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SIGNIFICANCE OF HISTOPATHOLOGICAL FINDINGS IN DUPUYTREN'S CONTRACTURE

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ABSTRACT

Clinical and histopathological data were compared in a series of 59 patients with Dupuytren's contracture (DC) from the years 1946—1971 in order to clarify whether histopathological findings were in accordance with the clinical development of the disease.

All well known histopathological features were inspected. The most valuable prognostic sign seemed to be the appearance of several active nodules, indicating rather rapid development of DC, with a high frequency of postoperative recurrence in these patients. Lack of active nodules did not exclude this possibility but made it less likely. Other occasional findings typical of DC such as the number of mitoses, microhaemorrhages, perivascular lymphocytic infiltrations and hypertrophied corpuscles of Vater-Paccini seemed to be of minor prognostic value. Mucopolysaccharides from DC tissue showed metachromasia with toluidine blue but did not stain with HID-AB (high iron diamine-alcian blue) as HID positive in specimens preserved embedded in paraffin blocks for several years.

KEY WORDS: DUPUYTREN'S CONTRACTURE; CONNECTIVE TISSUE; FIBROBLASTS; MUCOPOLYSACCHARIDES

INTRODUCTION

Dupuytren's contracture has an overall incidence of 1—3 %, occurring six to ten times more frequently in males than in females (1, 4, 5, 8, 13, 15, 20). Fortunately in many patients the condition remains localized in the palm and remains at the nodular stage for years causing only little if any contraction of the fingers (6, 15, 22). In others, permanent flexion appears (3), usually first in the metacarpophalangeal joints of the ring and little fingers, then in the middle and index fingers and lastly in the thumb (13, 15). The etiology of DC in unknown (9, 13), though heredity certainly plays an important role. Local or distant trauma, neurogenic and metabolic factors may be of some significance in the development of DC. Alcoholism, diabetes mellitus and epilepsy are often associated with it (15, 19, 21, 22). For reviews concerning anatomical and surgical aspects of DC the reader is referred to Stack (18). Histopathological changes in DC are described in the papers of Skoog (15), Sluiter (17) and MacCallum (11). The treatment of DC, if actually indicated, is surgical in most cases (2, 4, 5, 7, 10, 12, 16). Many operations for DC are available and the selection of the right one is not always easy (14). It has been postulated, however, that recurrences are determined more by the natural history of the disease than by the operation performed (5). If this conclusion is correct, the histopathological picture of the nodule or cord might reflect the activity of the disease and give some guidelines to the possibility of recurrences.

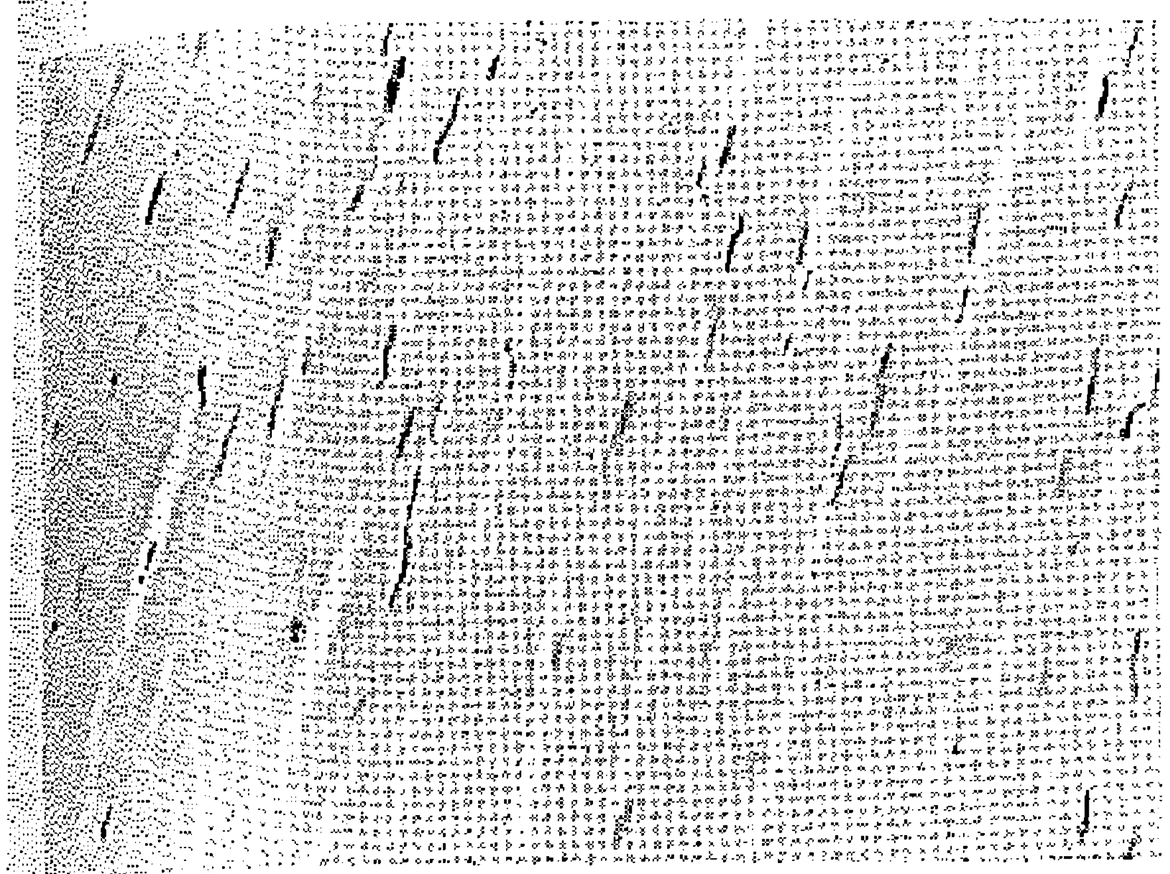

Fig. 1. Broad, partly hyalinized tendinous structures with scarce nuclei (van Gieson, hemat. 100 ×).

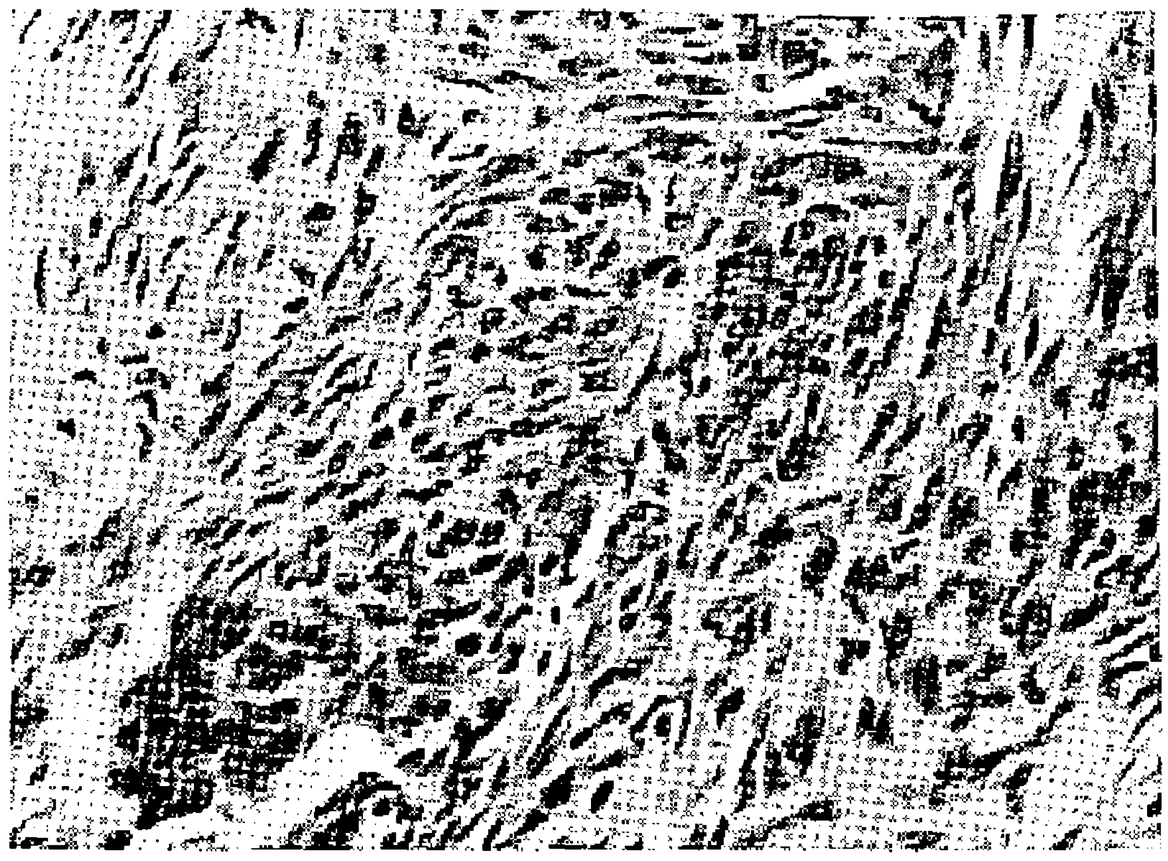

Fig. 2. A small cellular, »active» nodule with marked disarrangement of the cells and fibres (van Gieson, hemat. 250 ×).

PATIENTS AND METHODS

During the years 1946—71 a total of 128 patients, 112 men and 16 women with DC were treated in the Department of Surgery at Turku District Hospital, which later became the University Central Hospital of Turku. From 59 of these patients whose ages ranged from 25 to 87 years (mean 52.0 years) one or more specimens were taken for histopathological examination. In five cases, however, these specimens were inadequate. Six patients with recurrences were reoperated but from only two of them had histological specimens been taken on more than one occasion. For this study, in addition to the ordinary van Gieson-hematoxylin stain, Verhoeff stain for elastic fibres, high iron diamine-alcian blue (HID-AB) for acid mucopolysaccharides and phosphotungstic acid-hematoxylin for myofibrils were made. In a few cases toluidine blue staining for the demonstration of metachromasia of acid mucopolysaccharides was also made.

RESULTS

In the routinely stained sections our observations were consistent with those previously described. In all cases cell poor, tendinous structures consisting of parallel broad collagen fibres were seen (Fig. 1). Varying degrees of hyalinization were observed and the fibres were often stained yellow instead of red. Another feature typical of DC, cellular nodules (Fig. 2), was observed in 46 (85 %) of the 54 cases with diagnostic specimens. These nodules were formed by bundles and whorls of young connective tissue usually rich in fibroblasts and/or fibrocytes. A few mitoses were noticed in 9

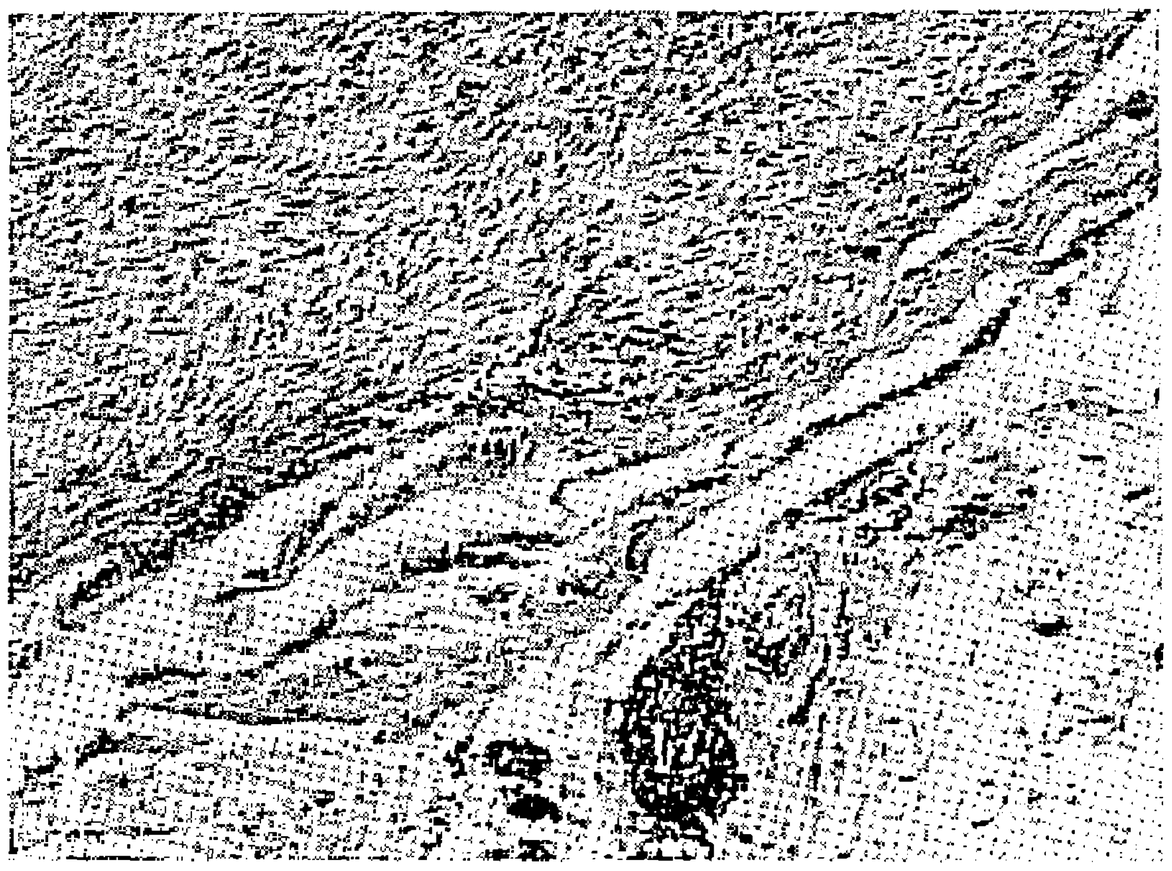

Fig. 3. A perivascular lymphocytic cuff in the vinicinity of a cellular nodule (van Gieson, hemat. 100 ×).

cases and microhaemorrhages or hemosiderin in 5 cases. In the surrounding fat tissue small blood vessels were thick-walled and around them lymphocytic infiltrates (Fig. 3) were seen in 17 cases (31 %). Furthermore, corpuscles of Vater-Paccini were often hypertrophied and perineural fibrosis was observed. The special stains revealed no elastic fibres or myofibrils in the nodules. Unexpectedly, acid mucins could not be demonstrated either, although a normal stain control was used. However, in fresh specimens having spent no more than one year embedded in paraffin blocks, sulphated acid mucopolysaccharides could be demonstrated in active nodules with the HID-AB method although the alcian blue component remained negative.

The duration of symptoms was reliably recorded in 30 out of 54 cases. In 16 patients the symptoms had lasted less than 10 years and in 14 longer. In 14 patients of this former group (88 %) one or more active nodules were seen in the histological specimens while in the latter group of 14 there were only 8 such patients (57 %). Thus active nodules were found nearly always in specimens taken from the patients whose DC had developed within 10 years to a stage where operation was necessary. The age of the patient, whether more or less than 40 years, had no effect upon the appearance of these nodules. The number of active nodules per specimen varied from case to case without any correlation with the duration of the disease. In those two cases in which several specimens had been taken during the progression of the disease the histologic picture remained essentially unchanged and did not differ markedly from that seen in other cases.

DISCUSSION

The fibroblast is the architect of the connective tissue both in physiological and pathological conditions. Healing of subepidermal wounds and deep burns has something in common with the development of DC or other fibromatous processes (21). In the former the cause of connective tissue activation is clear but in the latter it is unknown. Although the reason for the changed activity of the fibroblasts in DC is unsolved, some signs of its speed and direction are visible. The appearance of several active nodules with closely located fibroblasts must be considered as an expression of an active form of DC with a high probability of postoperative recurrence. Lack of these active nodules does not exclude this possibility, but does make it less likely. Other findings such as perivascular infiltrations, enlarged Vater-Paccini corpuscles (17), haemorrhages etc. do not seem to be of the same prognostic value. In our opinion the histopathological picture considered along with the earlier clinical course of DC, the heredity, sex, and the age of the patient, is valuable when the extent of an operation is under consideration. The frozen section technique, however, cannot be of any practical value during surgery because the size of the specimens generated for handling is too small for any diagnostic conclusions.

It has been shown chemically that DC tissue contains mucopolysaccharides similar to other proliferating fibrous tissue (19). Histochemically this could be demonstrated as a metachromasia with toluidine blue both in fresh and stored specimens, but with the HID-AB method as HID-positive only in fresh specimens. The most natural explanation must be the long embedding of the specimens in the paraffin blocks, during which some chemical alterations may have occurred. A final point is that in some cases, after a long latent period, DC may become activated irrespective of the nature of treatment. Then the role of a prognosticator is too complex.

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