

Dermato-Metabolic Syndrome

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ABSTRACT

We define the term 'dermato-metabolic syndrome' as the dermatologic (skin, hair, and nail) conditions associated with metabolic syndrome. These abnormalities can be classified as metabolic (hyperinsulinism, hyperandrogenism, hyperuricemia), mechanical (involvement of epidermal, dermal, sebaceous and sweat glands, subcutaneous tissue), mitogenic, miasmatic (infections) and microvascular/venous insufficiency. This construct highlights the importance of skin, and its related appendages, as a site of target organ damage in metabolic syndrome. The concept underscores the need for team-based approach towards dermato-vigilance in metabolic patients, metabolic vigilance in dermatologic patients, and management of both dermatological and metabolic manifestations of dermo-metabolic syndrome.

Keywords: Acanthosis, acne, diabetes, dermatology, dry skin, hirsutism, polycystic ovary syndrome, psoriasis, obesity, Tinea

Metabolic syndrome, with its component diseases of diabetes mellitus, obesity, hypertension, and dyslipidemia, is a major cause of morbidity and mortality. Newer associations of metabolic syndrome are being understood, including the dermatological manifestations of the disease¹.

We use the term 'dermato-metabolic syndrome' to describe the dermatologic (skin, hair, and nail) conditions associated with metabolic syndrome; to highlight the fact that the skin is a site of target organ damage in metabolic disorders; and to reinforce the need for metabolic vigilance and optimization in these situations.

DERMO-METABOLIC SYNDROME

Metabolic syndrome changes the structure and function of the skin and related tissues including the epidermis, dermis, sebaceous glands, sweat glands, and subcutaneous fat. Skin diseases are commonly classified

according to the anatomic layers that are predominantly affected. We share a unique classification that highlights the various ways in which metabolic dysfunction can impact the skin.

The metabolic, mechanical, mitogenic, miasmatic, and (micro)vascular conditions that make up the dermo-metabolic syndrome represent a wide spectrum of pathophysiological abnormalities that constitute the syndrome.

INSULIN RESISTANCE – THE CONNECTING LINK

Elevated insulin concentration or hyperinsulinemia is a key pathophysiologic feature of metabolic syndrome². Keratinocytes and fibroblasts express receptors for insulin and insulin-like growth factor-1 (IGF-1) and hyperinsulinemia exerts a mitogenic effect on these cells³. Insulin resistance is also linked to hyperandrogenism and is responsible for many features of excess androgen such as hirsutism and acne⁴.

Additionally, insulin resistance is characterized by a state of chronic inflammation, which can contribute to development of inflammatory skin conditions⁵.

SIGNIFICANCE

Knowledge about dermatological manifestations is important, as the skin is a mirror of metabolic health.

Both dermatologists and physicians should be aware of the intricate relationship between the skin and metabolic health, and be able to evaluate and address clinically significant issues as a team.

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Table 1. The **5M** Classification of Dermato-Metabolic Syndrome

Metabolic manifestations

Hyperinsulinism

- Acanthosis nigricans
- Acrochordons
- Scleredema diabeticorum
- Ichthyosiform skin changes
- Maturational hyperpigmentation

Hyperandrogenism

- Acne
- Hirsutism
- Patterned alopecia

Hyperlipidemia

- Xanthelasma
- Necrobiosis lipoidica
- Xanthomas (Tendinous, planar, tuberous, eruptive)

Hyperuricemia

- Gouty tophi
- Gouty panniculitis

Mitogenic

- Psoriasis vulgaris
- Plantar hyperkeratosis
- Keratosis pilaris
- Granuloma annulare
- Lichen planus
- Atopic dermatitis

Mechanical manifestations

Epidermal/dermal

- Striae distensae
- Intertrigo
- Diabetic bullae
- Acquired reactive perforating collagenosis

Sebaceous blockage

- Hidradenitis suppurativa

Subcutaneous

- Lipodystrophy
- Cellulite

Miasma (infections)

- Folliculitis, furunculosis, carbuncles
- Cellulitis
- Erythrasma
- Fungal infection: Candidiasis, dermatophytosis, mucormycosis

Microvascular and venous insufficiency

- Dry skin (xerosis)
- Diabetic pruritus
- Diabetic dermopathy
- Lymphedema
- Venous ulcers
- Peripheral neuropathy

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