Skin disorders in diabetes

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Patients with diabetes are more susceptible to a range of skin disorders, including infections, leg ulcers and specific conditions such as diabetic dermopathy and necrobiosis lipoidica. Early diagnosis and treatment are important to reduce complications.

Key points

- **Patients with diabetes have an increased risk of skin disorders.**
- **The most common skin disorders in patients with diabetes are cutaneous infections and disorders associated with diabetic vascular abnormalities.**
- **Necrobiosis lipoidica is important to recognise because it may occur before diabetes is diagnosed.**
- **Skin disorders that occur secondary to the underlying metabolic abnormalities include acanthosis nigricans and eruptive xanthomas.**
- **Patients with type 1 diabetes have an increased risk of autoimmune disorders.**
- **Other associations include diabetic bullae, stiff joints and waxy tight skin on the backs of the hands and a pebbly appearance on the knuckles and distal fingers.**

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Skin disorders are more common in people with diabetes, regardless of whether it is type 1 or type 2. Up to 30% of patients with diabetes have skin involvement at the time of presentation with diabetes and most will have some skin involvement during the course of the disease. This ranges from a higher incidence of common skin disorders such as infections to disorders that are relatively specific to diabetes, such as necrobiosis lipoidica.

Cutaneous infections

Although a skin infection is one of the most common manifestations of diabetes, the association is not completely understood. Studies have not shown that a high glucose level in the skin or poor control of diabetes is associated with an increase in skin infections.

Candidal infections

Candidal infections may be an early indicator of undiagnosed diabetes or may occur in older people with diabetes that is not well controlled. Angular stomatitis and oral mucosal candidiasis are common presentations. Genital candidiasis presents as pruritus vulvae, pruritus ani, vulvitis, balanitis or intertrigo. Candidal intertrigo may occur in flexures such as the axillae and inframammary area. Candidal paronychia presents as erythema, swelling and pain of the fingernail folds.

Although generalised pruritus may be a presenting feature of diabetes, it is no more common in people with diabetes than in the general population. However, people with diabetes have a higher incidence of localised pruritus, especially in the genital and perianal areas, caused by candidal infection.

Predisposing factors for candidal infection other than diabetes should be excluded; these include iron deficiency, antibiotic therapy, obesity, immobility and immunodeficiency. Initial treatment comprises topical antifungals, such as an imidazole or nystatin cream, and attention to local factors, such as drying the skin well especially in skin flexures and folds and avoiding irritants such as harsh soaps. If there is an associated underlying dermatosis then a topical corticosteroid may be used in conjunction. If the infection is severe or does not respond to topical treatment then oral treatment with fluconazole, itraconazole or ketoconazole is needed.

Bacterial infections

The frequency of bacterial infections is increased in people with diabetes, with *Staphylococcus aureus* being the most common cause and β-haemolytic streptococci also occurring often.[1] Presentations of these infections include boils, folliculitis, impetigo or cellulitis, all of which can be recurrent and may not respond well to treatment.

Swabs should be taken before treatment to determine organism antibiotic sensitivities. In patients with recurrent infections, a nasal or perineal carrier state should be suspected. Cephalosporins, flucloxacillin, dicloxacillin and clindamycin are effective first-line antibiotics for the treatment of bacterial infections in people with diabetes. Malignant external otitis caused by *Pseudomonas aeruginosa* is uncommon but can be serious and needs treatment with systemic antibiotics.

Dermatophyte infections

Dermatophyte infections are not more common in people with diabetes but are important because they may provide a site of entry for bacteria that cause cellulitis. All patients with diabetes and cellulitis affecting the legs should have their feet and toe nails examined for dermatophyte infections, which should be treated if present.

Disorders associated with vascular abnormalities

Leg ulcers

Both large vessel atherosclerosis and microangiopathy occur in patients with diabetes. The distal extremities become pale, cool and have decreased hair growth. Patients are at an increased risk of leg ulcers, which are the most costly and preventable complication of diabetes. Diabetic foot ulcers precede 85% of lower leg amputations. Leg ulcers are usually secondary to small arterial involvement but neuropathy can be a contributing or primary cause. Concomitant venous disease or other conditions that cause leg oedema may also be involved.

Treatment of leg ulcers includes optimising vascular supply, treating deep or surrounding skin infection and, for foot ulcers, redistributing plantar pressure. It is therefore important for patients with diabetes to receive regular foot care and to consult a podiatrist with an interest and expertise in diabetic foot problems or a specialised foot care service.

If a leg ulcer is thought to be infected, a wound swab should be taken after the ulcer has been cleaned and debrided. Gram-positive cocci, especially *S. aureus*, are the most common cause of leg ulcer infection, and initial antibiotic treatment should be directed towards these bacteria while the results of swabs are awaited. Gram-negative bacteria and anaerobes are common causes of chronic ulcers. Treatment of foot ulcers in patients with diabetes was discussed in detail in the October 2013 issue of *Endocrinology Today*.[2] Antibiotic therapy should continue at least until clinical infection has resolved.

Osteomyelitis should be suspected if an ulcer is deep or slow healing or if bone is exposed. If imaging is required, MRI is the best noninvasive test for osteomyelitis, but clinical examination and a plain x-ray showing delayed changes of osteomyelitis are often sufficient for diagnosis.

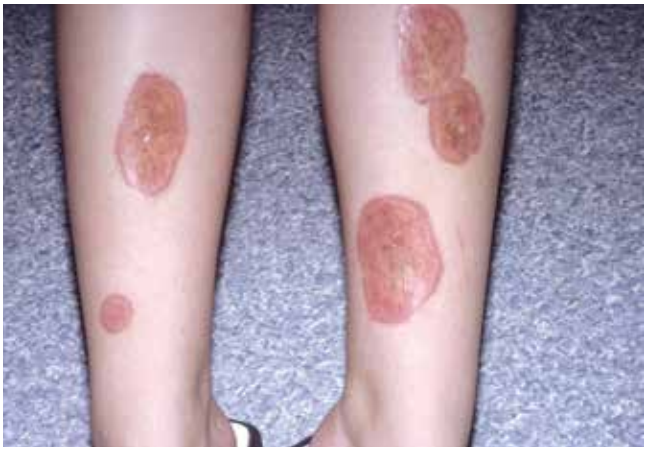

Figure 1. Necrobiosis lipoidica diabeticorum.

Diabetic dermopathy

Diabetic dermopathy is the most common skin change associated with diabetes and is thought to be secondary to microangiopathy and associated trauma. It presents as multiple, small (0.5 to 1 cm), oval atrophic brown scars, most commonly on the shins and other parts of the legs but also on the forearms and thighs. These lesions can also occur in patients without diabetes but if found should trigger investigation for diabetes or an underlying microangiopathy.

Acral erythema

Acral erythema of the feet can occur in patients with diabetes and is thought to be due to small vessel occlusion and a compensatory hyperaemia of the cutaneous vessels. It presents as well-demarcated areas of erythema clinically similar to erysipelas.

Rubeosis

Rubeosis is a chronic flushed appearance of the face, neck and upper extremities. It has been attributed to decreased vascular tone or microangiopathy. It improves with better diabetic control but can flare with use of vasodilator therapy.

Necrobiosis lipoidica

Necrobiosis lipoidica presents as irregular atrophic, yellow-brown telangiectatic plaques on the shins, which have a tendency to ulcerate in 35% of patients after minor trauma (Figure 1). It is usually associated with diabetes, with 65 to 75% of patients with necrobiosis lipoidica having diabetes.[3,4] Nevertheless, it is rare, occurring in only 0.3 to 0.7% of people with diabetes.[3] It may precede the diagnosis of diabetes, and patients without diabetes diagnosed with necrobiosis lipoidica should be investigated and followed up to help prevent or detect diabetes if it develops.

The aetiology of necrobiosis lipoidica is still unclear, but it is thought that microangiopathy causes collagen degeneration, and immune complex vasculitis leads to dermal inflammation.[5] Microscopy shows an interstitial granulomatous dermatitis with necrobiosis of the collagen.

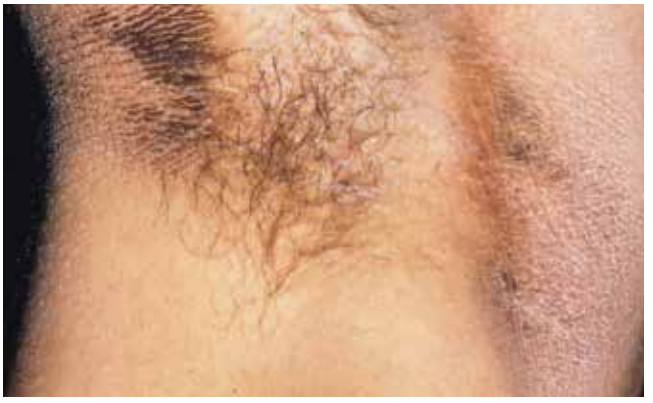

Figure 2. Acanthosis nigricans affecting the axilla.

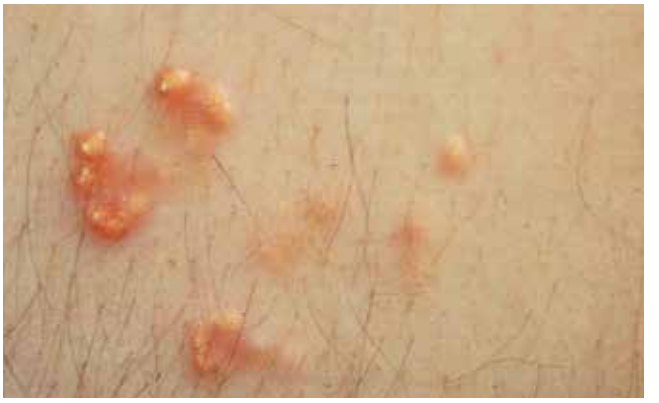

Figure 3. Eruptive xanthomas.

The course of necrobiosis lipoidica is unrelated to the duration of diabetes or adequacy of diabetic control. Treatment may be difficult but potent topical and intralesional corticosteroids, especially at the advancing edge, can be helpful. Treatments to improve blood flow, such as aspirin, dipyridamole, heparin and pentoxifylline, can be used. Treatments directed at the granulomatous inflammation are also helpful and include immunosuppressive agents, such as methotrexate and azathioprine, which have to be used with caution because of the increased risk of infections. More recently, tumour necrosis factor blockers have been used for necrobiosis lipoidica with good results.

Disorders secondary to metabolic abnormalities

Acanthosis nigricans

Type 2 diabetes is part of the metabolic syndrome along with central obesity, hypertension and hyperlipidaemia. The most common cutaneous manifestation of the metabolic syndrome is acanthosis nigricans, characterised by hyperpigmented, thickened plaques in the axillae, but can involve the neck and other areas (Figure 2). Acanthosis nigricans is most likely caused by factors that stimulate epidermal growth factor, leading to skin proliferation. Treatment is directed at diabetic control and particularly weight loss. Metformin is helpful and can control the underlying diabetes. Skin tags on the neck and axillae are associated with obesity and are increased in patients with type 2 diabetes.

Eruptive xanthomas

Eruptive xanthomas are small yellow papules with an erythematous rim (Figure 3). They are associated with secondary hyperlipidaemia, especially high triglyceride levels. The papules have an acute onset and are most common over the extensor surfaces. There is often associated obesity and alcohol misuse. Treatment includes dietary control and cholesterol-lowering drugs. Plasmaphoresis is used if triglyceride levels are very high and there is a high risk of pancreatitis.

Carotenoderma

Some people with diabetes have a diffuse orange-yellow colour to their skin. In most cases this is due to an increase in serum carotene levels, which is thought to be caused by impaired conversion of beta-carotene into retinol and an associated increase in serum lipid levels.

Other skin disorders

Disseminated granuloma annulare is a granulomatous disorder that has been reported to have an increased incidence in patients with diabetes, although this finding is controversial.[6]

A number of cutaneous autoimmune disorders, such as vitiligo, alopecia areata and lichen planus, have been found to be more frequent in patients with type 1 diabetes.

Diabetic bullae

Diabetic bullae are spontaneous atraumatic, tense blisters occurring on the legs and feet. They have a noninflamed base and can be up to several centimetres in size. They usually heal in two to five weeks. The pathogenesis is not well understood but diabetic bullae occur in patients with longstanding diabetes or multiple diabetes complications. Treatment is symptomatic, but the blisters should not be broken so as to avoid secondary infection.

Diabetic thick skin

Diabetic thick skin is common, occurring in up to 30% of people with diabetes.[7] It manifests as stiff joints, limited mobility of the hands and waxy, tight, thickened skin on the backs of the hands and distal fingers. It is caused by increased glycosylation of collagen in the skin. It can lead to flexion contractures, starting with the little finger. It is associated with retinopathy, nephropathy and duration of diabetes but not the degree of diabetic control. A pebbly thickening of the knuckles and interphalangeal joints also occurs in 20 to 30% of patients with diabetes.

Conclusion

Patients with diabetes are prone to a variety of skin disorders, which are important to recognise as early and appropriate treatment can reduce complications. Any patient with diabetes who has a new rash or skin changes should be assessed early for appropriate management. **ET**

References

A list of references is included in the website version (www.medicinetoday.com.au) of this article.

COMPETING INTERESTS: None.

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