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CONTENTS

EDITORIAL

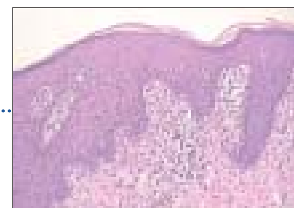
Management of autoimmune urticaria
Arun C. Inamadar, Aparna Palit 89

VIEW POINT

Cosmetic dermatology versus cosmetology: A misnomer in need of urgent correction
Shyam B. Verma, Zoe D. Draelos 92

REVIEW ARTICLE

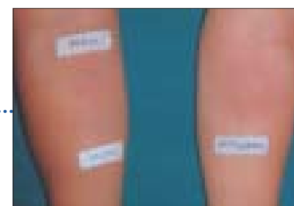
Psoriasiform dermatoses
Virendra N. Sehgal, Sunil Dogra, Govind Srivastava, Ashok K. Aggarwal 94



ORIGINAL ARTICLES

A study of allergen-specific IgE antibodies in Indian patients of atopic dermatitis
V. K. Somani 100

Chronic idiopathic urticaria: Comparison of clinical features with positive autologous serum skin test
George Mamatha, C. Balachandran, Prabhu Smitha 105



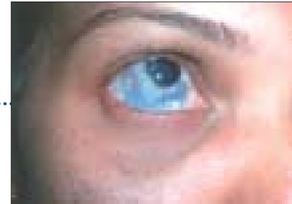
Autologous serum therapy in chronic urticaria: Old wine in a new bottle
A. K. Bajaj, Abir Saraswat, Amitabh Upadhyay, Rajetha Damisetty, Sandipan Dhar 109

Use of patch testing for identifying allergen causing chronic urticaria
Ashimav Deb Sharma 114

Vitiligoid lichen sclerosus: A reappraisal
Venkat Ratnam Attili, Sasi Kiran Attili 118

BRIEF REPORTS

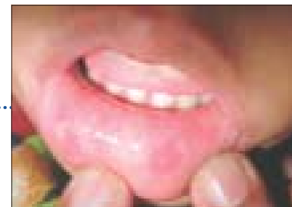
Activated charcoal and baking soda to reduce odor associated with extensive blistering disorders
Arun Chakravarthi, C. R. Srinivas, Anil C. Mathew 122



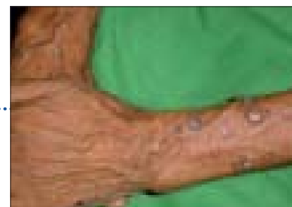
Nevus of Ota: A series of 15 cases
Shanmuga Sekar, Maria Kuruvila, Harsha S. Pai 125

Premature ovarian failure due to cyclophosphamide: A report of four cases in dermatology practice
Vikrant A. Saoji 128

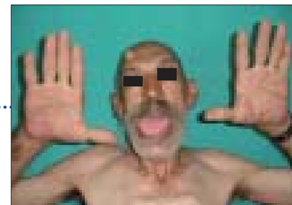
CASE REPORTS



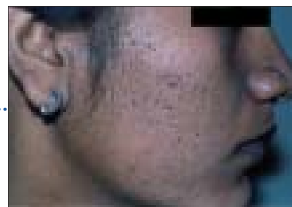
Hand, foot and mouth disease in Nagpur
Vikrant A. Saoji 133



Non-familial multiple keratoacanthomas in a 70 year-old long-term non-progressor HIV-seropositive man
Hemanta Kumar Kar, Sunil T. Sabhnani, R. K. Gautam, P. K. Sharma, Kalpana Solanki, Meenakshi Bhardwaj 136

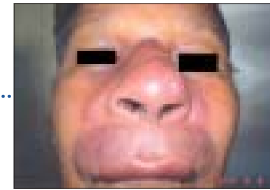


Late onset isotretinoin resistant acne conglobata in a patient with acromegaly
Kapil Jain, V. K. Jain, Kamal Aggarwal, Anu Bansal 139

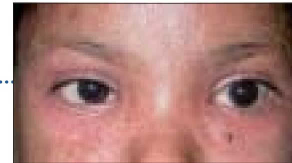


Familial dyskeratotic comedones
M. Sendhil Kumaran, Divya Appachu, Elizabeth Jayaseelan 142

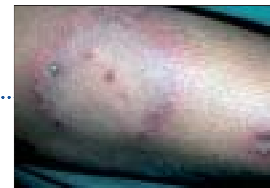
Nasal NK/T cell lymphoma presenting as a lethal midline granuloma
Vandana Mehta, C. Balachandran, Sudha Bhat, V. Geetha, Donald Fernandes 145



Childhood sclerodermatomyositis with generalized morphea
Girishkumar R. Ambade, Rachita S. Dhurat, Nitin Lade, Hemangi R. Jerajani....... 148



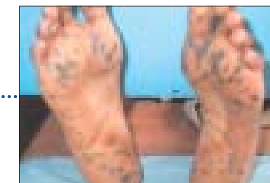
Subcutaneous panniculitis-like T-cell cutaneous lymphoma
Avninder Singh, Joginder Kumar, Sujala Kapur, V. Ramesh.. 151



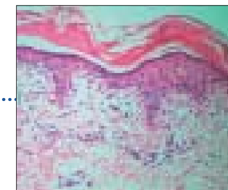
LETTERS TO EDITOR

Using a submersible pump to clean large areas of the body with antiseptics
C. R. Srinivas 154

Peutz-Jeghers syndrome with prominent palmoplantar pigmentation
K. N. Shivaswamy, A. L. Shyamprasad, T. K. Sumathi, C. Ranganathan 154



Stratum corneum findings as clues to histological diagnosis of pityriasis lichenoides chronica
Rajiv Joshi 156

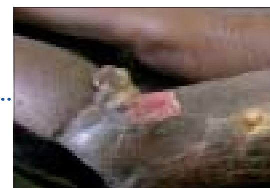


Author's reply
S. Pradeep Nair 157

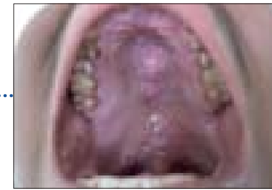
Omalizumab in severe chronic urticaria
K. V. Godse.. 157

Hypothesis: The potential utility of topical eflornithine against cutaneous leishmaniasis
M. R. Namazi 158

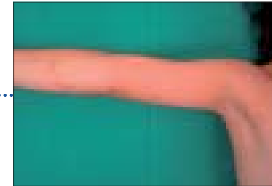
Nodular melanoma in a skin graft site scar
A. Gnaneshwar Rao, Kamal K. Jhamnani, Chandana Konda 159



Palatal involvement in lepromatous leprosy
A. Gnaneshwar Rao, Chandana Konda, Kamal Jhamnani 161



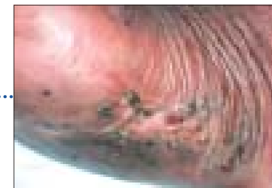
Unilateral nevoid telangiectasia with no estrogen and progesterone receptors in a pediatric patient
F. Sule Afsar, Ragip Ortac, Gulden Diniz 163



Eruptive lichen planus in a child with celiac disease
Dipankar De, Amrinder J. Kanwar 164

Xerosis and pityriasis alba-like changes associated with zonisamide
Feroze Kaliyadan, Jayasree Manoj, S. Venkitakrishnan 165

Treatment of actinomycetoma with combination of rifampicin and co-trimoxazole
Rajiv Joshi 166



Author's reply
M. Ramam, Radhakrishna Bhat, Taru Garg, Vinod K. Sharma, R. Ray, M. K. Singh, U. Banerjee, C. Rajendran 168

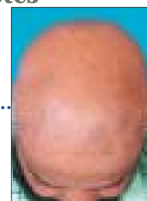
Vitiligo, psoriasis and imiquimod: Fitting all into the same pathway
Bell Raj Eapen 169

Author's reply
Engin Şenel, Deniz Seçkin 169

Multiple dermatofibromas on face treated with carbon dioxide laser: The importance of laser parameters
Kabir Sardana, Vijay K. Garg 170

Author's reply
D. S. Krupa Shankar, A. Kushalappa, K. S. Uma, Anjay A. Pai 170

Alopecia areata progressing to totalis/universalis in non-insulin dependent diabetes mellitus (type II): Failure of dexamethasone-cyclophosphamide pulse therapy
Virendra N. Sehgal, Sambit N. Bhattacharya, Sonal Sharma, Govind Srivastava, Ashok K. Aggarwal 171



Subungual exostosis
Kamal Aggarwal, Sanjeev Gupta, Vijay Kumar Jain, Amit Mital, Sunita Gupta 173

Clinicohistopathological correlation of leprosy
Amrish N. Pandya, Hemali J. Tailor 174

RESIDENT'S PAGE

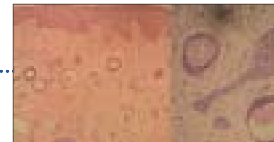
Dermatographism
Dipti Bhute, Bhavana Doshi, Sushil Pande, Sunanda Mahajan, Vidya Kharkar 177

FOCUS

Mycophenolate mofetil
Amar Surjushe, D. G. Saple 180

QUIZ

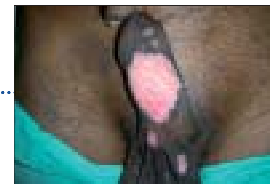
Multiple papules on the vulva
G. Raghu Rama Rao, R. Radha Rani, A. Amareswar, P. V. Krishnam Raju, P. Raja Kumari, Y. Hari Kishan Kumar 185



E-IJDVL

Net Study
Oral isotretinoin is as effective as a combination of oral isotretinoin and topical anti-acne agents in nodulocystic acne
Rajeev Dhir, Neetu P. Gehi, Reetu Agarwal, Yuvraj E. More 187

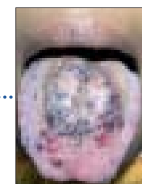
Net Case
Cutaneous diphtheria masquerading as a sexually transmitted disease
T. P. Vetrichevvel, Gajanan A. Pise, Kishan Kumar Agrawal, Devinder Mohan Thappa 187



Net Letters
Patch test in Behcet's disease
Ülker Gül, Müzeyyen Gönül, Seray Külcü Çakmak, Arzu Kılıç 187

Cerebriform elephantiasis of the vulva following tuberculous lymphadenitis
Surajit Nayak, Basanti Acharjya, Basanti Devi, Satyadarshi Pattnaik, Manoj Kumar Patra 188

Net Quiz
Vesicles on the tongue
Saurabh Agarwal, Krishna Gopal, Binay Kumar 188



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Dermatographism

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INTRODUCTION

Dermatographism also called as skin writing, dermographism or dermatographic urticaria is an enigma for dermatologists and immunologists alike. Although simpler to elicit, its clinical relevance or significance is yet to be fully known. When normal skin is stroked with a dull object, it becomes raised and inflamed to assume the shape of the stroke.[1] The response consists of local erythema followed by edema and a surrounding flare reaction. Exaggeration of this response is known as dermatographism. Dermatographism can appear in persons of any age but is more common in young adults. Peak incidence is in the second and third decades of life.

Symptoms of itching, rash and whealing are induced by scratching, stroking, tight or abrasive clothing or other personal wear. Rubbing, minor pressure or any form of physical stress to the skin may initiate lesions. Scalp, genitalia, mucocutaneous junctions and mucosae are involved less frequently.

HOW TO ELICIT DERMATOGRAPHISM

The diagnosis is usually made by observing the clinical response after using moderate pressure to stroke or gently scratch the skin [Figure 1]. The site of elicitation of dermatographism is important as areas protected from regular pressure and environmental influences are more reactive than others. For this reason, dermatographism is elicited more markedly over the trunk as compared to the limbs.

As the pressure of a stroke has inter-individual and intra-individual variations, a calibrated instrument known as a dermographometer can be used for applying uniform pressure over the skin. It has a spring-loaded stylus that applies graded and reproducible pressure (of 3600 g/cm^2) over the skin and then records skin responses. Although, it can also be used in children effectively, its current use is limited to research settings.

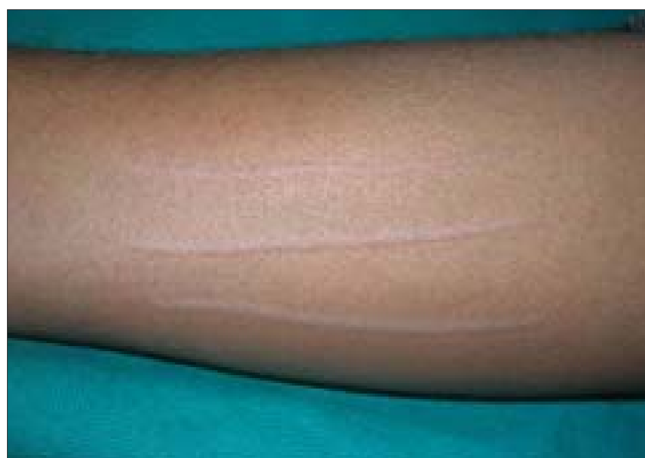

Figure 1: Dermatographism

PATHOPHYSIOLOGY OF DERMATOGRAPHISM

Firm stroking of the skin produces an initial red line (capillary dilatation) followed by an axon-reflex flare with broadening erythema (arteriolar dilatation) and the formation of a linear wheal (transudation of fluid/edema). This is termed as the triple response of Lewis. An exaggerated form of this response is known as dermatographism. Unfortunately, the so-called exaggeration is highly subjective and thus not enough to distinguish between dermatographism and the triple response of Lewis with precision and surety. The time

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needed for the response to occur after stroking may help to some extent. Dermatographism usually develops within five minutes of stroking the skin and persists for 15-30 min in contrast to the normal triple response of Lewis that subsides in less than 5-10 min. A short refractory period after clearance of the wheal has been reported in dermatographism.[2] The exact mechanism of dermatographism remains uncertain but according to many, it is likely to be caused by 'mechanico-immunological' stimulation of mast cells that release histamine. Mechanical trauma is thought to release an antigen that interacts with IgE-sensitized mast cells, which further release inflammatory mediators like histamine into the tissues. This causes small blood vessels to leak, allowing fluid to accumulate in the skin. Other mediators possibly involved are leukotrienes, heparin, bradykinin, kallikrein and peptides such as substance P. Thus, the proposed mechanism simulates a type I hypersensitivity reaction with the difference of being triggered by mechanical trauma and not by external immunologic stimuli. This hypothesis is supported by successful passive transfer of dermatographism to normal subjects by serum or IgE and its association with urticaria syndromes.[3]

Histopathology of dermatographism shows dermal edema with a few perivascular mononuclear cells similar to acute urticaria. Mixed interstitial infiltrate comprising neutrophils, eosinophils and lymphocytes as seen in late lesions are not seen in dermatographism.

TYPES OF DERMATOGRAPHISM

The phenomenon of dermatographism has the following morphological features, the unifying character of which is the appearance of urticarial lesions following stroking of the skin.

1. **Immediate symptomatic dermatographism (factitious urticaria)**: This perhaps is the most prevalent form of dermatographism seen in dermatologic practice. Along with the exaggerated triple response, the patients experience severe itching. The condition is more common in young adults. Though usually idiopathic, it may follow a drug reaction[4] (penicillin reaction) or infestations including scabies. A few human leukocyte antigen (HLA) associations have been described with symptomatic dermatographism. They are HLA A2, B16, A1 and B5.[5]
2. **Delayed dermatographism**: Develops 3-6 h after stimulation, either with or without a preceding immediate reaction and lasts for 24-48 h. The eruption is composed of red nodules. This condition may be associated with pressure urticaria.[3]
3. **Red dermatographism**: This is a rare form where repeated rubbing is necessary to induce small punctate wheals.[4] This form is probably seen in seborrheic dermatitis.[2]
4. **Follicular dermographism**: Transitory, discrete, follicular, urticarial papules occur on a bright erythematous background.[2]
5. **Cholinergic dermatographism**: Seen in some patients of cholinergic urticaria, whose dermographic response consists of grouped urticarial papules characteristic of cholinergic wheals. Purpura has been noted in severe cases. It can be associated with cholinergic urticaria.[2,6]
6. **Cold-precipitated dermographism**: Dermographism that can be elicited on already chilled skin.[7]

DIFFERENTIAL DIAGNOSIS

Symptomatic dermatographism has to be differentiated from Darier's sign seen in urticaria pigmentosa and systemic mastocytosis in which the actual number of skin mast cells is increased due to mast cell hyperplasia. However, symptomatic dermatographism is also observed in mastocytosis after stroking uninvolved skin. Whether this phenomenon is a positive, nonlesional Darier sign or dermatographism is not clear as yet.[8] Symptomatic dermatographism appears at the site of strokes or pressure while urticarial wheals appear *de novo*. Both are pruritic once apparent. Urticarial wheals are usually well-demarcated, round or annular plaques while dermatographism in a given patient assumes the shapes of the strokes/pressure. Dermatographism disappears within 30 min (except in delayed pressure urticaria) whereas urticarial wheals last longer and disappear within 24 h.

SIGNIFICANCE

Dermatographism is seen in 4-5% of the normal population.[9] Its prevalence in chronic idiopathic urticaria is reported to be 22%[3] but a few authors believe that dermatographism is not increased in chronic idiopathic urticaria.[6] In clinical practice, it is essential to differentiate episodes of dermatographism from chronic urticaria and the search for exogenous or endogenous antigens by intradermal tests or autologous serum skin test respectively, is probably unwarranted.

Dermatographism is also called as mechanical urticaria. In that sense, it is a type of physical urticaria. However, it has been reported in association with chronic idiopathic urticaria (22%), cholinergic urticaria, hypereosinophilic

syndrome,[10] drug-induced urticaria,[11] reactive polyarthritis with *Helicobacter pylori*[12] and endocrinopathies like hyperthyroidism, hypothyroidism, diabetes mellitus,[13] etc. A single case of familial dermographism probably inherited as an autosomal dominant trait has been reported.[9]

Cutaneous manifestations of dermatographism may be occasionally associated with mucosal symptoms. Cases of bronchial hyperreactivity[14] and mucosal affection[15] have been reported. Oral discomfort resulted in difficultly in maintaining oral hygiene in the patient.[15]

FALSE DERMATOGRAPHISM

Apart from classical dermatographism and its types, several other types of cutaneous responses associated with or without stroking of the skin entities have been described as dermatographism. These are as follows:

1. **White dermatographism**: when the skin is stroked with a blunt object, instead of erythema, a white line surrounded by an area of blanching appears due to capillary vasoconstriction. This phenomenon can occur normally but is more pronounced in atopic subjects.[7]
2. **Black or green dermatographism**: It is seen as staining under rings, metal wristbands, bracelets and clasps caused by the abrasive effects of cosmetics or other powders containing zinc (hard powder) or titanium oxide on gold jewelry.[13]
3. **Yellow dermatographism**: It has no relation with the process of dermatographism. Yellowish discoloration of the skin results from deposits of bile pigment in the skin in a patient of obstructive jaundice.

TREATMENT

Avoidance of precipitating physical stimuli, reduction of stress and anxiety are important factors. H1-antihistamines are the drugs of choice. However, combining H1 and H2 antihistamines has sometimes resulted in better control of the wheals. Other treatment options like NB-UVB therapy and psovalent + UVA (PUVA) therapy have been used with limited success.

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