigh. The distribution was semi-circular,
154 directly corresponding to the directions of Blaschko's lines for this region. For
155 Patient 3, the lesions were at the medial aspect of the left groin, involving the left
156 aspect of the scrotal skin as well. The curving distribution of the lesions conformed to
157 Blaschko's lines in that region.

158 Fourthly, the distributions of lesions for all three patients do not correspond with other
159 dermatological linear or curved patterns, such as dermatomes or lines of skin cleavage
160 [8,9].

161 We might compare the distribution of lesions with the dermatomes. For Patient 1, the
162 lesions inferior to the left inguinal crease lie at dermatome L2. However, the lesions
163 jump to medial aspects of the thigh which would correspond to L3. L3 covers the
164 anterior aspects of the lower thigh, but no lesion is there. For Patient 2, the lesions
165 seem to be lying at the right S3 region. However, S3 covers some of the anterior
166 surface of the scrotal skin, but no lesions are there. For Patient 3, the lesions jump
167 from S3 (and probably S4) to L1.

168 Many skin diseases exhibiting Blaschkoid distributions are congenital [10,11] such as
169 hypomelanosis of Ito, linear and whorled naevoid hypermelanosis, inflammatory
170 linear verrucous epidermal naevus, and congenital milia *en plaque* [12]. Acquired
171 skin diseases associated with Blaschko's lines include lichen striatus [13], lichen
172 planus [7,14], seborrhoeic keratosis, fixed drug eruption, segmental vitiligo [15],
173 linear trichilemmoma [16], and morphoea [17,18]. More intriguing are the
174 associations of Blaschko's lines and infections, including pityriasis versicolor [19]
175 and tuberculoid leprosy [20], suggesting immunopathogenetic elements of the lines in
176 these diseases.

177 For some conditions such as Becker's naevus, both congenital and acquired patterns
178 are seen [21]. For some conditions such as lichen planus, both Blaschkoid-types and
179 Köebner phenomenon-types are seen [14]. However, Blaschko's lines *per se* is not
180 related to Köebner phenomenon [3,14]. The nosology of lichen striatus and
181 Blaschkitis [22] and the classification of *Blaschko-linear manifestations of multifactor*
182 *polygenic diseases* [23] are still being explored.

183 A particular strength of this study is that all patients consulted us directly without
184 referrals. Patients with all variants and severities of PR could thus consult us. Our
185 data is therefore the best proxy measure of PR in the community. If this study was

186 performed in a hospital-based setting, only patients with extensive rashes or severe
187 pruritus might be seen. This would lead to biased sampling from all patients with PR.

188 Moreover, we could see patients at an earlier phase of PR, enabling us to document
189 the clinical manifestations as text and images in the active phase of PR. PR is a self-
190 limiting disease. A delay in referrals might be accompanied by partial remission of
191 the rash, and clinical photographs might only capture remitting rashes without active
192 earlier features.

193 The major limitation of this report is that owing to the retrospective methodology, we
194 had little to no virological, histopathological, immunohistochemical, and serological
195 results for our patients. However, given the classical clinical features of coryzal
196 phase, herald plaque, secondary eruptions, peripheral collarette scaling, typical course,
197 and the compatible histopathologies, we leave no doubt that *Blaschkoid pityriasis*
198 *rosea* is the most appropriate diagnostic label for our three patients.

199 Another limitation is that owing to the small number of patients with Blaschkoid PR
200 found, the estimated proportional incidence of 0.59% incurs low validity and low
201 reliability. Studies on larger scales would be needed to determine the incidences of
202 this and other variants of this paraviral exanthem.

203 **Conclusion**

204 Blaschkoid PR is a very rare variant of PR. The proportion was only 0.59% for all
205 patients with PR which we have seen over eight years. Apart from the rash
206 distribution, clinical features of this variant are in line with classical PR, with coryzal
207 symptoms, herald patch, secondary eruption, peripheral collarette scaling, and
208 spontaneous remission over two to four weeks.

209

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Table 1

Patient number	Age and sex	Prodromal symptoms	Herald patch	Number of groups of lesions	Symmetry	Skin areas with Blaschkoid pityriasis rosea	Linear or slightly curved strip	Peripheral collarette scaling	Treatments given	Clinical course
1	18 years, male	Present	Present, clearly documented	One	Strictly unilateral, left	Medial aspect of left thigh	Yes	Present	Oral levocetizine, topical fluticasone	Clinical remission 19 days after the appearance of the herald patch
2	32 years, male	Present	Present, clearly documented	One	Strictly unilateral, right	Posterior and superior aspect of right thigh	Yes	Present	None	Clinical remission 10 days after appearance of the herald patch
3	12 years, male	Present	Present, clearly documented	One	Strictly unilateral, left	Medial aspect of left groin and left scrotal skin	Yes	Present	None	Clinical remission 14 days after appearance of the herald patch

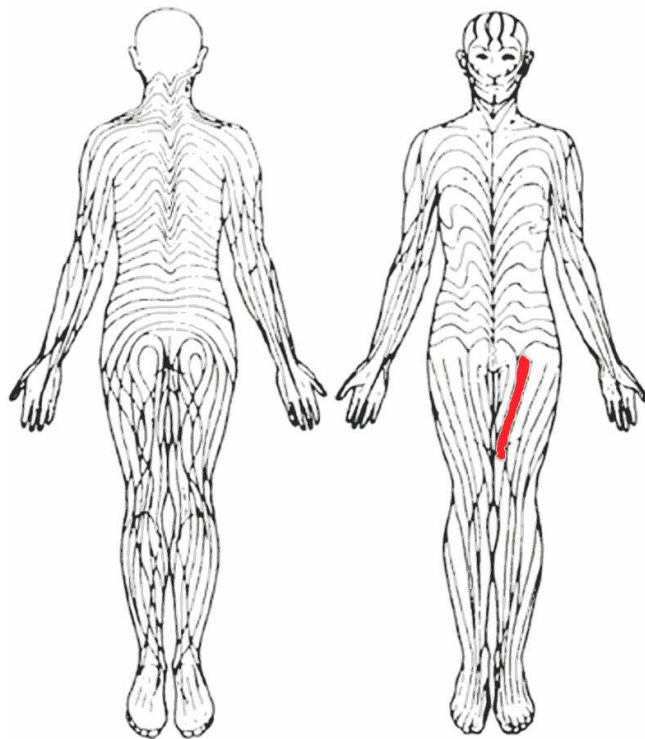
Table legend

Table 1: Clinical data of three patients with Blaschkoid pityriasis rosea

Figure 1



Figure 2



278 **Figures legends**

279 Figure 1: Lesions of Patient 1 with Blaschkoid pityriasis rosea in a linear
280 distribution along the medial aspect of his left thigh. The herald is
281 arrowed black.

282 Figure 2: Classical Blaschko's lines with the affected area of Patient 1 colour-
283 filled in red.