Table II. *Potentiation of allergic contact dermatitis to NDMA by C. parvum*

Group	Day 0	Day 6	Day 7	Day 8
I	*C. p.* 30 μg	Challenge with 0.5% NDMA	1.2±0.3	0.8±0.3
II	Saline – NDMA	Challenge with 0.5% NDMA	0.5±0.5	0.3±0.4
III	–	Challenge with 0.5% NDMA	0.0±0.0	0.0±0.0

Two groups of 10 guinea pigs each were sensitized to NDMA by the application of 0.02 ml of 0.5% NDMA in acetone to the skin of the dorsal right flank. A few minutes earlier, the sensitization site had been injected intradermally with 0.1 ml of 30 μg *C. parvum* (Group I) or with saline (Group II). The average intensity of the challenge reactions (± the standard deviations) at 24 and at 48 hours, to testing with 0.2% NDMA in dibutyl phthalate is shown for the sensitized groups as well as for a toxicity control group.

parvum. However, the issue is complex in that both stimulation and inhibition of T-cell immunity may occur, depending on the conditions of the experiment (2). A local specific immunoadjuvant effect of *C. parvum* with respect to the induction of tumor immunity in mice has been described when *C. parvum* is given with antigen (6). We have found that killed *C. parvum* can act as a substantial immunoadjuvant for allergic contact dermatitis in the guinea pig. The induced hypersensitivity to contact allergens is increased by injecting a suspension of killed *C. parvum* into the sensitization site. The local skin toxicity from *C. parvum* is minor and transient. It is likely that *C. parvum* can be incorporated into protocols to enhance the sensitivity of bioassays of potential human sensitizers in the guinea pig.

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REFERENCES

1. Chase, M. W.: Disseminated granulomata in the guinea pig. *In* Mechanisms of Hypersensitivity (ed. J. H. Shafer, G. A. Lo Grippo & M. W. Chase). Little, Brown & Co., Boston, 1959.
2. Halpern, B. (ed.): Corynebacterium Parvum. Plenum Press, New York, 1975.
3. Kero, M. & Hannuksela, M.: Guinea pig maximization test, open epicutaneous test and chamber test in induction of delayed contact hypersensitivity. Contact Dermatitis *6:* 341–344, 1980.
4. Magnusson, B. & Kligman, A. M.: Allergic Contact Dermatitis in the Guniea Pig. Ch. C. Thomas, Springfield, Ill., 1970.
5. Maguire, H. C., Jr & Chase, M. W.: Studies on the sensitization of animals with simple chemical compounds. XIII. Sensitization of guinea pigs with picric acid. J Exp Med *135:* 357–375, 1972.
6. Titus, M. J., Bartlett, G. L. & Kreider, J. W.: Local effects in the prevention of tumor cell immunization by supra-optimal doses of admixed *Corynebacterium parvum*. Proc Am Assoc Cancer Res *71:* 217, 1980 (Abstr.).

The Isomorphic (Koebner) Phenomenon in Cutaneous Mastocytosis

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Abstract. A patient with cutaneous mastocytosis is described who developed diffuse mast-cell infiltration in two burned areas of the skin in a Koebner-like manner. This appears to be the third instance of the isomorphic phenomenon in cutaneous mastocytosis reported in the literature.

Key words: Mastocytosis; Koebner phenomenon; Isomorphic phenomenon

The Koebner (isomorphic) phenomenon is known to occur in a wide variety of dermatological conditions. It is a distinguishing feature of psoriasis, but it also occurs in lichen planus, Darier's disease, pityriasis rubra pilaris, vitiligo, and many other dermatoses. The Koebner response is a rare event

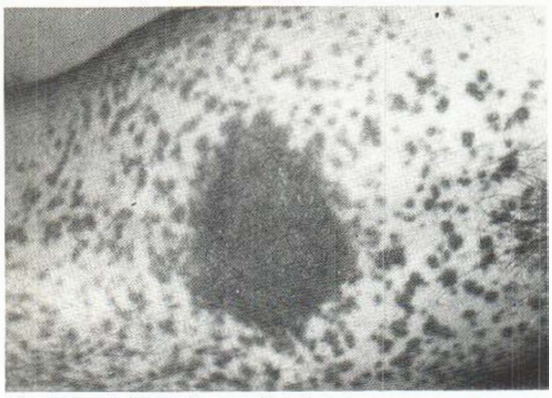

Fig. 1. Koebner lesion on the upper arm.

in cutaneous mastocytosis (urticaria pigmentosa), not mentioned in the major textbooks. MacDonald (2) described a case of mastocytosis in which mast-cell proliferation occurred at the site of a radiation dermatitis. In the same article a personal communication of Comaish is mentioned about a patient with mastocytosis who developed numerous typical lesions in the area of a vigorous hypersensitivity reaction to Elastoplast. We report here a third patient with cutaneous mastocytosis who showed the Koebner phenomenon after a thermal burn.

REPORT OF A CASE

A 67-year-old male patient was referred to our department in 1980 because of cutaneous mastocytosis. The diagnosis had been established histologically some 10 years previously at another institution. The history dated back to 1935 when the patient was 22 years old. At that time he noticed brownish, slightly elevated skin lesions which showed gradual spreading within the first year after onset. Since then the condition has been stable. Subjective symptoms have always been very minute, although itchy sensations could be evoked by rubbing the skin. Two years before referral to our centre the patient suffered burns on the right upper arm and forearm. Immediately after healing of the second-degree burns he noticed a reddish-brown discoloration of both burned areas, which have persisted ever since. Apart from the cutaneous mastocytosis he complained of vague gastric discomfort, though without pyrosis, vomiting or diarrhoea. He denied having suffered from any serious illness during his life.

On physical examination we noticed a generalized eruption, composed of small, reddish-brown macules and slightly elevated papules, only sparing the face, hands and feet. Darier's sign (urtication after friction) could readily be elicited. At the site of the alleged burns the individual lesions had coalesced to large brownish macules with irregular borders (Fig. 1). No lymph nodes were palpable. The liver and spleen were enlarged to about two fingers under the costal margins. The remainder of the physical examination results was unremarkable.

The following laboratory indices were either negative or within normal limits: ESR, WBC and platelet count, haemoglobin level, serum electrolytes, liver and kidney function tests, serum glucose level, protein level and electrophoresis, urinanalysis, ECG and chest roentgenogram. Differential count showed 10% eosinophils. X-ray examination of the skull, spine, pelvis and long bones revealed nothing remarkable. Liver and spleen scans exhibited marked diffuse organomegaly. Unfortunately the patient refused a liver biopsy. Bone marrow aspiration indicated no abnormalities. Gastric examination, comprising gastroscopy and multiple biopsies, was without abnormal findings. Quantitative urinary 5-hydroxyindoleacetic acid (5-HIAA) was undetectable in an aliquot of a 24-hour collection. The plasma histamine level (10.6 μg/ml) and the 24-hour urinary histamine excretion (165.6 μg/24 hr) were greatly elevated.

Biopsies were obtained from an individual mastocytosis papule and from the Koebner lesion on the right upper arm. Both specimens showed numerous mast cells (toluidine blue staining), confirming the diagnosis of urticaria pigmentosa.

DISCUSSION

In the present case a definite diagnosis of urticaria pigmentosa could be made on the basis of clinical, laboratory and histopathological findings. The hepatosplenomegaly in our patient may indicate involvement of the reticuloendothelial system by the mastocytosis. Rodermund et al. (3) described pathological changes in liver and spleen scintigraphies in 22 out of 36 patients with cutaneous mastocytosis.

Apart from the two cases mentioned in the article of MacDonald (2) we were unable to trace other instances of the isomorphic phenomenon in urticaria pigmentosa patients in the available literature. The exact mechanism of the Koebner phenomenon remains unknown. It is generally believed that the determining factor is inherent in the patient's skin. The quality or strength of the stimulus is of secondary importance. In the three mastocytosis patients described by MacDonald or quoted herein the eliciting trauma was radiation therapy in one case, an allergic reaction to Elastoplast in the second instance, and a thermal burn in our patient. The rarity of the Koebner response in cutaneous mastocytosis can be explained by the "all-or-none" character of the reaction.

Positive reactors are destined to develop Koebner lesions in any traumatized area, provided the injury is sufficient. In negative reactors trauma

will not induce a Koebner phenomenon, regardless of the strength of the stimulus. Probably, in urticaria pigmentosa the number of positive reactors is very low, unlike for instance in psoriasis where approximately 25% of patients exhibit the Koebner sign (1).

REFERENCES

1. Farber, E. M., Roth, R. J., Aschheim, E., Eddy, D. D. & Epinette, W. W.: Role of trauma in isomorphic response in psoriasis. Arch Dermatol *91*: 246, 1965.
2. MacDonald, A.: Cutaneous mastocytosis: an unusual radiation dermatitis. Proc Roy Soc Med *64*: 29, 1971.
3. Rodermund, O.-E., Biersack, H.-J. & Rohner, H.-G.: Szintigraphische Veränderungen an Leber und Milz bei Urticaria pigmentosa. Hautarzt *29*: 478, 1978.

Clear Cell Acanthoma: Not of Sweat Gland Origin

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Abstract. We have previously reported the presence of carcinoembryonic antigen in eccrine and apocrine gland and duct and in all sweat gland adenomas. The absence of carcinoembryonic antigen in clear cell acanthoma suggests that this lesion is not derived from sweat gland epithelium.

The classification of clear cell acanthoma is obscure (1–3). We have recently reported that carcinoembryonic antigen (CEA) can be detected in eccrine and apocrine glands, ducts, duct cuticle and acrosyringium by immunoperoxidase techniques (4). Furthermore, CEA can be visualized in all sweat gland adenomas by using similar techniques (5). CEA is also detectable in sweat by radioimmunoassay. If clear cell acanthoma is a proliferation that arises from acrosyringial epithelium, then CEA should be detectable within the mass of the lesion.

In this report, we have examined two typical lesions of clear cell acanthoma for the presence of CEA and find no demonstrable CEA within the lesions.

METHODS

An unlabelled antibody peroxidase–antiperoxidase (PAP) technique was carried out in the following manner as previously described (6): (1) Paraffin sections (3 μm) incubated 24 hours at 37°C, dewaxed in xylol–alcohol; (2) 0.3% hydrogen peroxide in methanol for 30 min to block endogenous peroxidase; (3) normal rabbit serum 1 : 20, 30 min, to reduce non-specific background staining; (4) goat antihuman CEA, 1 : 6 000 for 30 min; (5) rabbit antigoat IgG 1 : 20 for 30 min; (6) goat peroxidase–antiperoxidase 1 : 100 for 30 min; (7) 3-amino-9-ethylcarbazole reaction with hydrogen peroxide for 3 min; (8) hematoxylin counterstain for 10 min, dehydrate and mount.

All reactions were carried out in phosphate-buffered saline solution, pH 7.4, with washes after each of stages 4 through 7. Goat antibody against CEA was donated by Hoffmann-LaRoche Inc. and rabbit antibody against CEA was donated by Dako Laboratories. Rabbit antigoat IgG and goat peroxidase–antiperoxidase were from Dako Laboratories, Inc, Santa Barbara, Ca. 3-amino-9-ethylcarbazole was from Aldrich Chemical Co., Milwaukee, Wisconsin.

RESULTS AND DISCUSSION

CEA is easily visualized within the cells that compose the acrosyringial unit and in the sweat duct (Fig. 1). However, in neither case did we observe CEA within the tumor mass of clear cell acanthoma. Since we have observed the presence of CEA in varying amounts in all sweat gland adenomas and sweat gland carcinomas (5), we conclude that clear cell acanthoma is most likely not derived from sweat gland or duct epithelium.

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REFERENCES

1. Wells, G. C. & Wilson-Jones, E.: Degos' acanthoma (acanthome à cellules claire). A report of five cases with particular reference to the histochemistry. Br J Dermatol *79*: 249, 1967.
2. Degos, R. & Civatte, J.: Clear-cell acanthoma. Experience of 8 years. Br J Dermatol *83*: 248, 1970.