

# Pityriasis Amiantacea Following Bone Marrow Transplant

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## PRACTICE POINTS

- Pityriasis amiantacea (PA) is associated with several dermatologic conditions, including atopic dermatitis, bacterial and fungal infections, psoriasis, and seborrheic dermatitis.
- Drug-induced PA is rare, but the condition has been reported in the context of treatment with tumor necrosis factor  $\alpha$  inhibitors and vemurafenib.
- Our report suggests that PA may be associated with either melphalan conditioning, bone marrow transplant, or both.

Pityriasis amiantacea (PA) is a hair disorder characterized by matting of multiple hair shafts, typically occurring as an idiopathic condition. A 67-year-old woman with multiple myeloma who developed PA following a bone marrow transplant with melphalan conditioning is described. She noted initial changes in scalp hair regrowth 4 weeks posttransplant. During the next 4 months she developed multiple lesions of PA that rapidly responded to management, including mineral oil under occlusion in the evening followed by daily shampooing with alternating coal tar, salicylic acid, and ketoconazole shampoos. We review medications that have been associated with PA and conditions related to PA, including atopic dermatitis, bacterial infection, fungal infection, psoriasis, and seborrheic dermatitis. Our patient developed PA that was associated with either melphalan conditioning, bone marrow transplant, or both.

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**P**ityriasis amiantacea (PA) is characterized by adherence of hair shafts proximally.<sup>1</sup> It has been associated with dermatologic conditions and rarely with

medications. We describe a woman who developed PA following a bone marrow transplant with melphalan conditioning. We also review drug-induced PA and disorders that have been linked to this condition.

## Case Report

A 67-year-old woman with a history of multiple myeloma was treated with 7 courses of chemotherapy (cyclophosphamide, bortezomib, prednisone). One month later, the patient underwent a bone marrow transplant with melphalan conditioning due to residual plasma cell myeloma. Following the transplant, she developed complete scalp alopecia. Prior to and following transplant, the patient's hair care regimen included washing her hair and scalp every other day with over-the-counter "natural" shampoos. During drug-induced alopecia, the hair washing became less frequent.

The patient left the hospital 4 weeks posttransplant; her hair had started to regrow, but its appearance was altered. Posttransplant, the patient was maintained on bortezomib every other week and zoledronate once per month. She continued to develop multiple lesions in the scalp hairs during the following 4 months.

Eight months posttransplant she presented for evaluation of the scalp hair. Clinical examination showed hairs that were entwined together proximally, resulting in matting of the hair (Figure 1). A diagnosis of PA was established based on the clinical examination.

Treatment included mineral oil application to the scalp under occlusion each evening, followed by morning washing with coal tar 0.5%, salicylic acid 6%, or ketoconazole 2% shampoo in a repeating sequential manner. Within 1 month there was complete resolution of the scalp condition (Figure 2).

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**FIGURE 1.** A, Distant view of the scalp of a 67-year-old woman showed pityriasis amiantacea presenting as proximal matting of hair with concretions around multiple hair follicles. B, Closer view showed the same.



**FIGURE 2.** A, Distant view of scalp after resolution of pityriasis amiantacea showed the hair without any matting. B, Closer view showed the same.

## Comment

**Clinical Presentation**—Pityriasis amiantacea is characterized by thick excessive scale of the scalp<sup>1</sup>; it was initially described by Alibert<sup>2</sup> in 1832. He described the gross appearance of the scales as resembling the feathers of young birds, which naturalists dub “amiante” or asbestoslike.<sup>1,2</sup> In 1917, Gougerot<sup>3</sup> explored infectious etiologies of this condition by describing cases of impetigo that transitioned into PA.<sup>1</sup> Later, in 1929, Photinos<sup>4</sup> described fungal origins of PA, giving credence to “tinea amiantacea.”<sup>1</sup> However, more recent analyses failed to isolate fungus.<sup>5–7</sup> As such, *pityriasis (scaling) amiantacea* is the more appropriate term, as emphasized by Brown<sup>8</sup> in 1948. The cause of PA remains unclear; it is hypothesized that the condition is a reaction to underlying inflammatory dermatoses, though concurrent bacterial or fungal infection may be present.<sup>5,9</sup>

**Prevalence**—Pityriasis amiantacea is considered to be most prevalent in pediatric patients and young adults; it is more common in females.<sup>1,9,10</sup> In a review of 85 PA patients, more than 80% were women (n=69), and the mean age at presentation was 23.8 years. Approximately half of these patients had widespread scalp lesions (n=42); however, focal localized lesions were common.<sup>9</sup> No hereditary patterns have been described, though 3 pairs of the 10 patients with PA in Ring and Kaplan’s<sup>7</sup> review were siblings.

**Clinical Findings**—Clinically, lesions of PA present as matted hairs.<sup>1</sup> Thick scales encompass multiple hair shafts, binding down tufts of hair.<sup>1,6,11</sup> Patients are asymptomatic, though the lesions may be accompanied by pruritus. The hairs enclosed by the scales in some cases may be easily pulled out.<sup>6</sup> Notably, alopecia often accompanies PA; it often is reversible, but in some cases, it is permanent and can lead to scarring.<sup>9,12</sup>

**TABLE 1. Drug-Induced Pityriasis Amiantacea**

Reference (Year)	Medication	Onset, mo <sup>a</sup>	Associated Disease	Treatment	Comments
Ettler et al <sup>16</sup> (2012) <sup>b</sup>	Adalimumab, infliximab	24	Crohn disease	Keratolytic shampoo, coal tar, topical corticosteroids	Psoriasis can be a complication of TNF- $\alpha$ inhibitors in patients with Crohn disease; the authors contend this patient's PA was a unique manifestation of his underlying psoriasis; lesions responded within 1 wk of treatment for PA
Bilgiç <sup>20</sup> (2016) <sup>c</sup>	Vemurafenib	2	Metastatic melanoma	Salicylic acid shampoos, coal tar, and topical corticosteroids	Lesions responded within 10 d of treatment with no modification of vemurafenib dosage
Zamperetti et al <sup>21</sup> (2017) <sup>d</sup>	Adalimumab	NR	Crohn disease	Povidone-iodine liquid soap, clobetasol propionate, zinc pyrithione shampoo, and systemic antibiotics	Lesions responded promptly to povidone-iodine liquid soap, clobetasol propionate, zinc pyrithione shampoo, and systemic antibiotics
Current report <sup>e</sup>	Melphalan	1	Multiple myeloma	Nightly mineral oil under occlusion with alternating shampoo sequence of salicylic acid, coal tar, and ketoconazole	Patient strongly suspected scalp lesions resulted from melphalan conditioning and subsequent bone marrow transplant; lesions responded rapidly to PA therapy

Abbreviations: TNF, tumor necrosis factor; PA, pityriasis amiantacea; NR, not reported.

<sup>a</sup>The number of months between initiation of treatment with the drug and the occurrence of PA.

<sup>b</sup>Man (age, 21 years) with Crohn disease began treatment with infliximab 6 years prior to presentation for PA. Two years after starting infliximab, the patient began to develop lesions on the scalp. One year later, infliximab was stopped. At this point, adalimumab was started then continued for 3 years. Scalp lesions progressed to affect the entire scalp. Adalimumab was stopped 4 months before the patient presented with a 4-year history of pruritic scalp lesions.

<sup>c</sup>Man (age, 54 years) presented with thick white scales surrounding hair shafts on the entire scalp of 3 weeks' duration. The patient was on vemurafenib for melanoma, which metastasized to the lungs, liver, and vertebrae.

<sup>d</sup>Woman (age, 21 years) presented with crusts and erosions on the scalp that began within weeks of starting adalimumab for Crohn disease. Clinicopathologic correlation led to the diagnosis of PA with underlying folliculitis decalvans.

<sup>e</sup>Woman (age, 67 years) with multiple myeloma developed PA following a bone marrow transplant with melphalan conditioning.

**Histopathology**—Submission of hair specimens to histopathology usually is not performed since the diagnosis often is established based on the clinical presentation.<sup>5</sup> However, submitted specimens have demonstrated spongiosis and parakeratosis along with reduction in the size of the sebaceous glands.<sup>1,9</sup> Additionally, follicular keratosis that surrounds the hair shafts with a sheath of horn is present.<sup>9</sup> Acanthosis and migration of lymphocytes into the epidermis also have been found.<sup>1</sup> Often, *Staphylococcus aureus* isolates are detected.<sup>9,13</sup>

**Differential Diagnosis**—The clinical differential diagnosis of PA includes hair casts,<sup>11</sup> pediculosis,<sup>14</sup> and tinea capitis.<sup>12</sup> In PA, thick scales surround hair shafts and thus bind down tufts of hair.<sup>9</sup> In patients with pediculosis, nits are attached to the hair shaft at an angle and do not entirely envelop the hair shaft.<sup>14</sup> In addition, PA may be complicated by impetiginization; bacteria often are found in the keratin surrounding the hair shaft and represent either normal flora or secondary infection.<sup>1,15</sup> It has been speculated that microbial biofilms from *S aureus*



and *Staphylococcus epidermidis* promote agglomeration of hair shafts and adherent scale.<sup>16</sup> Bona fide dermatophyte infection of the scalp also may be concurrently present.<sup>12</sup>

**Treatment**—Our treatment included occlusion with mineral oil to loosen the scales from the scalp in tandem with shampoos traditionally used in patients with seborrheic dermatitis or psoriasis. Timely treatment is important to prevent scarring alopecia.<sup>13,17</sup> Pityriasis amiantacea may be treatment resistant, and there are no specific therapeutic guidelines; rather, therapy should be targeted at the suspected underlying condition.<sup>17</sup> Treatment generally includes keratolytic agents, such as salicylic acid.<sup>18</sup> These agents allow enhanced penetration of other topical agents.<sup>19</sup> Topical antifungal shampoos such as ketoconazole and ciclopirox are recommended,<sup>18</sup> though other topical agents, such as coal tar and zinc pyrithione, also may benefit patients.<sup>13</sup> Topical corticosteroids may be used if the condition is linked with psoriasis.<sup>13</sup> Systemic antibiotics are added if *S aureus* superinfection is suspected.<sup>9</sup>

A single report described successful management of a patient with severe refractory PA who was treated with the tumor necrosis factor (TNF)  $\alpha$  inhibitor infliximab.<sup>13</sup> A 47-year-old woman presented with thick adherent scale on the scalp. She was treated with coal tar for 18 months but showed no improvement; the patient was subsequently prescribed salicylic acid 10%, clobetasol solution, and coal tar shampoo. After 3 months, when no improvement was observed, the patient was offered infliximab but declined. For 6 years the patient was treated with salicylic acid 20%, clobetasol (foam, lotion, shampoo, and solution), and coal tar shampoo without improvement. She then consented to infliximab therapy; after 3 infusions at weeks 0, 2, and 6, she demonstrated notable improvement. The patient was maintained on infliximab every 8 weeks.<sup>13</sup>

**Pathogenesis**—The pathogenesis of PA has yet to be definitively established, and the condition is usually idiopathic. In addition to bacterial or fungal etiologies,<sup>3,4</sup> PA has been linked to medications (Table 1)<sup>16,20,21</sup> and systemic conditions (Table 2).<sup>1,3,5,7-10,12,22-25</sup>

A PubMed search of articles indexed for MEDLINE using the search terms *amiantacea*, *bone*, *drug*, *hair marrow*, *malignancy*, *melfhalan*, *pityriasis*, *tinea*, and *transplant* yielded 4 patients—2 men and 2 women (including our patient)—with possible drug-induced PA (Table 1)<sup>16,20,21</sup>; however, the onset after 2 years of medication (TNF- $\alpha$  inhibitors) or resolution while still receiving the agent (vemurafenib) makes the drug-induced linkage weak. The patients ranged in age from 21 to 67 years, with the median age being 37.5 years. Medications included melfhalan, TNF- $\alpha$  inhibitors (adalimumab, infliximab),<sup>16,21</sup> and vemurafenib<sup>20</sup>; it is interesting that infliximab was the medication associated with eliciting PA in 1 patient yet was an effective therapy in another patient with treatment-resistant PA. The onset of PA occurred between 1 month (melfhalan) and 24 months

**TABLE 2. Dermatologic Conditions Associated With Pityriasis Amiantacea**

Condition
Atopic dermatitis <sup>1,9</sup>
Bacterial infection <sup>1,3,9</sup>
Darier disease <sup>22,23</sup>
Fungal infection <sup>9,10,12</sup>
Lichen planus <sup>9</sup>
Lichen simplex <sup>9</sup>
Neurodermatitis <sup>8</sup>
Pityriasis rubra pilaris <sup>5</sup>
Psoriasis <sup>1,7-10,24,25</sup>
Seborrheic dermatitis <sup>7,9,10,25</sup>

(TNF- $\alpha$  inhibitors) after drug initiation. The patients' associated diseases included Crohn disease,<sup>16,21</sup> metastatic melanoma,<sup>20</sup> and multiple myeloma.

Other conditions have been described in patients with PA (Table 2). Indeed, PA may be a manifestation of an underlying inflammatory skin disease.<sup>9</sup> In addition to dermatologic conditions, procedures or malignancy may be associated with the disease, as demonstrated in our patient. Most commonly, PA is seen in association with psoriasis and seborrheic dermatitis; atopic dermatitis, bacterial infection, fungal infection, lichen planus, and neurodermatitis also have been associated with PA.<sup>1,3,5,7-10,12,18,22-25</sup>

## Conclusion

Pityriasis amiantacea is a benign condition affecting the scalp hair. Albeit uncommon, it may appear in patients treated with medications such as melfhalan, TNF- $\alpha$  inhibitors, and vemurafenib. In addition, it has been described in individuals with dermatologic conditions, systemic procedures, or underlying malignancy. Our patient developed PA following a bone marrow transplant after receiving conditioning with melfhalan.

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