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CORRELATIONS BETWEEN SCLERODERMA AND DERMATITIS ATROPHICANS

(CONCEPT OF THE SO-CALLED COLLAGEN DISEASES)

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Problems concerning the so-called "collagen diseases" have formed the subject of numerous congresses and symposia during recent years (Stockholm 1954, Strassbourg 1957, Budapest 1957, Cracow 1958, Moscow 1959, etc.). Unfortunately — instead of discussing the clinico-pathological significance of the syndromes in question —, these scientific meetings more or less confined themselves to debates concerning the terms to be applied to these diseases falling in the above category. The term "collagen disease" seems to be a misnomer. It was KLEMPERER himself, the inventor of the concept, who arrived subsequently at the conclusion that what characterizes the syndromes known collectively as collagen diseases is not so much a change of the collagenous fibres as a pathological alteration of the interfibrillar ground substance. It should be noted that the morbid changes in question are far from being uniform either qualitatively or quantitatively. Although it is chiefly the change of fibrinoid which is regarded as the principal feature of these diseases, it must be borne in mind that fibrinoid itself is not a morphologically or chemically uniform substance.

We think that the clinical use of this nosological category is justified chiefly by the fact that the pertaining diseases frequently show intermediate forms, thus constituting transitions from one to the other member of the group (see Table I), and further by the fact that the frequency of their simultaneous occurrence in the same patient is greater than the statistical probability.

It has been mentioned that, in the diseases at issue, the pathological change in the ground substance displays quantitative and qualitative differences. While in some cases an accumulation of mucopolysaccharides is encountered, in others sclerosis of the connective tissue or fibrinoid degeneration — particularly in the vessel walls — is observed. The fundamental problem is the determination of the factors responsible for the various phenomena characterizing histologically each particular pathological process, such as the atrophy of collagenous tissue accompanied by the loss of the elastic matter in one case, sclerosis of the connective tissue in another, accumulation of mucoproteins in a third, and fibrinoid in the vessel walls in a fourth case.

Certain facts are actually available for the interpretation of the various changes affecting the connective tissue. A certain correlation is known to exist between the mucopolysaccharides contained in the ground substance, and the sclerosis of the connective tissue. WYDROFF, HIGHBERGER and BANGA and others observed the incorporation of mucoids into the collagenous fibres. These authors performed their experiments on tissue cultures, while ROMHÁNYI et al. "in vivo" experiments observed the gradual incorporation

Fig. 1. Scleromyxoedema : accumulation of mucoids in the corium. Cresyl-violet stain

of mucoid into the collagenous tissue after intracutaneous injection into the tail of albino rats. Clinical observations supplied adequate evidence to show that the relationship between mucoids and collagen may be disturbed under morbid conditions. A good example in this respect is the peculiar dermatological process termed *scleromyxoedema.* It was first described by DUBREUILH at the beginning of the century, and a few years later by ARNDT. Of recent, it was GOTTRON, then, — in 1956 — KEINING and BRAUN—FALCO who concerned themselves with this syndrome. In scleromyxoedema the conversion of mucoids into sclerotic collagenous tissue is inhibited. There are great amounts of mucoid in the corium which shows metachromasia on staining with toluidine blue and cresyl violet (acid mucopolysaccharides, see Fig. 1), while advanced fibrosis of the connective tissue is also encountered (hypertrophy and homogenization of collagen).

A similar problem is presented by the association of scleroderma and alterations suggestive of dermatitis atrophicans or, again, by the sclerodermatous appearance of some areas in dermatitis atrophicans plaques. The observation of such intermediate forms or the simultaneous appearance of true scleroderma and dermatitis atrophicans gives rise to the question, why initial inflammatory alterations are followed by a sclerosis of collagenous tissue in some areas, and by atrophy without sclerosis in other regions. It should be noted in this connection that certain cases of localized scleroderma (morphea) lead likewise to atrophy. Dermatologists have long been interested in the concurrence of these two — both histologically and clinically so different — processes. The problem was treated by OPPENHEIM as long ago as 1910 and 1913, and it was raised again by PAUTRIER, who at the Strassbourg conference in 1929 reported to have observed sclerodermic symptoms in 60 per cent of his cases of dermatitis atrophicans. It was in 7 cases of scleroderma, out of a total of 42, that we were able to encounter the signs of dermatitis atrophicans. The publications of the said authors gave rise to a wide-spread discussion of the problem whether the sclerodermatous alterations observable in cases of dermatitis atrophicans were really indicative of true scleroderma. PAUTRIER inclined to this view: "si nous disons lésions sclerodermiformes, c'est pour indiquer qu'elles n'obéissent pas à la topographie de la sclerodermie en bandes, de la sclerodactylie ou de la sclerodermie en plaques, mais ce n'est pas qu'une question des mots, en réalité c'est bien de la sclerodermie qu'il s'agit". In discussing this problem we must bear in mind that the various members of the scleroderma group display certain histological differences. This view seems to be confirmed by GOTTRON—SCHÖNFELD's recent textbook whose chapter on scleroderma was written by KORTING. The evidence furnished by our own histological material induces us to accept this view. In connection with a number of cases of scleroderma and dermatitis atrophicans, we undertook investigations with a view to throwing light on transitional structures and, in particular, on the combination of sclerosis with the atrophy of the connective tissue.

Before describing these investigations we wish to deal briefly with the histomorphology and with the histogenesis of scleroderma (or, more correctly, scleropathy Emmerich). Most of the authors (GOTTRON and his school, LONGHI, ALLEN, etc.) agree that, in sclerodermic processes, changes in the connective tissue are preceded by neurovascular alterations. We agree with JABLONSKA et al. in regarding sclerodermia as a neurotrophic — or, more correctly, neurovascular — process. The correctness of this concept substantiated by the evidence of those earlier histological (neuromorphological: ORMEA, JOHN, SZODORAY*) observations and by capillarmicroscopical observations which

* *Szodoray* observed enhanced cholinesterase activity in the nerve fibres of the little blood vessels in the sclerotic corium (see Fig. No 2/b).

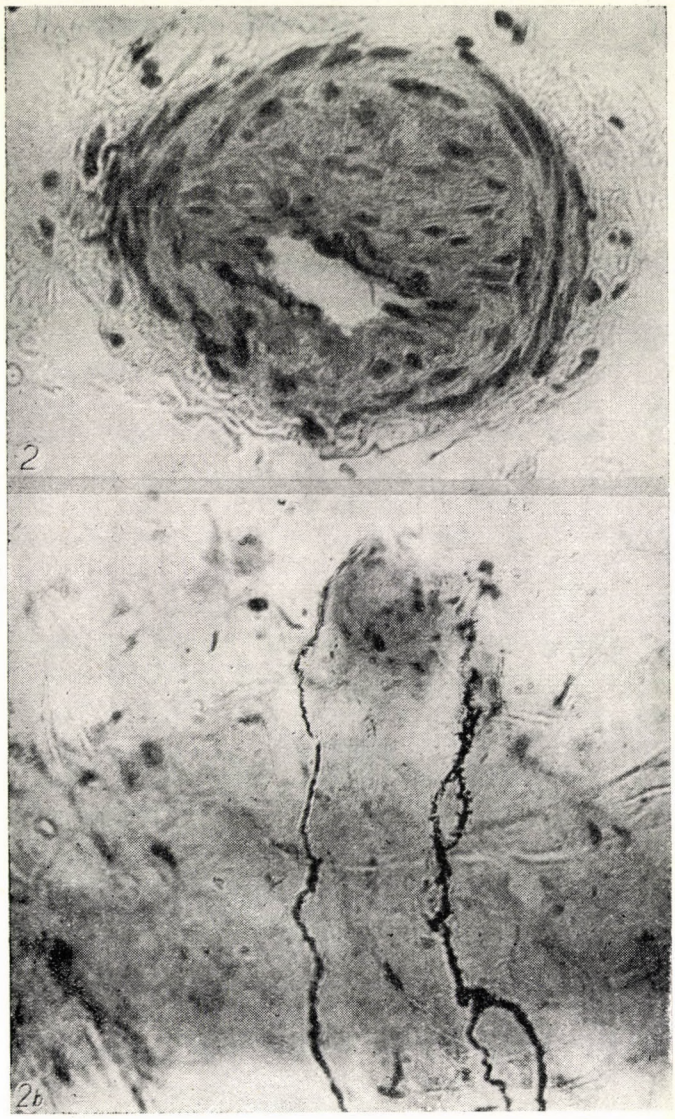

Fig. 2/a Scleroderma : typical thickening of arteriolar walls
Fig. 2/b Cholinesterase activity (Kolle-Friedenwald's technique). Note nerve fibres running towards the wall of blood vessels

were made by BUGÁR—MÉSZÁROS and later by MÁRAMAROSI and NAGY, and in histological sections by LONGHI and others (Figs. 2a). The chronaximetric investigations performed by JABLONSKA et al. also point to the importance of neural factors. Apart from neurovascular ones we must, however, take also other pathogenic factors into account, *e. g.* endocrine, allergic (auto-allergic), etc. factors, as indicated also by the evidence of certain clinical observations such as the preponderance of female patients ; the appearance of hypergammaglobulinaemia which is not infrequently associated with hypo-proteinaemia ; the *increased level of hexosamine in the serum* (SZABOLCS and TANKÓ), premenstrual exacerbation of cutaneous changes in certain cases, etc. We refer in this connection to SULZBERGER's statement concerning the pathogenesis of skin diseases that many cutaneous processes may be regarded as examples of the general rule according to which "a disease will develop if several pathogenic factors exert a simultaneous action on the tissues". It is in our opinion on the extent to which the various pathogenic factors become operative that the clinical and pathomorphological picture of each individual case depends. We are, therefore, inclined to accept PAUTRIER's view that the members of the scleroderma group are histologically different from one another, and cannot share the view — expressed by WORINGER and LAUPIER at the conference of Strassbourg in 1957 — that all the diseases (about six) classified under the head of scleroderma show a common characteristic histological picture.

Of recent, we undertook histochemical investigations with a view to finding the reason why the sclerosis of collagenous tissue is associated with elastosis in some, and with atrophy and the destruction of elastic tissue in other cases. The direction of our studies was based on a statement made by REICH some 8 years ago that the onset of both scleroderma and dermatitis atrophicans was characterized by an inflammatory process. In the case of scleroderma, this initial phase is followed by sclerosis due to exoserosis. In the case of dermatitis, the initial inflammation has an overwhelmingly cellular character (circumscribed masses of leukocytes and lymphocytes) which is really responsible for the fact that here the initial phase is followed by atrophy of collagen and elastolysis. Perivascularly arranged lymphocytes and leukocytes are indeed well observable in the upper layer of the corium not only in the incipient phase of dermatitis atrophicans.

In the investigations we endeavoured to demonstrate exoserosis as postulated by REICH by means of HAITINGER's fluorochrome method. After preparing histological sections from four cases of scleroderma and four cases of dermatitis atrophicans, we stained them with mixtures of euchrysene, thiazine-red and thioflavine, and examined them under the fluorescence microscope. Brownish discoloration is regarded by EPPINGER and HAITINGER as indicating the presence of serum in the tissues. Intact epidermis shows

otherwise a pale blue, and collagen tissue a greenish fluorescence. All of our sections obtained from the skin of sclerodermatous patients showed a more or less diffuse, brownish discoloration of the corium (Fig. 3), while all the sections obtained from the skin of the dermatitis cases showed a weak, greenish fluorescence of the connective tissue (Fig. 4). Sections obtained from the edge of sclerotic areas revealed a marked brownish colour also (Fig. 5).

Our observations support the assumption of WYDROFF and HIGHBERGER, BANGA and ROMHÁNYI that mucoproteins that have gained access to the intercellular ground substance are involved in the development of sclerosis, and to confirm at the same time REICH's statement that exoserosis occurs in the initial stage of sclerodermal processes. The manner in which pathological mucoproteins find their way to the connective tissue is still unelucidated. Sclerodermic vascular processes are possibly associated with increased permeability which may facilitate the escape of mucoproteins from the blood stream into the tissues.

It is only too natural that vascular changes, characteristic of the initial inflammatory processes, may be of various degrees and different types and that, consequently, sclerosis can be of a different degree in each particular case. The fact that cellular infiltrations are different in different cases would then explain the reason why sclerosis is followed by elastosis in some instances and by atrophy in others. It is moreover conceivable that vascular changes of different types occur in different regions of the organism of one and the same individual and give thus rise to different types of cutaneous alterations.

Table I makes it evident that the concurrence of different pathological processes of the collagenosis group or the simultaneous appearance of intermediate forms, *e. g.* scleroderma and myxoedema (scleromyxoedema) or dermatomyositis and myxoedema (dermatomyxomyositis) are fairly frequent. (The syndrome termed "localized panatrophy" by GOWERS and BETTLEY, in which atrophy takes a predominantly vertical course, might also be regarded as belonging to this category).

We propose to present, in the following, the case records of three patients in whom the existence of intermediate forms and the simultaneous occurrence of dermatitis atrophicans and scleroderma caused considerable difficulties in diagnosis, from histological point of view also.

Case I. L. K., female, 56 years of age, menopause at the age of 46 years, had noticed the first cutaneous alterations in 1945 when she had become aware of numbness in the fingers ; this had been followed by a bluish pigmentation and thinning of the skin of the hand. Similar symptoms had subsequently developed on the lower extremities and had continuously spread over wider and wider areas.

The patient was admitted in October 1958, when the skin of both her hands was bluish and astrophied and similar diffuse alterations were visible on the skin of the lower limbs. Lentil-sized, yellowish, round and indurated foci were seen around lesions. A histological analysis of the sections made from the atrophied areas of the skin revealed advanced atrophy of the epidermis and corium, as also a marked dilatation of the capillaries in the upper layer of the corium, with a moderate lymphocitic infiltration. We were surprised to find, instead of elas-

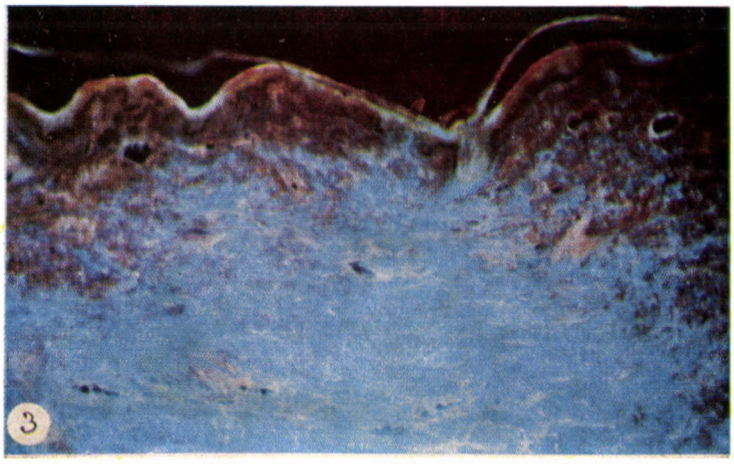

Fig. 3. Scleroderma: brownish coloration of sclerosed area. Haitinger's fluorochrome method

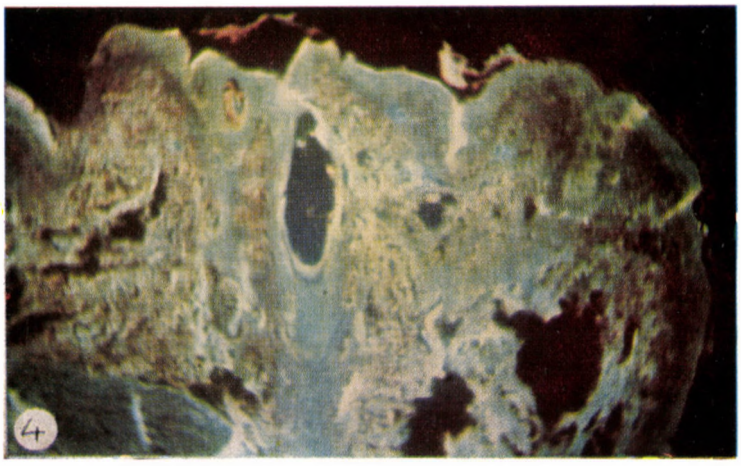

Fig. 4. Dermatitis atrophicans: no brownish colour visible. Haitinger's fluorochrome method

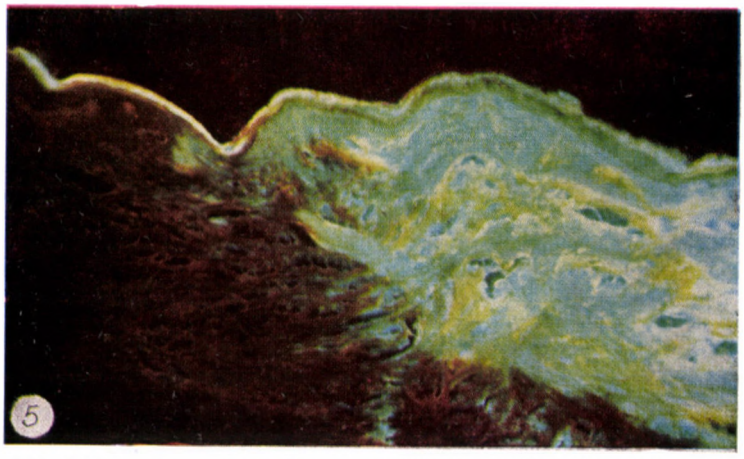

Fig. 5. Scleroderma (morphoea guttata): brownish coloration at the edge of the lesion. Haitinger's fluorochrome method

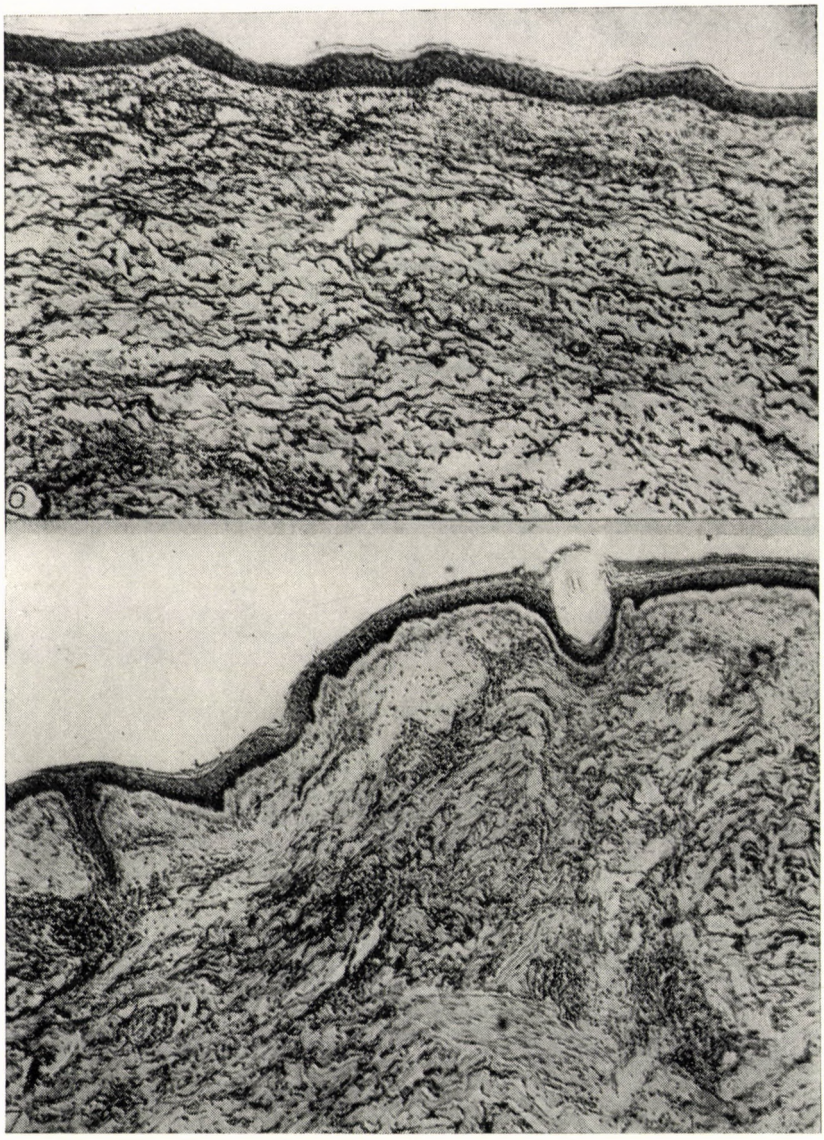

Fig. 6. Case I. Lesions indicative of dermatitis atrophicans. Note well-preserved elastica!
Fig. 7. Case II. Elastolysis in the upper part of corium. Resorcin-fuchsin stain

tolysis, a marked relative hyperplasia of the elastica (Fig. 6.), a phenmenon characteristic of scleroderma. In the deeper layer of the corium there were arterioles with thickened walls, likewise a characteristic feature of scleroderma.

Case II. S. Sz., female, 56 years of age, had become aware of cutaneous changes 4 years before admission ; bluish pigmentation and thinning of the skin of the feet, the shank, thigh and gluteal area. A few round, mildly yellow, indurated foci were observable on the skin of the trunk, some of which were surrounded by a marginal hyperemia, the so-called "lilac-ring" characteristic of scleroderma. All these lesions were diagnosed as indicative of morphea. Histological examination showed an atrophied epidermis, a flattened papillary layer and a lymphocytic infiltration around the capillaries in the upper part of the corium. The network of collagenous fibres in the corium was found to be reduced, and the number of interfibrillar fibrocytes increased. Contrary to expectation, the upper part of the corium

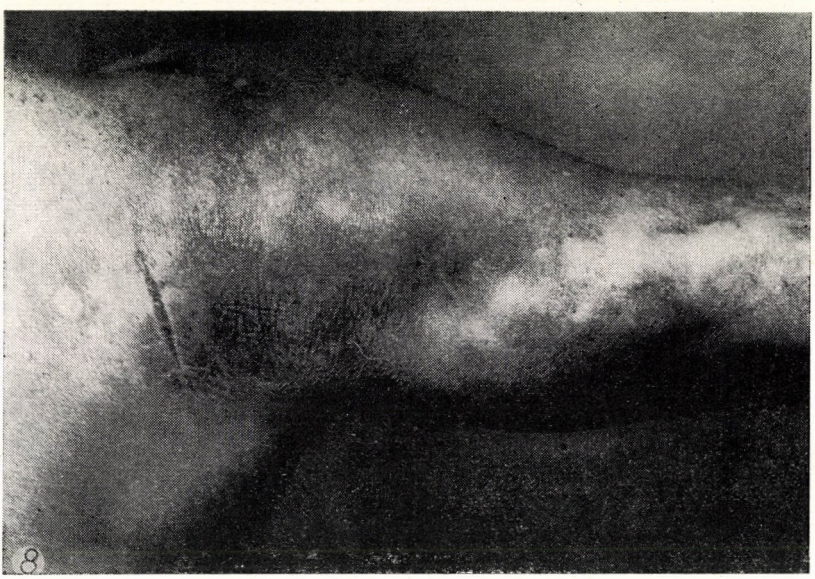

Fig. 8. Scleroderma on right arm with morphoea guttata. Dermatitis atrophicans of both elbows and the dorsal surface of both hands

was devoid of elastic matter (elastolysis, Fig. 7), while its relative hypertrophy was seen in the deeper layers. Histological analysis of the muscles showed an increased number of sarcolemmal nuclei, as also a loss of myofibrillar striation at several points (parenchymatous alterations) ; the capillaries of the endomysium and perimysium were dilated in some places. Laboratory tests : no pathological changes in urine or blood ; erythrocyte sedimentation rate 27/50 per hour. There was no significant response to treatment with penicillin. After 2 ½ months Aralen treatment resulted in a considerable improvement of the cutaneous disorders. The case was considered an intermediate form between dermatitis atrophicans and scleroderma combined with parenchymatous myositis : sclerodermatomyositis complicated with dermatitis atrophicans.

*Case III.** A. K., male, 38 years of age, had noticed the first cutaneous lesion in March, 1958, a yellow pigmentation of the right shoulder which had made him visit the outpatient department of Miskolc Hospital. There the tentative diagnosis : dermatitis atrophicans was made. He was admitted to our department on January 19, 1959. There was a 5 cm wide band-shaped, yellow induration of the skin, starting from the right scapula and running along the right upper arm ; it was interrupted at the elbow by a palm-sized atrophied patch beyond

* Published by L. SZODORAY in the Derm. Wochenschr. *138*. 653, 1959.

which the sclerosed bundle continued along the extensor surface of the lower arm right down to the wrist. Several lentil-sized, round, in some place depressed, whitish and markedly indurated papules were scattered along the edges of the sclerosed area. The skin showed bluish pigmentation and was markedly thinned over the left elbow, at an area similar in size to that around the right elbow, as also on the dorsal surface of both hands. Unilateral scleroderma "en bandes" was diagnosed on the right side, while the symptoms seen on the elbows and the dorsal surface of the hands pointed to symmetrical dermatitis atrophicans *(Fig. 8.)*. A round, penny-sized depigmented area: *vitiligo* occurred around the right eyebrow. Neurological and internal examinations gave negative results. Since the sclerodermal lesions showed a segmental arrangement, corresponding to the VIIth and VIIIth cervical segments, we made radiographs which showed a flattening of the cervical lordosis. *Histological analysis* of the skin taken from around the elbows revealed an atrophied epidermis, a flattened papillary layer, lymphocytic infiltration around the capillaries in the upper part or the corium, and a reduction of elastic fibres, all symptoms characteristic of dermatitis atrophicans. Sections prepared from the skin of the right upper arm revealed the typical features of scleroderma: thinning of the epidermis and thickening of the corium. The collagenous fibers were coalescent and homogenized; the elastic fibres were preserved or showed signs of elastolysis. A thickening of the arteriolar walls (also a feature characteristic of scleroderma), moderate proliferation of the intima and increased elastic were also present.

The case is a good example of the simultaneous occurrence of scleroderma "en bandes", morphea guttata, dermatitis atrophicans and vitiligo; it was in many respects similar to the case published by RICHTER, and those observed by JABLONSKA.

Summary

(I) Syndromes, classified in the group of collagen diseases, frequently appear in forms that constitute transitions from one to the other member of the group. This is one of the reasons why it is justified to place them in a separate nosological group.

(II) Such classification is in conformity with the frequent association of scleroderma and dermatitis atrophicans, a phenomenon which had given rise to certain controversies in earlier literature.

(III) Whether inflammation is followed by sclerosis or by atrophy depends, according to our examinations by means of Haitinger's fluorochrome method, on the character of the initial inflammatory process. If the inflammation is associated with cellular infiltration, the appearance of atrophy may be expected, while sclerosis is to be expected if exudative factors are prevailing in the initial inflammatory process.

REFERENCES

1. ALLEN, A. G.: (1954) The skin. Mosby Co. St. Louis. p. 128. — 2. BANGA, I. (1958) Börgy. Vener. Szemle *34.* 150. — 3. BETTLEY, R.: (1950) Localised panatrophy. Brit. J. Derm. *62.* 330. — 4. BUGÁR—MÉSZÁROS, K.: (1929) Capillarmikroskopos megfigyelések sklerodermiánál. Orv. Hetil. *73.* 60. — 5. GOTTRON, H. A.: (1954) Skleromyxödem. Arch. Derm. Syph. (Berl.) *199.* 71. — 6. HAITINGER, M.: (1938) Die Fluoreszensmikroskopie. — 7. JABLONSKA, S., BUBNOW, B., u. B. LUKASIAK: (1957) Auswertung von Chronaxiemessungen bei Sclerodermie. Derm. Wschr. *136.* 821. — 8. JABLONSKA, S., BUBNOW, B., B. LUKASIAK: (1959) Acrosclerosis: a disease sui generis or a variety of diffuse scleroderma. Brit. Derm. *71.* 123. — 9. KEINING, E., O. BRAUN—FALCO: (1959) Zur Klinik u. Pathogenese der Skelromyxödems. Acta Derm.-Venereol. (Stockholm) *36.* 37. — 10. KLEMPERER, P.: (1955) General Considerations of Collagen Diseases. Acta Med. Scand. *312.* 261. — 11. KORTING, G. W.: (1958) Dermatologie und Venerologie. Editors: Gottron u. Schönfeld Bd. II/2. 5. 898. — 12. LONGHI, A.: (1954) Contributo allo studio malattir sclerodermica. Nota IV. La situazion vascolare cutanea. Arch. Ital. Derm. *26.* 287. cit: Zbl. Haut- u. Geschlkr. *91.* 337. 1955. — 13. MÁRAMAROSI, GY., NAGY, E.: (1957) Kapillármikroskópos vizsgálatok sclerodermiás betegeken. Börgy. Vener. Szle. *33.* 195. — 14. PAUTRIER, L. M.: (1929) Les rapports de la dermatite chronique atrophiante de l'anetodermie et de la sclerodermie. L'étude des troubles du métabolisme du tissu conjonctif. Bull. Soc. Franc. Derm. Syph. 973. — 15. PEARSON: (1926) Acrodermatitis chronica atrophicans with scleroderma. Arch. Derm. Syph. *13.* 690. — 16. PETRÁNYI, GY.: (1958) Naturgeschichte des Lupus erythematosus und die klinischen

Zusammenhänge der rheumatischen Erkrankungen. Acta Med. Hung. *12.* 85. — 17. PETRÁNYI, GY. : (1958) Cardialis elváltozások a kollagen betegségekben. Orv. Hetil. *99.* 329. — 18. REICH : (1950) Histologische Untersuchungen bei diffuser (progressiver) Sklerodermie, circumscripter Sklerodermie und sklerodermieähnlichen Veränderungen der Acrodermatitis chronica atrophicans. Arch. Derm. Syph. *191.* 505. — 19. ROMHÁNYI, GY. : (1958) Felszólalás a M. D. T. Kollagen-symposiumján. 1957. dec. 20. Bőrgyógy. Vener. Szemle *34.* 150. — 20. RICHTER, W. : (1937) Pseudosklerodermie in Vorlauf der Akrodermatitis chronica atrophicans, in ihrer Stellung zur Sklerodermie. Arch. Derm. Syph. *175.* 123. — 21. SCHWITZER and LAYMAN : (1935) Acrodermatitis chronica atrophicans and scleroderma. Arch. Derm. Syph. (Chicago) *31.* 194 — 22. SCHULTZE, W., E. KURUCZ : (1954) Kritische Bemerkungen zur Panaatrophia Localisata, Derm. Wschr. *133.* 865. — 23. SULZBERGER, M. B. : (1958) Multiple Factors in the Causation of Diseases and the Implications of this Concept for their Understanding and Management. Dermatologica. *117.* 407. — 24. SZODORAY, L. : (1959) Über den Zusammenhang zwischen Sklerodermie und Dermatitis atrophicans. Derm. Wschr. *139.* 653. — 25. WYDROFF, HIGHBERGER cit. by Musso : (1954) A contribution to the pathogenesis of the changes in the collagen ground substance equilibrium in morphea (scleroderma). Brit. J. Derm. *66.* 377. — 26. WORINGER, F. et P., LAUPIER : (1955) L'histologie des sclerodermies. Bull. Soc. franc. Derm. Syph. *64.* 497. 612.

Table 1

Transitions and simultaneous occurrence of collagenous diseases in the same patient
(Review of the literature)

1. *L. erythematodes with sclerodermia:*
   H. L. Arnold: Arch. Derm. *76.* 427. 1957.
   Lutz, W. and U. F. Wartmann: Dermatologica *108.* 451. 1954.
   Sertoli, P.: Mesenchimopatia collagenica polisin. Minerva med. *32.* 241. 1957.
2. *Erythematodes with M. Raynaud and polyarthritis:*
   Sharp, A. A.: Brit J. Derm. *69.* 50. 1957.
3. *Scleroderma with polyarthritis:*
   Zadek: Berl. Klin. Wschr. No. 2. 1917.
4. *Rheumatoid arthritis with L. E. phenomenon:*
   Cohen and Cadman 6 cases, Friedeberg et al. 2 cases, Shearn and Pirovek 4 cases (cit. Talbot H. and R. Ferrandi : Collagen Diseases.
5. *Poikilodermatomyositis with periarteritis nodosa and panniculitis:*
   Manus M. D. and W. E. Wooldridge: Arch. Derm. Syph. (Chicago) *62.* 131. 1950.
6. *Sclerodermatomyositis:*
   Duperrat, B. et coll.: Bull. Soc. fran. Derm. Syph. *62.* 438. 1956.
   Szodoray L. and J. Petrányi: Sclerodermatomyositis with erythematodes see *Petrányi* Orv. Hetil. *99.* 329. 1958.
   Szodoray L.: Dermatomyxomyositis. Demonstrated at the Meeting of the Hungarian Dermatological Society 1958.
7. *Scleropoikilodermatomyositis:*
   Lutz, W. and Wartmann: Dermatologica 108. 452. 1954.
8. *Sclerodermatomyositis with erythaematodes dissemin:*
   Pagel, W. and S. C. Treip: Collagenosis-viscerocutanea. J. Clin. Path. *8.* 1. 1953.
9. *The so called "Panatrophy"*
   Bettley R.: Brit. J. Derm. *62.* 330. 1950.

СКЛЕРОДЕРМИЯ И ЧАСТИЧНАЯ АТРОФИЯ ЭЛАСТИЧЕСКОЙ ТКАНИ КОЖИ (DERMATITIS ATROPHICANS)

Л. СОДОРАИ и П. ДАРОЦИ

1. Картины болезни, относимые в группу коллагеновых заболеваний, нередко показывают переходы. Наряду с прочими аргументами данное явление также объясняет их причисление в одну нозологическую группу.

2. На основе такой классификации становится понятным переплетение процессов склеродермии и частичной атрофии эластичной ткани кожи у одного и того же лица, что впрочем в прежней литературе было предметом обширных дискуссий.

3. Авторы на основе проведенных исследований того мнения, что возникновение склероза или атрофии определяется характером *начальных воспалительных изменений*. Поскольку для воспаления были характерны, главным образом, клеточные инфильтрации, то можно ожидать наступление атрофии. Если, однако, в воспалении играли роль также экссудативные факторы, то возникнет склероз. Данный тезис, повидимому, подкрепляется также исследованиями авторов, проведенными флуорохромированием клеток по методу Хайтингера.

SKLERODERMIE UND DERMATITIS ATROPHICANS

L. SZODORAY und P. DARÓCZY

1. Die in die Gruppe der Kollagenen Erkrankungen gereihten Krankenheitsbilder zeigen häufig Übergänge. Neben anderen Argumenten ist ihre Einordnung in eine nosologische Gruppe auch durch diese Tatsache begründet.

2. Auf Grund dieser Klassifikation wird die Verflechtung der Prozesse von Sklerodermie und Dermatitis atrophicans bei ein und derselben Person, — welcher Umstand im übrigen Gegenstand ausgedehnter Diskussionen in der früheren Literatur bildete — verständlich.

3. An Hand ihrer Versuchsergebnisse sind Verfasser der Meinung, dass die Entstehung von Sklerose oder Atrophie durch den Charakter der einleitenden entzündlichen Veränderungen bestimmt wird. Ist diese Entzündung hauptsächlich von zelliger Infiltration gekennzeichnet, so ist das Auftreten von Atrophie zu erwarten. Spielen dagegen in der Entzündung auch exsudative Faktoren eine Rolle, so wird Sklerose entstehen. Diese Thesen scheinen durch Untersuchungen mittels der Haitingerschen Fluorchrom-Methode eine Bestätigung zu finden.

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