



PATHOGENESIS AND MANAGEMENT OF DIABETIC DERMOPATHY

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ABSTRACT

Round, brown atrophic skin lesions that occur on the shins of patients with diabetes. The lesions are asymptomatic and occur in up to 55% of patients with diabetes, but incidence varies between different reports. Diabetic dermopathy is more common in older patients and those with long-standing diabetes. It is associated with other microvascular complications of diabetes such as retinopathy, nephropathy and neuropathy and also with large vessel disease. Histological changes include epidermal atrophy with flattening of the rete ridges, dermal fibroblastic proliferation, altered collagen, dermal oedema and an increase in dermal capillaries, with a perivascular inflammatory infiltrate, changes to the vessel walls and melanin and haemosiderin deposition. The underlying mechanism for diabetic dermopathy is unknown, although it may be related to local thermal trauma, decreased blood flow causing impaired wound healing or local subcutaneous nerve degeneration. Diabetic dermopathy requires no treatment, but may be a surrogate for more serious complications of diabetes, which require investigation and management. They heal as scaly patches that are light brown or red, often with thinning of the skin. Diabetic dermopathy is a harmless skin condition that affects people living with diabetes. It looks like small, round brownish patches and usually appears on your shins. There's no treatment for diabetic dermopathy, but makeup and moisturizer can help with its appearance.

Key words: Dermatology, diabetes mellitus, diabetic dermopathy, other associated diseases.

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INTRODUCTION

Diabetic dermopathy is a fairly common skin problem for people living with diabetes. The condition doesn't occur in everyone with diabetes. However, it's estimated that up to 50 percent of people living with the disease will develop some form of dermatosis, such as diabetic dermopathy. The condition causes small lesions in the skin. They can be reddish or brownish in color and are usually round or oval in shape. Lesions can occur anywhere on your body, but they tend to develop on bony parts. It's common for them to develop in the shins. Diabetic dermopathy is sometimes referred to as shin spots or pigmented pretibial patches. Diabetic dermopathy is a type of skin condition that can occur more commonly in older people with a long history of diabetes. It appears on the shins as reddish-brown patches [1-3].

Diabetic dermopathy is a harmless skin condition that affects people living with diabetes. It looks like small, round brownish patches and usually appears on your shins. There's no treatment for diabetic dermopathy, but makeup and moisturizer can help with its appearance. Diabetic dermopathy (often called "shin spots") is a fairly common skin condition that affects people who are living with diabetes, including Type 1 diabetes and Type 2 diabetes. Diabetic dermopathy looks like small, round pink, reddish or brown patches on your skin. They can look like scars and be indented. They're generally 1 centimeter to 2.5 centimeters in size. The patches are harmless and don't itch, ooze liquid or cause pain. Diabetic dermopathy most often appears on the front of both of your lower legs (on your shins), but one leg may have more patches than the other. It can also appear on other parts of your body,

such as your thighs and arms. Diabetic dermopathy affects people who have diabetes mellitus. Diabetic dermopathy is more common in people who have diabetes and are over 50 years of age and those who have had diabetes for a long time. The condition is also more common in people assigned male at birth. Diabetic dermopathy is fairly common in people who have diabetes. It's the most common skin condition that affects people who have diabetes [2].

Diabetic dermopathy is a skin condition that commonly appears on the lower part of the legs in people with diabetes. People may sometimes refer to the condition as pigmented pretibial patches or shin spots. The spots may come and go with time, and they generally do not cause symptoms. Although there is no specific treatment to manage diabetic dermopathy, managing diabetes carefully may help prevent this and other complications. Diabetic dermopathy is common in people with diabetes. Estimates of its prevalence vary, but research in the *British Journal of Diabetes and Vascular Disease* notes that up to 55% of people with diabetes may have these skin lesions. The spots are more common among people over the age of 50 years and those who have had diabetes for longer. Other research shows that the condition is more common among males than females. It is not contagious, meaning that it does not spread from one person to another. The American Diabetes Association notes that diabetes can cause changes in small blood vessels and that these changes may lead to skin issues such as diabetic dermopathy. However, the exact cause of the lesions that occur in diabetic dermopathy is unknown. Researchers have suggested various theories to explain their appearance, including Trusted Source thermal damage to the area, slower wound healing due to decreased blood flow in the region, and nerve degeneration [3-7].

Diabetic dermopathy refers to small lesions or spots on the skin. This diabetic skin condition can form anywhere on the body, but tends to develop on bony parts, such as the shins. This condition is fairly common for people with diabetes. While not everyone who has diabetes will develop diabetic dermopathy, 50% will develop some disease of the skin [4].

Diabetic dermopathy was first reported by Hans Melin in 1964 and the term was coined by Binkley in 1965. Other phrases used interchangeably with diabetic dermopathy were shin spots, pigmented pretibial patches, diabetic derm-angiopathy and spotted leg syndrome. These lesions have been reported to occur in 0.2-55% of diabetic patients. The lowest incidence was noted in a study conducted in India with 500 diabetic subjects, out of which only one was found to have diabetic dermopathy and the reason suggested was the darker skin complexion of Indians however, an exception was noted in a study from the western Himalayas with 36% diabetics showed DD. Melin described DD as small, circumscribed, brownish, atrophic skin lesions commonly seen on lower

extremities. These lesions are asymptomatic, non-contagious and develop as single or clusters and are often asymmetric and bilateral. In his original article, Melin stated that these lesions were more or less specific to diabetes mellitus. Most of the reports published later agreed to his findings; however, other authors suggested finding similar lesions in non-diabetics. It is a frequent finding in older patients with a history of diabetes for a long duration and coexists with the microvascular disease. It is uncertain whether it has more predilection to type 1 or type 2 diabetes; no difference in prevalence among males or females was observed. [5-12]

Diabetic dermopathy is a skin condition characterised by light brown or reddish, oval or round, slightly indented scaly patches most often appearing on the shins. Although these lesions may appear in anyone, particularly after an injury or trauma to the area, they are one of the most common skin problems found in patients with diabetes mellitus. Diabetic dermopathy has been found to occur in up to 30% of patients with diabetes. Diabetic dermopathy is sometimes also referred to as shin spots and pigmented pretibial patches. They resemble solar lentiginos [13].

Diabetic dermopathy (DD) is the most common specific skin lesion in patients with diabetes. The disease was first described by Hans Melin in the early 60s, as circumscribed brownish lesions located in the lower limbs of diabetic patients and named as diabetic dermopathy by Binkley (1965), who considered it a cutaneous manifestation of diabetic microangiopathy. Its incidence may range from 7% to 70% of diabetic patients. DD is seen more often in older patients, aged more than 50 years, and in those with a long history of diabetes. Also, it is more common in men (2: 1). There is some controversy as to DD be a pathognomonic sign for diabetes since there are studies that have shown its involvement in non-diabetic subjects. The origin of DD is unknown and there is no relation with decreased local perfusion. Another possible explanation is due to mild traumas that do not compromise wound healing. There is also degeneration of subcutaneous nerves in patients with neuropathy. However, the most acceptable explanation is the relation between DD and microvascular complications of diabetes. Studies have shown strong association with DD, nephropathy, retinopathy or neuropathy. [7] Shemer *et al.* observed increased incidence of DD in 52-81% when associated with such complications. Another study showed that 42.9% of patients presented neuropathy associated with DD ($p < 0.01$) although about 21% of patients with DD showed no evidence of microangiopathy. The association between DD and cardiovascular disease has also been identified based on ECG changes, history of coronary artery disease or both. About 53% of patients with type 2 diabetes and DD had coronary artery disease. DD association with neuropathy, nephropathy,

retinopathy and coronary artery disease may indicate a severity marker of the evolution of diabetes. As DD tends to occur over bony prominences, it is suggested that occur in response to sudden trauma. The association between trauma and DD lesions is further confused by the frequent presence of peripheral neuropathy. Nevertheless, some studies have failed to induce DD *in vivo*. DD consists of small, well-defined surface, brownish depressions, with atrophic appearance, resembling scars. Commonly the lesions measure less than 1cm in diameter and present rounded shape. They can occasionally extend and reach up to 2.5cm. Depressions are smooth and hyperpigmented and intensity of the pigment is related to the degree of atrophy. Generally asymptomatic, it does not cause pain or itching and is typically located bilaterally in pretibial regions and distributed asymmetrically. More rarely, DD occurs on the thighs, trunk and lower abdomen. The location and atrophic appearance cause many patients to consider DD as scars resulting from a possible trauma. The appearance of DD at the beginning is hardly documented, being an underreported disease. [14-40]

For instance, a review article notes that research has shown that people with diabetic dermopathy have a significantly higher chance of developing eye, nerve, or kidney damage than those without this condition. Also called as shin spots or pigmented pretibial patches. Most common dermatosis associated with diabetes mellitus. Early lesions are small, flat-topped, dull, red painless papules later those lesions progress to atrophic hyperpigmented irregular patches approximately 5 to 12 mm in diameter. The lesions are most commonly located on the anterior shins, as well as on the forearms, anterior thighs, and feet more over bony prominences.

Histologically the dermal arterioles and capillaries show thickening and PAS positive fibrillar material deposition in the vessel walls. Hemosiderin deposits due to extravasation of red blood cells are also seen. Diabetic dermopathy has been found to be associated with diabetic retinopathy, neuropathy, and nephropathy. [37-49]

EPIDEMIOLOGY

Dermopathy (DD), also known as pigmented pretibial patches or diabetic shin spots, is the most common dermatologic manifestations of diabetes, presenting in as many as one-half of those with diabetes. Although disputed, some consider the presence of DD to be pathognomonic for diabetes. DD has a strong predilection for men and those older than 50 years of age. Although DD may antecede the onset of diabetes, it occurs more frequently as a late complication of diabetes and in those with microvascular disease. Nephropathy, neuropathy, and retinopathy are regularly present in patients with DD. An association with cardiovascular disease has also been identified, with one study showing 53% of non-insulin-dependent diabetes mellitus with DD had coexisting coronary artery disease. [40-44]

The following picture gallery contains common examples of diabetic dermopathy:

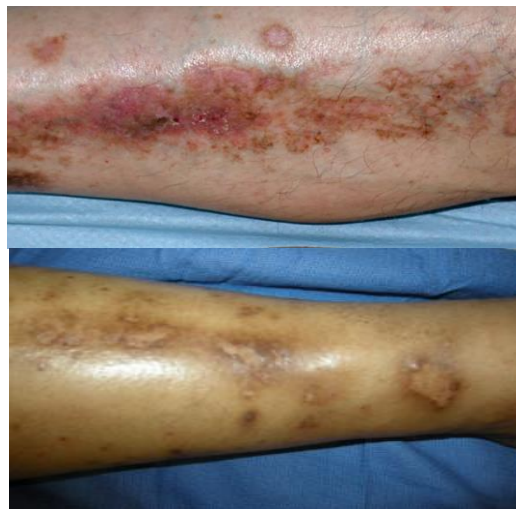


Figure 1: Diabetic dermopathy [1,13]

Etiology

Researchers don't yet know the exact cause of diabetic dermopathy. Many researchers and healthcare providers think that diabetic dermopathy may be related to prior trauma to your skin from an injury or extreme heat or cold, especially if you have neuropathy, which is a type of nerve damage that's caused by chronic high blood sugar (hyperglycemia). Diabetic dermopathy isn't contagious. [2]

Even though diabetic dermopathy is common when you're living with diabetes, the exact cause of this condition is unknown. However, there's a theory about the underlying mechanism behind these spots. Shin spots have been linked to leg injuries, leaving some doctors to conclude that the lesions might be an exaggerated response to trauma in people who have diabetes that's not well-managed. Uncontrolled diabetes often leads to poor circulation, or inadequate blood flow, to different parts of the body. Over time, poor circulation can reduce the body's wound-healing abilities. Decreased blood flow to the area surrounding an injury prevents a wound from healing properly, resulting in the development of bruise-like lesions or spots. It appears that nerve and blood vessel damage that can result from diabetes can also predispose you to diabetic dermopathy. This condition has been associated with diabetic retinopathy (eye damage), diabetic nephropathy (kidney damage), and diabetic neuropathy (nerve damage). It also seems to be more common in males, older adults, and those who have been living with diabetes for a longer period of time. It's important to remember that this is only a theory regarding what causes diabetic dermopathy. There's no available research to confirm this information. [1]

The exact cause of diabetic dermopathy is unknown. However, there is a theory behind the formation of these lesions. Shin spots have been connected to leg

injuries and some doctors have concluded they are a reaction to trauma in patients who have diabetes that isn't well managed. Poorly managed diabetes can often lead to poor circulation, and poor circulation can reduce the body's ability to heal from wounds. Decreased circulation to an area surrounding an injury prevents proper healing, resulting in the lesions or spots characteristic of diabetic skin problems. [4,50]

Pathogenesis

The underlying pathogenesis of Diabetic dermatopathy is unclear; however, several theories have been postulated. Melin suggested that DD's occurrence was secondary to trauma as the lesions are asymptomatic and often go unnoticed by patients with the presumption that lesions might have arisen due to trauma. Experiments were conducted to mimic the lesions in vivo by striking the skin with a rubber hammer that was unsuccessful. [6]

Binkely proposed that shins' predilection was due to lower skin temperature, slow blood flow, increased plasma viscosity, and vessel fragility. Attempts to experimentally induce DD lesions with thermal stimuli induced atrophic, circumscribed skin lesions in people with diabetes; however, similar lesions were elicited in patients with amyloidosis. DD is neither caused by decreased local perfusion; instead, the lesion occurs due to the scarring process resulting from poor wound healing. The authors discovered that blood flow in lesions was increased rather than decreased, making local ischemia theory unlikely. Subcutaneous nerve degeneration as the causative factor for dermatopathy lesions was also suggested; however, the relation of microvascular complications of Diabetes and DD is the most acceptable explanation. [5, 7, 46-58]



Figure 2: Pathogenesis of diabetic dermatopathy. [5]

The exact cause of diabetic dermatopathy is unknown but may be associated with diabetic neuropathic and vascular complications, as studies have shown the condition to occur more frequently in diabetic patients with retinopathy, neuropathy and nephropathy.

Diabetic dermatopathy tends to occur in older patients or those who have had diabetes for at least 10–20 years. It also appears to be closely linked to increased glycosylated haemoglobin, an indicator of poor control of blood glucose levels.

Because lesions often occur over bony parts of the body such as the shins, it is thought that diabetic dermatopathy may also be a magnified response to injury or trauma to these areas. Studies have shown that shin spots have

appeared in response to trauma with heat, cold or blunt objects in patients with diabetes. [13]

Prognosis (outlook) for diabetic dermatopathy

Diabetic dermatopathy itself is harmless. However, diabetic dermatopathy can be a warning sign of diabetes complications such as neuropathy, nephropathy and retinopathy.

If you have signs of diabetic dermatopathy, be sure to contact your healthcare provider. In some cases, diabetic dermatopathy “helps” with early diagnosis and prevention of these diabetes complications.

On average, diabetic dermatopathy patches tend to fade after one to two years, but they can remain on your skin for longer. Better blood sugar management doesn't seem to have an effect on how diabetic dermatopathy progresses once you already have it. After specific spots fade, new spots can appear. [2]

Clinical manifestation

Diabetes mellitus is a chronic disease which leads to various mucocutaneous diseases.

1. To study mucocutaneous manifestation of diabetes mellitus.
2. To compare mucocutaneous manifestation in controlled and uncontrolled diabetes mellitus.

This prospective study was carried out on 200 patients with diabetes mellitus in Department of Medicine, Jawahar Lal Nehru Medical College and Hospital, Ajmer, Rajasthan. Out of 200 patients diabetic foot ulcers were present in 3% (6) cases, diabetic bullae, necrobiosis lipoidica diabetorum, granuloma annulare respectively in 0.5% (1) case, 1.5% (3) cases, 2% (4) cases, 2.5% (5) alopecia areata, 2.5% (5) Lichen amyloidosis, 1.5% (3) macular amyloidosis, 1.5% (3) vitiligo 1% (2) carbuncle, 1% (2) eruptive xanthomas, SLE in 0.5% (1) cases, systemic sclerosis in 1% (2) cases, localized sclerosis Morphea in 1% (2) cases, psoriasis in 1.5% (3) cases, Lichen planus in 2% (4) cases, yellow palms in 0.5% (1) case and pterygium unguis inversus in 0.5% (1) case. [49, 59]

The lesions are asymptomatic and there are only a few reports of their onset and progression. The lesions begin spontaneously as non-blanching, scaly, red or purple, round or oval macules or papules. There may be induration, with a central depression or vesiculation. Most frequently presenting as round, brown, atrophic lesions of less than 1cm diameter, some may be elongated and up to 2.5cm. They usually occur on the shins in a bilateral asymmetrical distribution, but have been rarely reported on the arms, thighs, trunk and abdomen. The intensity of pigmentation corresponds to the degree of atrophy, with the darkest lesions also being the most atrophic. Each individual lesion lasts on average 18-24 months, before fading to minimally atrophic macules, or clearing completely. In some cases, the brownish colour disappears and is replaced by a slight depigmentation. As older lesions clear, new lesions appear.

The presence of diabetic dermopathy may be an indicator of other more serious pathology and its occurrence has been associated with both microvascular complications and large vessel disease. In Melin's original study 69% of patients with skin lesions had retinopathy; only 25% of the group without skin lesions had retinopathy.¹ Similarly, there were significantly more patients with nephropathy in the group with diabetic dermopathy, than in those without (27% versus 5%) and more patients with neuropathy amongst those with diabetic dermopathy than in those without (57% versus 20%).¹ Another study examining the relationship between retinopathy and diabetic dermopathy also found that the frequency of retinopathy in patients with diabetic dermopathy was significantly greater than in patients without diabetic dermopathy (44% versus 15%). Although most other studies have confirmed similar findings, one study of 457 diabetic patients found that diabetic dermopathy was associated with neuropathy, but not retinopathy or nephropathy. [6] Shemer *et al.* (1998) found that patients with other diabetic microvascular complications such as retinopathy, neuropathy and nephropathy were more likely to have diabetic dermopathy than those patients with no complications.¹³ Furthermore, the incidence of diabetic dermopathy increased with number of complications, seen in patients with kidney failure or type 2 diabetes or both, and to a lesser extent in type 1 diabetes. Treatments include avoiding trauma; and using psoralen-ultraviolet A light, ultraviolet B light, topical and systemic retinoids, topical and intralesional steroids, and oral antihistamines; and cryotherapy.

Calciophylaxis

First appears as localized redness and tenderness, then as subcutaneous nodules and necrotizing skin ulcers. Usually occurs in vascular regions with thicker subcutaneous adipose tissue.

Eruptive xanthoma

Usually occurs on extensor surfaces and the buttocks. Treatment: lesions tend to resolve with control of carbohydrate and lipid metabolism

Granuloma annulare

Association with diabetes has been hypothesized but not clearly established. Oval or ring-shaped lesions with a raised border of skin-colored or erythematous papules. Treatment: sporadic success has been reported with steroids (topical, intralesional, and systemic).

CONDITION FEATURES, TREATMENT

Candidal infections:

Perleche is a classic sign of diabetes in children, and localized candidal infection of the female genitalia is strongly associated with diabetes. Paronychia is also seen.

Dermatophyte infections:

Trichophyton rubrum: powdery white, noninflamed scaling over palms and soles.

Trichophyton mentagrophytes: maceration, superficial scaling, active red border between digits.

Both infections treated by keeping area dry, applying a new imidazole agent.

Bacterial infections:

Erythrasma caused by *Corynebacterium minutissimum*. Hyperpigmented, shiny patches with active border, coral fluorescence when examined with Wood's lamp. Intertriginous areas typically affected.

Treated with erythromycin (topical, systemic, or both). Impetigo, folliculitis, erysipelas, and others caused by *Staphylococcus aureus* or beta-hemolytic streptococci. Usually treatable with adequate diabetic control; systemic antibiotics if needed.

Rare infections Mucormycosis:

Caused by Phycomycetes and anaerobic cellulitis caused by *Clostridium* species may occur when diabetes is not well controlled.

Treatment consists of metabolic control, aggressive debridement of devitalized tissue, and intravenous antimicrobial therapy.

Malignant otitis externa:

Treatment consists of draining and irrigating the ear canal, debridement, and giving parental or oral quinolones.

Pseudomonas aeruginosa infection can be fatal.

SIGNS AND SYMPTOMS

The appearance of diabetic dermopathy can vary from person to person.

The skin condition is characterized by reddish-brown, round or oval, scar-like patches that are usually a centimeter or less in size. It's typically asymptomatic, meaning it usually doesn't present any symptoms.

Though lesions primarily form on the shins, they can be found on other parts of the body, too. However, they're less likely to develop on those areas. Other areas lesions can be found include:

- thigh
- trunk
- arms

Even though lesions can be unpleasant to look at - depending on the severity and the number of spots - the condition is harmless. Diabetic dermopathy doesn't usually cause symptoms like burning, stinging, or itching. You may develop one lesion or clusters of lesions on the shin and other parts of your body. When spots develop on the body, they often form bilaterally, meaning they occur on both legs or both arms. Other than the appearance of skin lesions, diabetic dermopathy doesn't have any other symptoms. These lesions or patches don't break open or release fluids. They're also not contagious. [1]

Diabetic dermopathy is usually asymptomatic, meaning it doesn't cause symptoms like pain or itching.

Characteristics of the diabetic dermopathy spots that develop on your skin include spots that are:

- Pink, reddish or brown.
- Round or oval.

- Slightly indented into your skin and/or somewhat scaly.
- Bilateral, meaning they appear on the skin of both of your legs or both of your arms at the same time.

The spots last for many months. Over time, the clusters of spots may look like age spots. [2]

Diabetic dermopathy may appear spontaneously as pigmented patches of skin on the shins, generally on both legs. The spots may initially be slightly pink, tan, or purple and feel a bit scaly to the touch. The spots may appear indented, with a slight dip in the center. After some time, the spots progress and become brown and either round or oval. They are typically less than 1 centimeter (cm) in diameter but can measure up to 2.5 cm. They may resemble age spots, especially if they appear in clusters. In rare cases; diabetic dermopathy may also appear on other areas of the body, such as higher up on the thighs or on the forearms or the sides of the feet. The condition itself is harmless and does not cause any additional symptoms or pain. Therefore, skin spots that are burning, tingling, or itching may be a sign of another skin condition instead. [3]

Diabetic skin lesions are round or oval. They are shiny, reddish-brown in color and appear in clustered patches. Symptoms of diabetic dermopathy include [4]:

- Spots or lesions on the shins, front of the thighs, scalp, sides of the feet, chest and forearms
- Spots are pink, tan, red or dark brown in color
- Spots are round and somewhat scaly
- Clusters of spots that have existed for a time become slightly indented
- Spots are bilateral (found on both shins at the same time)
- Over time, the clusters look like an age spot

Diabetic dermopathy lesions appear most frequently on the shins. Less commonly lesions can be found on the front of the thighs, forearm, side of the foot, scalp and trunk.

Features of lesions are:

- Round or oval-shaped
- Reddish-brown colour
- Initially scaly but then flattens out and becomes indented
- Commonly occur on both shins.

The presence of four or more lesions is almost always limited to patients with diabetes. People presenting with shin spots not already diagnosed with diabetes should undergo a further investigation to rule out the possibility of early diabetes. [13]

DIAGNOSIS AND TESTS

For patients with diabetes, doctors may be able to diagnose a diabetic skin condition by visually examining the skin. The doctor will evaluate the shape, color, size

and location of the lesions to see if they are characteristic of diabetic dermopathy. In some cases, a biopsy may need to be performed if there is concern about other skin conditions. [4]

If you have diabetes, your doctor might be able to diagnose diabetic dermopathy after a visual examination of your skin. Your doctor will evaluate the lesions to determine:

- shape
- color
- size
- location

If your doctor determines you have diabetic dermopathy, they may forgo a biopsy. A biopsy may present concerns of slow wound-healing. However, you may need a skin biopsy, if your doctor suspects another skin condition.

Diabetic dermopathy can be an early symptom of diabetes. You may experience other early signs of having diabetes. These include:

- frequent urination
- frequent thirst
- fatigue
- blurry vision
- weight loss
- tingling sensation in your limbs

If you haven't been diagnosed with diabetes and your doctor concludes your skin lesions may be caused by diabetic dermopathy, they may order further tests. The test results can help them confirm your diagnosis. [1]

Your healthcare provider will ask you questions about your medical history and your skin spots. They'll then examine the size, color, shape and location of your spots to determine if it could be diabetic dermopathy. Your provider might perform a skin biopsy on one or more of the spots to rule out other possible skin conditions. [2]

DD initially presents with rounded, dull, red papules that progressively evolve over one-to-two weeks into well-circumscribed, atrophic, brown macules with a fine scale. Normally after about eighteen to twenty-four months, lesions dissipate and leave behind an area of concavity and hyperpigmentation. At any time, different lesions can present at different stages of evolution. The lesions are normally distributed bilaterally and localized over bony prominences. The pretibial area is most commonly involved, although other bony prominences such as the forearms, lateral malleoli or thighs may also be involved. Aside from the aforementioned changes, patients are otherwise asymptomatic. DD is a clinical diagnosis that should not require a skin biopsy.

Histologically, DD is rather nonspecific; it is characterized by lymphocytic infiltrates surrounding vasculature, engorged blood vessels in the papillary dermis, and dispersed hemosiderin deposits. Moreover, the histology varies based on the stage of the lesion. Immature lesions present with epidermal edema as opposed to epidermal atrophy which is representative of older lesions. [44-45]



Figure 3: Diabetic Dermopathy [44]



Figure 4: Diabetic dermopathy consists of small brownish-colored depressions in the skin surface, of atrophic appearance, which look like scars [14]

Histologic findings include atrophy of the dermal papillae, variable pigment at basal cells, thickening of the superficial blood vessels intima, hypertrophy and hyalinization of the deepest arterioles, extravasated erythrocytes, hemosiderin deposition and a mild lymphocytic infiltration. There is telangiectasia, edema, and fibroblast proliferation at the papillary dermis. The differential diagnosis of DD includes many diseases. Early lesions of DD can be mistaken with fungal infection. While typical brownish atrophic scars may require differentiation of Schamberg's disease (progressive pigmented purpuric dermatitis), purpura annularis telangiectasica, purpuric lichenoid dermatitis, pigmented stasis dermatitis, scarring lesions, papulonecrotic tuberculids, factitious dermatitis and abrasions. Many of these entities can be differentiated by distribution, appearance and natural history. [14,16,19,29]

MANAGEMENT AND TREATMENT

There's no specific treatment for diabetic dermopathy. Some lesions may take months to resolve, while others may take more than a year. There are other instances where lesions may be permanent.

You can't control the rate that lesions fade, but there are steps you can take to manage the condition. Here are a few management tips:

- Applying makeup may help cover the spots.

- If your diabetic dermopathy produces dry, scaly patches, applying moisturizer may help.
- Moisturizing may also help improve the appearance of spots.

While there's no specific treatment for diabetic dermopathy, managing your diabetes is still important to prevent diabetes-related complications. [1, 13]

There's no known treatment for diabetic dermopathy, but the good news is that the skin patches themselves are harmless. Researchers aren't sure if better diabetes management and having better blood sugars help improve the patches after someone already has them. However, if you have diabetic dermopathy, it's important to continue to treat your diabetes and manage it well in order to stay healthy and prevent complications. [2]

Diabetic dermopathy treatment really focuses on prevention. Existing lesions will fade as time goes by. Healthy, moisturized skin that is free of injury will help keep diabetic dermopathy from developing further. The most important step to take is to control blood sugar levels. Unregulated glucose is the biggest trigger for diabetic dermopathy. Managing blood sugar levels will not only help keep diabetic skin conditions under control, it will help prevent other complications of diabetes. [4]

Treatment is typically avoided given the asymptomatic and self-resolving nature of DD as well as the ineffectiveness of available treatments. However, DD often occurs in the context of microvascular complications and neuropathies; hence, patients need to be examined and followed more rigorously for these complications. Although it is important to manage diabetes and its complications accordingly, there is no evidence that improved glycemic control alters the development of DD. [33, 34]

Treatment of DD is not recommended and is little effective. Lesions are asymptomatic and can persist indefinitely or make spontaneous regression without treatment.²¹ Nevertheless, the conditions associated with DD require attention. Patients should be evaluated for the diagnosis of DM, which when is not confirmed, should require further investigations. Once confirmed the presence of diabetes, attention should be focused on prevention, detection and control of associated complications. As with all patients with diabetes, glycemic control is critical. [14, 16, 25,40-50]

Herbal Treatment [51]

Ayurvedic remedies for diabetic dermopathy

Skin is the broadest and vertical system of the human body. It's in ultimate contact with the outside environment. Any chemical or physical change in the external or internal environment (body) directly affects the skin and its appendages such as hairs, sweat glands, nails, etc. and many times, it provides a hint to a lot of internal diseases like Diabetes & Renal disorders. Lots

of uncontrolled or poorly controlled diabetic patients suffer from skin ailments.

Taking care of diabetic dermopathy

Diabetic dermopathy is benign and does not necessarily require treatment. Blood glucose control can be helpful for slowing the development of diabetic neuropathy and cardiovascular disease that often goes with it. There is no specific treatment for diabetic dermopathy. Some lesions may take weeks to fix, while others might take over a year. There are other cases where lesions could be permanent. You can not control the speed that lesions fade, but you can take steps to deal with the condition. Listed below are a few management tips:

– Moisturizing can also help enhance the appearance of stains.

– Applying makeup might help cover the stains.

While there is no specific diabetic dermopathy treatment, managing your diabetes remains important to stop diabetes-related complications. No comprehensive remedy for diabetes has been demonstrated so far, and complications of uncontrolled diabetes are more severe than the disease itself. But we can keep it in check with appropriate diet, exercise, and medications if needed.

– **Manage high blood sugar levels.**

– **Ayurvedic Massage:** Approaches to improve subcutaneous blood flow should be implied, e.g., massage, skincare packs, patting, etc.

– **General body health** ought to be maintained with the support of mild exercises, Yogasanas (Dhanurasana, Ardha-matsyendrasana, Sarvangasana, Halasana, Yogamudrasana, Bhujangasana, Chakrasana etc.)

– **Medicines:** Diabetic patient has to maintain regular contact with their doctor and take normal medications prescribed by him.

– **Regular blood glucose level monitoring.** Check the higher blood sugar level and to keep it with the support of oral hypoglycemic agents (e.g., Sulfonylureas, Biguanides) and nourishment.

– **Treat skin ailments**, appropriate antifungal, and antibacterial agents should be used (oral or local use or both if necessary).

– **Natural herbal remedies:** Shilajeet, Haridra, Guduchi, Nimb, Vijaisar, Gudmar, Methi, Karela, Triphala, Ashwagandha, Phaltrikadi kwatha, Lodhrasava, Madhvasava, Shiva gutka, Chandraprabhavati, Basantkusumakar ras are beneficial to assess and to counteract the side effects and complications. These medications also restore overall health and boost the immunity of the patient.

Allopathic Treatment

Skincare was prescribed for all patients, including debridement, the use of antibiotic creams, and the application of dressings with betadine solution. The patients were requested to avoid trauma or injury of affected areas and to perform twice-daily circulatory exercise training to enhance the range of motion in the ankle and foot, including active ankle movements in the form of dorsiflexion, plantar flexion,

inversion, and eversion (10 repetitions each) and the manual self-mobilization of the forefoot joints. Furthermore, all patients received general information on the self-treatment of diabetes, including dietary measures, regular exercise, and continuous care of legs and feet to prevent recurrence or any other complications such as foot ulcers or wounds, skin infection, abscess, and gangrene.

Laser Therapy Protocol

Prior to each treatment session of LLLT, the dressing was removed and the lesions were cleaned with saline to remove creams or ointments and any discharge or debris. For the LLLT side, one limb received three sessions per week for 1 month using a scanning helium-neon (He-Ne) laser (ASA, Terza-via Alessandro, Italy). Briefly, the patient was placed in a comfortable position; the limb was appropriately positioned, and the affected areas were exposed to LLLT intervention. Protective goggles were used by the patient and the LLLT technician during the session to avoid laser exposure. The distal cylinder of the probe of the scanner was applied perpendicular to the dermopathic patch and the entire patch area was irradiated with a 30-cm distance between the laser probe and patch areas. The scanning He-Ne laser was used at a 632-nm wavelength, 25-Hz pulsed frequency, and 20-mW/cm² power density, and the duration of irradiation was estimated according to the irradiated area (120 s/1cm²) at an energy density of 2.5 J/cm². For the placebo side, this limb received the same laser device but the laser was switched off (no effect), and the lack of a heating effect of the laser meant that the patients were unaware whether the device was operational. Only the patients were blinded about the laser therapy (LLLT or placebo). [60-61]

Diabetes mellitus and the prediabetic state are associated with a number of skin manifestations. This study is a systematic review of the following manifestations:

- acanthosis nigricans (AN),
- skin tags (ST),
- diabetic dermopathy
- (DD),
- rubeosis faciei (RF),
- pruritus (PR),
- granuloma annulare (GA),
- necrobiosis lipoidica (NL),
- scleroedema diabeticorum (SD)
- and bullosis diabeticorum (BD).

These conditions possibly relate to underlying diabetogenic mechanisms. Our aim was to determine whether skin signs are feasible as cutaneous markers for the prediabetic or diabetic state. Data were collected from the databases PubMed, Embase and Cochrane. Articles were excluded if the populations presented with comorbidities or received treatment with drugs affecting the skin. Also, animal studies, studies with poor methodology and pilot studies were excluded. The results indicate a benefit of diabetes screening in

individuals presenting with AN, ST or BD. Further studies are required to enlighten a possible association with RF, GA, SD or NL. Until such studies are available, it is advisable to screen individuals with the skin lesions presented by measuring their glycated haemoglobin. [62]

There are many cutaneous signs in diabetes mellitus (DM) which is the most common endocrine disorder among the general population. Diabetic Dermopathy (DD) or Shin Spots are the most common cutaneous signs of diabetes. Although they occur individually in people who do not have diabetes, if four or more are present the specificity is high for microvascular disease in other tissues. This study was done to evaluate frequency of diabetic dermatopathy among diabetic patients and use this obvious subtle clinical sign as marker for early detection of atherosclerotic changes in diabetic patients including myocardial infarction. This study was done at diabetic center in Sulaimani intensive care unit (IUC) in teaching hospital of Sulaimani during the period from November 2008 to June 2009. A total of 384 patients with Diabetes mellitus were included in this descriptive case series hospital-based study. All patients were diagnosed by specialist diabetician as a case of DM depending on classic diagnostic criteria of DM. All patients were thoroughly assessed regarding the age, sex, skin color, duration of diabetes mellitus and treatment regime. Careful skin examinations have been performed for diabetic dermatopathy, diabetic wet gangrene of foot. Diagnosis of myocardial infarction was done either by electrocardiographic changes or by plasma biochemical marker. Eighty-four (21.9%) cases with DD were reported in our study; fifty-four (64.3%) cases of them were females while the remaining 30 (35.7%) cases were male. Diabetic patients with myocardial infarction were 44 (11.5%) cases, 36 cases as acute MI, while the other eight cases were old cases of MI. Of these 44 cases 16 (36.4%) had DD while 28 (63.6%) had no DD. There was a statistically significant association between the myocardial infarction and the frequency of diabetic dermatopathy and we should use this obvious subtle clinical sign as marker for early detection of atherosclerotic changes in diabetic patients including myocardial infarction. Wet gangrene of the foot is also considered a marker of bad glycemic control. [63-70]

Diabetic dermatopathy is described in variable percentage of patients: 36% of the patients or 7-70% of the diabetics, more often in men over 50 years and it is related pathogenically with diabetic microangiopathy. Bullosis diabeticorum is rarely reported (0.4%) patients although it is admitted as a marker of diabetes mellitus. [71-73]

Diabetic Dermopathy (DD) is a dynamic process in which multiple lesions co-exist at different stages of evolution: the disease originates with the occurrence of red or pink papules or plaques typically on pretibial region but also on forearms, thighs and lateral malleoli. Initial stage can be misdiagnosed as a dermatophytosis. Two

weeks after occurrence the lesions change and become a well defined atrophic brown macule. Different lesions can be contemporarily present at different stages of evolution. The lesions solve spontaneously, usually leaving a slightly depressed area [59].

DD is typically present in diabetic men with long duration of disease and poor glycaemic control. The mean age at onset is about 50 years. If the association with diabetes is well known, during recent years the clustering with other diabetes chronic complications have been demonstrated. The incidences range therefore from 7% in general population, to 52% in diabetics without microangiopathy, to 82% in patients suffering from multiple chronic microvascular complications [60]. Histological analysis is varied, from the first stages in which we observe epidermis oedema and perivascular lymphohistiocytic infiltrate, to the later stages, characterized by thickened dermis blood vessels and hemosiderin deposits [61]. The etiopathogenetic mechanism, not well defined, focused on micro-angiopathy associated to unrecognized trauma. [72-75]

Diabetic dermatopathy presents as well-demarcated, hyperpigmented, atrophic depressions, macules or papules located on the anterior surface of the lower legs of diabetic patients. The histopathology remains poorly defined which may in part be due to the fact that the lesions are rarely biopsied. To further define the histopathological features of this entity, we studied tissue taken from characteristic lesions at autopsy. Inclusion criteria included the presence of the lesions and diabetes-related nephroarteriosclerosis at autopsy. Surprisingly, only four out of 14 skin biopsies showed moderate to severe wall thickening of arterioles or medium-sized arteries on periodic acid Schiff (PAS) stains. Only mild basement membrane thickening was noted in 11 of 14 which were highlighted by the PAS stain. Pigmented material was identified within the dermis of 13 cases. In 10 of the cases, the material was positive for Perl's iron stain. Ten cases had material staining positive for Fontana-Masson in the dermis. Nine cases had markedly increased epidermal melanin. The findings suggest that hemosiderin deposition in conjunction with the deposition of melanin contribute to the clinical features of diabetic dermatopathy. [57, 75-77]

Diabetic dermatopathy consists of small, round, brown atrophic skin lesions that occur on the shins of patients with diabetes. Its proper diagnosis is essential for proper management. The present study has been undertaken to study the complications, signs, symptoms, prevention and cure of dermatopathy caused by diabetes. Dermatopathy was studied in brief with the help of literature available in the form of articles, various databases, medical news, etc. Proper diagnosis and cure are necessary at early stages to prevent future complications associated with it. Diabetic dermatopathy requires no treatment, but may be a surrogate for more serious complications of diabetes, which require investigation and management. [75, 76]

Managing of diabetic dermopathy

While there's no formal treatment for diabetic dermopathy, there are some things you can do at home to help manage the appearance of the diabetic dermopathy, including:

- Using makeup to help cover the patches.
- Using a moisturizer to help improve the appearance and texture of the patches.

It's also important to manage your diabetes as well as you can to prevent complications.[2]

There is no specific treatment for diabetic dermopathy. As the spots themselves are harmless and asymptomatic, treatment is unnecessary. The condition usually Trusted Source resolves by itself, although the healing time can vary among individuals. If a person dislikes the appearance of the spots, they may choose to cover them with makeup. If the condition causes dry or scaly patches of skin, moisturizer may help ease the symptoms and stop lesions from progressing. Research Trusted Source suggests that the application of lotions containing ingredients such as collagen or glycerin can make the changes in skin tone less visible. [3]

PREVENTION

Currently, there's no known way to prevent diabetic dermopathy resulting from diabetes.

However, if your diabetic dermopathy is caused by trauma or injury, there are preventive measures you can take. These measures can protect your shins and legs, two areas where lesions most likely occur.

For example, wearing knee-length socks or shin pads may offer protection when playing sports or engaging in other physical activity. [1]

The risk factors for developing diabetic dermopathy include:

- **Having diabetes mellitus:**

Diabetic dermopathy can affect people with diabetes. The two most common types of diabetes mellitus are Type 1 diabetes and Type 2 diabetes.

- **How long you've had diabetes:**

The longer you've had diabetes, the more at risk you are for developing diabetic dermopathy.

- **age:**

People who have diabetes and are over the age of 50 are more likely to get diabetic dermopathy.

- **sex:**

People assigned male at birth who have diabetes are more likely to get diabetic dermopathy.

- **Having chronic high blood sugar (hyperglycemia):**

Diabetic dermopathy is associated with diabetes complications that are caused by long-term high blood sugar. Since diabetic dermopathy is associated with these complications, having chronic high blood sugar could put you at a higher risk of getting diabetic dermopathy.

Although not all cases of diabetic dermopathy are preventable, the main way to try to prevent diabetic dermopathy is to manage your diabetes well. Steps you can take to manage your diabetes well include:

- **Checking your blood sugar regularly:**

Checking your blood sugar with a glucometer and/or using continuous glucose monitoring (CGM) is crucial to managing diabetes and preventing complications. Try to at least check your blood sugar before and after meals and before you go to sleep. It's important to treat high blood sugar as soon as possible in order to stay healthy and prevent complications.

- **Taking your insulin and/or medication regularly:**

Follow your healthcare provider's instructions for taking your insulin and/or medication.

- **Seeing your healthcare provider regularly:**

Every person with diabetes has a management plan that's unique to them. It's important to see your healthcare provider regularly to make sure your plan and medication(s) are working for you. If your management plan isn't working for you, reach out to your healthcare provider or schedule an appointment to make improvements to your management.

- **Exercising regularly:**

Exercising regularly helps to increase insulin sensitivity, which means your body is able to better use the insulin it makes or the insulin that you inject. Having insulin sensitivity makes it a little easier to manage your blood sugars.

- **Eating healthy:**

See a registered dietitian for help understanding nutrition and meal planning that will work best for you.

- **Asking for help:**

Diabetes management can be confusing and difficult. If you're struggling to manage your diabetes, reach out to your healthcare provider for help and reach out to family and friends for support.

Since many researchers think that diabetic dermopathy may be related to prior injuries to the affected area, wearing protective gear such as shin guards or thick, long socks when you're doing physical activities could help protect your shins from getting injured. [2]

As experts do not fully understand what causes diabetic dermopathy, there is no known way to prevent it completely.

However, if a person notices that spots tend to appear after injuries to the area, it may help to find ways to avoid injuries. For example, a person could use padding to protect areas of the body that they regularly bump or to round the edges of items that they may knock against at home.

Properly managing diabetes is key to reducing the risk of associated complications. Controlling blood sugar correctly may help prevent serious health issues, such as eye, nerve, and kidney damage.

Although effective control of blood sugar levels will not have an effect on any existing lesions, it can help

prevent Trusted Source future lesions from developing. [3]

Anyone who suspects that they are experiencing the early symptoms of uncontrolled diabetes should also see a doctor. These symptoms may include [3]:

- frequent urination
- constant hunger
- increased thirst
- fatigue
- blurred vision
- slow wound healing

THE BOTTOM LINE

Diabetic dermopathy is a common condition in people living with diabetes. The condition is characterized by the presence of lesions. These lesions are harmless and don't cause any pain, but they shouldn't be ignored.

It's vital that you keep your diabetes well-managed, which involves regularly monitoring your blood sugar. Managing your condition is important in preventing diabetes-related complications such as:

- nerve damage
- increased risk of stroke or heart attack

It's important to schedule regular visits with your doctor to discuss your diabetes treatment plan and make any necessary adjustments to maintain good glycemic management.

For example, if you take your medication as prescribed, but your blood sugar remains high, talk to your doctor. You may need to adjust your current therapy.

Make a concerted effort to exercise at least 30 minutes, three to five times a week. Regular exercise is important to your overall health. This can include:

- walking
- jogging
- doing aerobics
- biking
- swimming

Eat plenty of fresh fruits, vegetables, and lean meats. It's important to eat a healthy, well-balanced diet. If you're overweight, losing excess pounds can help stabilize your blood sugar level.

Be mindful that diabetes management doesn't only involve maintaining a healthy blood sugar. There are other steps you can take, including:

- stopping smoking, if you smoke
- reducing stress

If your diabetic dermopathy is the result of trauma or injury, you can take preventive steps such as wearing protecting clothing and gear during physical activities.

It's important to protect your shins and legs since diabetic dermopathy tends to primarily affect those areas. Scheduling regular visits with your doctor will enable them to complete a thorough examination to help determine the best management plan for your condition. [1]

CONCLUSION

Diabetic dermopathy refers to small discolored spots that tend to appear on the lower legs, most commonly in people with diabetes. There is no known cause, but the spots generally cause no pain and resolve without treatment. People can usually prevent diabetic dermopathy and other complications of diabetes by taking steps to manage their blood sugar levels carefully. Anyone who has symptoms of diabetes or feels as though they are struggling to control their blood sugar levels may wish to discuss treatment options with a doctor.

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