CASE REPORT

Acquired perforating dermatosis: A rare presentation

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ABSTRACT

Perforating diseases are a group of papulonodular skin disorders characterized by keratotic plugs or crusts in which dermal connective tissue is eliminated through the epidermis. We present a case of acquired perforating dermatosis that manifested mainly by ulcerations on the lower limbs, which is a rare presentation of this disease. Hence acquired perforating dermatosis must be considered in the differential diagnosis of any ulcerations of the lower limbs, especially in patients with renal disease and diabetes mellitus.

INTRODUCTION

The perforating diseases are a group of papulonodular skin disorders characterized by keratotic plugs or crusts in which dermal connective tissue 'perforates' or is eliminated through the epidermis.1 The epidermis often becomes hyperplastic, eventually surrounds the material to be extruded, and subsequently causes the material's elimination via normal keratinocyte maturation.[1]

The major perforating diseases are divided into acquired perforating dermatosis, perforating folliculitis, elastosis perforans serpiginosa, reactive perforating collagenosis, and perforating periumbilical calcific elastosis. They are classified histopathologically according to the type of epidermal disruption and the nature of the eliminated material.[2] Until recently, the five conditions mentioned were thought to be unrelated, but there have now been numerous reports of these perforating dermatoses occurring in diabetes mellitus or in patients with chronic renal failure, many of whom were undergoing hemodialysis.[3-8] An incidence of 11% has been reported, with a particular association with long-standing diabetes.[8]

We report a patient who presented with a rare ulcerative form of acquired perforating dermatosis.

CASE REPORT

A 43 year old diabetic male presented with an acute, progressive eruption of multiple, pruritic papules on both lower limbs of one month duration. Most lesions were ulcerated with a crust. There was no significant past or family history. He had been taking oral hypoglycemic agents and had no history of hypertension, chronic renal failure, or trauma. Review of other systems was unremarkable.

Examination revealed multiple keratotic papules and ulcers topped by crusts, mainly affecting the legs and dorsae of both feet. (Fig. 1) They varied in shapes and sizes ranging from 0.5-2.0 cm, few were keratotic, while the majority were ulcerated. (Fig. 2) There was slight erythema surrounding the lesions. Most of the ulcerations were having crusts without evidence of pus with healthy granulation tissue on the floor. Umbilcated dome-

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shaped keratotic papules were mostly observed on the dorsae of the feet. (Fig. 3) The differential diagnoses included cutaneous small vessel vasculitis, pyoderma gangrenosum, ecthyma, dermatitis artefacta, and acquired perforating dermatosis.

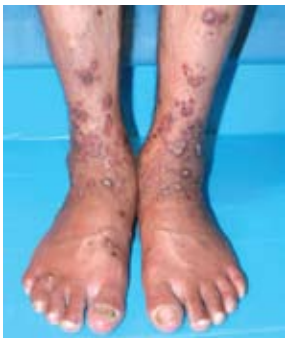

Fig. 1 Multiple umbilicated papules with central keratin-filled plugs and ulcers on the dorsal aspect of the lower limbs.

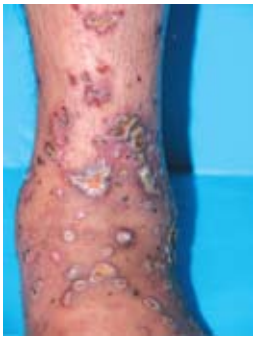

Fig. 2 Ulcerated papules and plaques varying in size from 0.5-2.0 cm with few keratotic lesions.

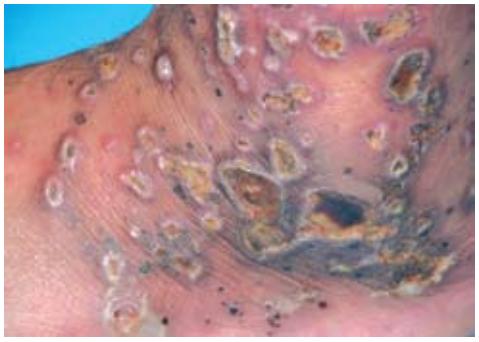

Fig. 3 Ulcerated lesions with surrounding erythema and healthy granulation tissue at the base without any evidence of pus.

Investigations revealed a fasting blood glucose level of 9.9 mmol/L. However, complete blood count, blood urea nitrogen, creatinine, serum electrolytes, urinalysis, anti nuclear antibodies and cryoglobulins were negative or within normal ranges. Biopsy specimens from the lesion were stained with hematoxylin-eosin, Masson-trichrome, Verhoff von Geison, and Periodic Acid-Schiff. These sections showed a central cup-shaped depression area of the epidermis that contained a solid mass of hyperkeratosis and parakeratotic keratinous material combined with inflammatory cells. The periphery of the epidermis showed pale vacuolated keratinocytes. The epidermis at the base of the crater was ulcerated. (Fig. 4) Masson-trichrome stained sections showed an invagination that contained altered collagen eliminated transepidermally surrounded by mixed inflammatory infiltrate. (Fig. 5)

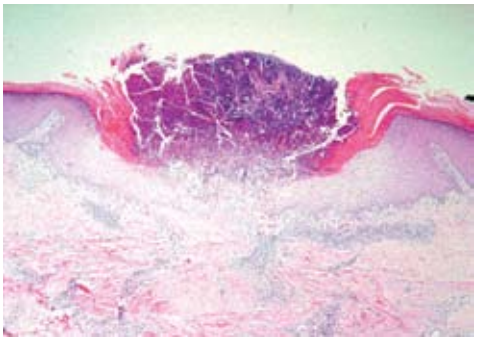

Fig. 4 H&E section of an umbilicated lesion showing transepidermal elimination of fibers and cup-shaped invagination of the epidermis containing a large plug of keratin and degenerating nuclei of inflammatory cells.

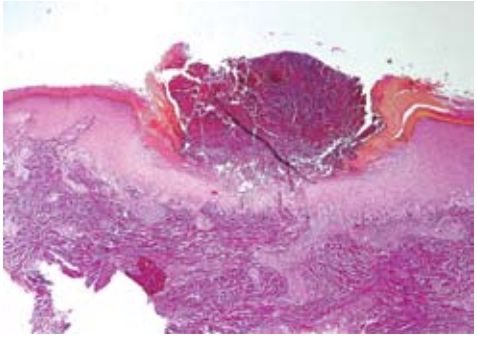

Fig. 5 Degenerated collagen bundles are seen in the umbilicated lesion. (Masson-trichrome)

DISCUSSION

The acquired perforating disorders consist of a group of conditions characterized by transepithelial elimination of dermal material.[9] Umbilicated papules with central white, keratotic crusts are the

clinical hallmarks of the perforating disorders.[9] Historically, reactive perforating collagenosis, Kyrle's disease, and perforating folliculitis have been differentiated from another histologically.[9] In 1982, reactive perforating collagenosis was described as associated with diabetes and renal disease.[10] In retrospect, cases of Kyrle's disease and perforating folliculitis had also been associated with diabetes and renal failure[11,12] and reexamination of histologic sections and some of those cases revealed transepidermal elimination of collagen consistent with reactive perforating collagenosis. Because of the common association with diabetes and renal failure, one group of authors suggested that the diseases be called reactive perforating collagenosis of diabetes and renal failure.[13] More recently, another group of authors suggested the term acquired perforating dermatosis.[14]

Although there are several theories that seek to explain the etiology of the perforating disorders, none have been proven.[9] Noting a microvasculopathy in the dermis of affected patients, one study hypothesized that perforating disorders are triggered by trauma to the skin that results in an abnormal cutaneous response due to the dermal vasculopathy.[15] Yet another group of investigators showed increased serum or extracelleular matrix fibronectin, suggesting that fibronectin may result in increased epithelial migration that ultimately results in perforation.[16] Other theories have attributed perforating disorders to elevated plasma silicon in patients on dialysis[17] or to the vitamin A deficiency.[18,19] The pathogenesis of acquired perforating dermatosis is thought to be related to pruritis, leading to traumatization by scratching or rubbing, and dermal microdeposits of uric acid or hydroxyl apatite, resulting in an inflammatory reaction, connective tissue degeneration, and the release of mediators in patients with chronic renal failure.[20] While none of these theories concerning the etiology of the perforating disorders has been proven, all agree that affected patients have an abnormal cutaneous response to trauma.

The patient fulfilled Favers diagnostic criteria for acquired reactive perforating dermatosis, i.e. (i) histopathologic findings of elimination of necrotic basophilic collagen tissue into a cup-shaped epidermal depression, (ii) clinical presentation of umbilicated papules or nodules with central adherent keratotic plug, and (iii) onset of skin lesions after the age of 18 years.[21] Acquired perforating dermatosis is associated with diabetes mellitus and renal failure patients undergoing hemodialysis. It has also been found to be linked to other entities including hepatic disease, thyroid illness, malignancy, scabies, AIDS[22,23] and primary sclerosing cholangitis.[9] The clinical presentation is characterized by umbilicated papules with central white, keratotic crusts that develop on the arms and legs, but any site on the cutaneous surface can be affected including the trunk and scalp.[9] Virtually all patients complain of pruritis, and scratching can lead to a Koebner phenomenon.[9] Recently, several cases were described occurring in a zosteriform distribution.[24]

Histpathologically, acquired perforating dermatosis exhibit invagination of the epidermis that is filled with a keratotic plug containing a parakeratotic column which has elements of leukocytes, collagen, and nuclear debris.[25-27] Subsequent studies with Masson-trichrome stains show an invagination containing altered collagen as well as the fibers transepidermal elimination.

Acquired perforating dermatosis is difficult to treat. Retinoic acid has shown some benefit along with topical antihistamines to alleviate the pruri-

tis.[28] Other topical agents used include lubricants, steroids, keratolytics, and vitamin A with variable degrees of success.[22,23] In recent years, oral retinoids, including isotretinoin[29] and acitretin,[30] and phototherapy has also been used effectively. Most recently, there have been several reports of success in treating perforating disorders with allopurinol.[31-33] Also, doxycyclin has been used successfully to treat acquired perforating disorders.[34] A Chinese study showed a reduction of pruritis with the use of trans-cutaneous electrical nerve stimulation.[35] Destructive modalities such as cryotherapy and laser have been effective.[36,37] Most of the perforating diseases continue for years unless treated. With renal transplantation, lesions can resolve.[38]

CONCLUSION

We presented a case of acquired perforating dermatosis that manifested mainly by ulcerations on the lower limbs, which is a rare presentation of this disease. So, acquired perforating dermatosis must be considered in the differential diagnosis of any ulcerations of the lower limbs, especially in patients with renal disease and diabetes mellitus.

REFERENCES

1. Rapini, P, Ronald. Dermatology. 2nd Ed. Spain : Elsevier Limited, 2008:232-342.
2. Burrows, N.P. & Lovell C.R. Rook's Textbook of Dermatology. 7th Ed. UK: Blackwell Publishing Ltd, 2004:872-882.
3. Patterson JW. The perforating disorders. J Am Acad Dermatol 1984; 10:561-81.
4. Cochran RJ, Tucker SB, Wilkin JK et al. Reactive perforating collagenosis of diabetes mellitus and renal failure. Cutis 1983; 3:55-8.
5. Poliak SC, Lebwohl MG, Parris A et al. Reactive perforating collagenosis associated with diabetes mellitus. N Engl J Med 1982; 301:81-4.
6. Rapini RP, Herbert AA, Drucker CR et al. Acquired perforating dermatoses; evidence of combined transepidermal elimination of both collagen and elastic fibers. Arch Dermatol 1989; 125:1074-8.
7. Stone RA. Kyrle-like lesions into patients with renal failure undergoing dialysis. J Am Acad Dermatol 1981; 5:707-9.
8. Morton CA, Henderson IS, Johns MC et al. Acquired Perforating Dermatosis in a British Dialysis Population. Br J Dermatol 1996; 135:671-7.
9. Lebwohl, Mark. Fitzpatrick's Dermatology in General Medicine. 6th Ed. USA: McGraw Hill Companies, 2003:page no.
10. Poliak SC et al. Reactive perforating collagenosis associated with diabetes mellitus. N Engl J Med 1982; 306:81.
11. Harman M et al. Kyrle's disease in diabetes mellitus and chronic renal failure. J Eur Acad Dermatol Venereol 1998; 11:87.
12. Hurwitz RM et al. Perforating folliculitis in association with hemodialysis. Am J Dermatopathol 1982; 4:101.
13. Cochran RJ et al. Reactive perforating collagenosis of diabetes mellitus and renal failure. Cutis 1983; 31:55.
14. Rapini RP et al. Acquried perforating dermatosis. Evidence for combined transepidermal elimination of both collagen and elastic fibers. Arch Dermatol 1989; 125:1074.
15. Kawakami T, Saito R. Acquired reactive perforating collagenosis associated with diabetes mellitus: Eight cases that meet Faver's criteria. Br J Dermatol 1999; 140:521.
16. Morgan MB et al. Fibronectin and the extracellular matrix in the perforating disorders of the skin. Am J Dermatopathol 1998; 20:147.
17. Saldanha LF et al. Silicon-related syndrome in dialysis patients. Nephron 1997; 77:48.
18. Neil SM et al. Phrynoderma and perforating folliculitus due to vitamin A deficiency in a diabetic. J R Soc Med 1988; 81:171.
19. Barr DJ et al. Bypass Phrynoderma. Vitamin A deficiency associated with bowel-bypass surgery. Arch Dermatol 1984; 120:919.
20. Hana B et al. An unusual case with membranous lipodystrophy in a hypertensive patient with transepidermal elimination. Yon Med J 2006; 47:428.
21. Faver IR, Daoud MS, Su WP. Acquired reactive perfo-

rating collagenosis. J Am Acad Dermatol 1994; 30:575-580.

22. Morton CA et al. Acquired perforating dermatosis in a British dialysis population. Br J Dermatol 1996; 135:671-677.
23. Saray Y et al. Acquired perforating dermatosis: Clinicopathological features in twenty-two cases. J Eur Acad Dermatol Venereol 2006; 20:679-688.
24. Nakanishi G, Tsunemitsu R, Akagi O. Reactive perforating collagenosis occurring in a zosteriform distribution. PR J Dermatol 1999; 414:367-9.
25. Norman, A. Dermal manifestations of diabetes. Norman R(Ed). Geriatric Dermatology. New York, NY: Parthenon Publishing, 2001; 143-54.
26. Perez I and Kohn R. Cutaneous manifestations of diabetes. J Am Acad Dermatol 1994; 30:519-31.
27. Zelger B, Hintner H, Aubock J, et al. Acquired perforating dermatosis: transepidermal elimination of DNA material and possible role of leukocytes in pathogenesis. Arch Dermatol 1991; 125:695-700.
28. Berger RS. Reactive perforating collagenosis of renal failure: diabetes responsive to topical retinoic acid. Cutis. 1989; 43:540-2.
29. Saleh HA et al. Kyrle's disease. Effectively treated with isotretinoin. J Fla Med Assoc 1993; 80:395
30. Baumer FE et al. The Kyrle's disease entity and its therapeutic modification by acitretin. Z Hautkr 1989; 64:286-289.
31. Quering K et al. Treatment of acquired reactive perforating collagenosis with allopurinol. Br J Dermatol 2001; 145:174.
32. Munch M et al. Treatment of perforating collagenosis of diabetes and renal failure with allopurinol. Clin Exp Dermatol 2000; 25:615.
33. Kruger K et al. Acquired Reactive Perforating Dermatosis. Successful treatment with allopurinol in 2 cases. Hautarzt 1999; 50:115.
34. Brinkmeier T et al. Successful treatment of acquired reactive perforating collagenosis with doxycyclin. Acta Derm Venereol 2002; 82:393-5.
35. Chan LY, Tang WY and Lo KK. Treatment of pruritis of reactive perforating collagenosis using transcutaneous electrical nerve stimulation. Eur. J. Dermatol 2000; 10:59-61.
36. Tuyp EJ. Mcleod WA. Elastosis perforans serpiginosa: treatment with liquid nitrogen. Int J Dermatol 1990;29:655.
37. Kaufman AG. Treatment of elastosis perforans serpiginosa with the flash-lamp pulsed dye laser. Dermatol Surg 2000; 26:1060.
38. White CR Jr et al. Perforating folliculitis of hemodialysis. Am J Dermatopathol 1982; 4:109.