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On the Etiology of Periarthritis humero-scapularis

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ABSTRACT

One hundred years ago, Duplay described "Periarthrite scapulo-humerale" (3). Since then, numerous authors have shown that trauma with concomitant degeneration of the tendons belonging to m. supraspinatus and caput long. bicipitis are the predominant causes. In this connection, the formation of osteophytes in the vicinity of these tendons play a decisive role because of local, mechanical irritation. Thus, the pathogenesis would appear to be rather well established but in most cases, the etiology is still obscure. By using own cases, the present author intends to show that the above-mentioned osteophytes are part of a general growth tendency in the supporting connective and skeletal tissues, which is particularly pronounced in postmenopausal women. The condition could, by way of suggestion, be referred to as involutional acromegaly. The remarkable age and sex distribution of the periarthritis, as well as its clear connection with other diseases in the connective tissue appearing as tendovaginitis and some endocrine disturbances, such as diabetes and thyroid dysfunction, could thus be explained against this background.

INTRODUCTION

As is well known, the humeral head rotates in a gliding plane which consists partly of the primary shoulder joint, articulatio scapulo-humeralis, and partly of the secondary acromio-humeral joint. The bone components of the latter are formed by the lower part of the acromion and the humeral head, predominantly tuberculum majus. Between these bones is the so-called rotator cuff, which here consists primarily of the tendon to m. supraspinatus. Between this tendon and the acromion is bursa subacromialis which has been regarded as particularly important with respect to the development of periarthritis humero-scapularis (p.h.s.). Together with the lax articular capsule in the primary shoulder joint and the rotation of the scapula against the thorax, these anatomical conditions allow great mobility of the shoulder joint. But, obviously, there are two weak points in the system where physical strain is particularly great (20). One friction zone is created when the arm is abducted, and is manifested in a compression of the supraspinatus tendon between the tuberculum majus and the acromion. The risk of degeneration of this tendon, perhaps with perforation to the bursa located above, appears to be pronounced. The other friction zone is formed where the biceps tendon runs into sulcus intertubercularis and comes into close contact with tuberculum minus, against which it is pressed when the arm is rotated outwards. The clinical and basic pathological-anatomical course of events appears to be, that local, mechanical irritation with subsequent degeneration processes in the tendons mentioned above may give rise to "painful shoulder" with pains at abduction or outward rotation of the arm, respectively. A secondary manifestation may be a capsular contraction which gives rise to "frozen shoulder" with considerable inhibition of mobility.

The vulnerability which can thus be anticipated, considering the anatomical construction of the shoulder joint, has been verified in studies of large patient materials at operation and autopsy. Degeneration and rupture of the supraspinatus tendon are common, especially in elderly persons (1, 2, 9, 20). Corresponding changes of the tendon to the long head of the biceps, usually located where this tendon runs in the sulcus intertubercularis, often give rise to pain and inhibited mobility of the shoulder joint (6, 10, 16, 17). The tendon damage mentioned can without doubt be ascribed to a direct trauma. In most cases, however, it seems to be a question of a chronic, mechanical irritation localized to the above-mentioned friction zones. The unevenness and the osteophyte formations which have been found on the lower surface of the acromion (9), on the tuberosities (2, 4, 12) and in the sulcus inter-

tubercularis (6, 7, 17) have been reported to be responsible for this traumatization. It would appear reasonable that overexertion caused by monotonous work can increase the friction and wear on the tendons and thus cause periarthritis.

The literature contains a considerable number of reports on the problem of the etiology of periarthritis, but no reasonable solution has been suggested. The medical "clues" that have been available in connection with this research can be summarized as follows:

1. P.h.s. is often combined with other tendon and joint changes, i.e. tendovaginitis stenosans Quervain, the carpal tunnel syndrome and trigger finger. A general connective tissue damage has therefore been suggested (2, 11, 18, 19).

2. The shoulder disorder is remarkably often combined with diabetes and thyroid dysfunctions (5, 8, 11, 18, 19).

3. The disease effects primarily post-menopausal women (4, 11, 18). The two latter factors, of course, make it of particular interest to consider endocrine disturbances.

As mentioned above, local bone overgrowth is decisive for the pathogenesis. In post-menopausal women there are often signs of a general proliferation of connective tissues, e.g., in the form of cranial hyperostoses, spondylosis and osteoarthrosis in the joints of the hand and of the fingers (13, 14). This growth disturbance, often combined with diabetes (13), has been referred to as involutional acromegaly by the present author (15). In order to see whether this condition is of relevance with respect to the etiology of p.h.s., a few recently observed cases will be described.

MATERIAL

Case 1

M. M., a 71-year-old woman. Menopause at the age of 50. Sought treatment in January, 1958, because of severe pain in her left shoulder. Was given short-ray therapy which did not improve her condition. Patient improved after roentgenological therapy. Treated for adipositas, 105 kg, and hypertension. In October, 1960, the patient again suffered from acute pain in her left shoulder. Improved, although no special therapy was given. In June, 1967, the patient was found to have diabetes. Treated with tolbutamid and fenformin and later also received insulin Sought treatment again at a medical clinic in September, 1971, because of pain in her left shoulder; improved following rest. At that time, the patient stated that she had had pains in her fingers for several years, as well as tingling sensations, especially at night, which improved after rubbing her fingers. During the last year, the patient also reported pain and swellings in her distal finger joints. Examination revealed tender Heberden nodes (H.n.), especially in the fingers of her left hand, tenderness over the carpo-metacarpal joints (c.m.c.) of both thumbs, especially the left. The patient reported severe pain in the same area on the left side at ulnar flection of the hand with her fingers tight around a maximally flexed thumb (Finkelstein's test). Pronounced tenderness at palpation over the left biceps tendon and pain in this tendon at outward rotation of the arm bent at a right angle. Roentgen revealed pronounced Hyperostosis frontalis interna (H.f.i.), arthrotic changes in both shoulder joints, sclerosis in the tub. majus region, calcifications within sulcus intertub. dxt. and calcification above tub. majus sin. Roentgen also showed arthrosis in the distal inter-phalangeal joints and in the wrists, especially between os naviculare, multangulum majus and os metacarpale I bilaterally.

Case 2

A. K., a 79-year-old woman, previously treated for cholelithiasis and cardiosclerosis. Sought treatment at a medical clinic on August 31, 1971, because of dizziness, pains in her right shoulder radiating down into her fingers. The patient stated that between the age of 50 and 55, she had had pains in her arms and hands, especially at night. Since April, 1971, pains in her right shoulder, could not comb her hair, or dress herself. Showed extreme tenderness on direct palpation of the biceps tendon on the right side, and when her arm, bent at a right angle, was rotated outwards. Pain when lifting to a horizontal plane. Pronounced H.n. in her index fingers. Tenderness on palpation of the c.m.c. joint of her right thumb and of the tendons of the first dorsal sheath of the wrist. Roentgen revealed insignificant H.f.i. and calcified deposits in the soft parts of sulcus intertubercularis dxt. as well as at the usual site of "peritendinitis calcarea", arthrosis of the shoulder and of the distal inter-phalangeal joints of her index fingers. Previous treatment with heat and salicylates without improvement. Hydrocortisone injection close to the long tendon of the biceps caused rapid improvement. Later treated with butazolidin. September 30: considerably improved, could lift her right arm straight up but still reported some tenderness over the biceps tendon. Roentgen October 7: small calcification next to tub. majus dxt. which had a coarse surface. Small indication of calcification also next to tub. majus on the left side.

Case 3

O. K., a 72-year-old woman, who had been treated for Parkinson's disease for 6 years. During the last 2 years, the patient had been troubled by pain and stiffness in her right shoulder and numbness and pricking pains in her hands, especially on the right side and at night. Improved when she shook her hand. Found it difficult to perform precision movements with her right hand. In April, 1971, the patient reported pain and palpation tenderness over her

Fig. 1. Case 3 (O. K.) with osteophytes neighbouring sulcus intertubercularis.

right biceps tendon and found it difficult to lift her arm above the horizontal plane. At the same time, there was tenderness over proc. styloideus and the tendons of the first dorsal sheath of her right wrist. Finkelstein-test positive on the same side. Roentgen showed pronounced H.f.i., severe arthrotic changes between the carpal bones, especially in the c.m.c. joints of both hands, moderately pronounced H.n. and, on the right side, sclerosis within tub. majus region and osteophytes next to sulcus intertubercularis (Fig. 1). On the left side, similar changes but considerably less pronounced. The patient improved after treatment with salicylates and rest.

Case 4

H. L., a 63-year-old woman, who for a few years had been treated for moderately elevated blood pressure. Was treated at the medical department in January, 1969, following a period with headache and dizziness. Diagnosis: hypertension + glucosuria + spondylarthritis deformans. In October, 1960, the patient reported pain in her right shoulder, radiating down into her hand, pains when moving her right shoulder joint. Roentgen revealed disc degeneration in the cervical vertebral column with calcifications at the margins of the vertebra. Moderate arthrotic changes in the right shoulder joint and osteophytes and sclerosis on the tuberosities. Diagnosis: rhizopathia cervicalis. Improved spontaneously. November 16, 1971: the patient sought treatment for pain and stiffness in her right shoulder, could not comb her hair. Showed tenderness over the right biceps tendon and over the first tendon sheath of the wrist and a positive Finkelstein-test on the right side as well as large, tender H.n. on both hands. Blood pressure 165/85. Roentgen: slight hyperostoses parietally. Osteophytes next to the tuberosities and on the acromion on both sides, most pronounced on the right side, however (Fig. 2). Considerable arthrosis of the first c.m.c. and distal interphalangeal joints, osteophytes on os naviculare and multang. majus on both sides (Fig. 3).

Case 5

I. B., a 57-year-old woman, who had been treated at the medical department in 1951 och 1952 for adipositas + hypertension + arthrosis of her knee joint. 1959: cardiosclerosis. 1963: diabetes mellitus. 1964: radiation treatment for cancer uteri at Akademiska sjukhuset, Uppsala. At that time, the patient weighed 130 kg and an endocrine disturbance, most likely Morbus Cushing or hypothyreosis, was suspected. Examination revealed an enlarged sella turcica. Encephalography: signs of central and cortical atrophy. Laboratory tests did not support the suspected hypothyreosis. The basic excretion of 17-ketosteroids = 5.7 and 17-hydrocorticosteroids = 5.9 mg/day, i.e. normal values. Dexacortal and metopiron tests did not reveal any pathological signs. M. Cushing could be ex-

Fig. 2. Case 4 (H. L.) with osteophytes in the region of the tuberosities narrowing the subacromial space when the arm is abducted.

cluded. The patient was admitted on September 29, 1971, to the medical department in this city. The main reason was a fainting attack. As before, the patient showed pronounced adipositas and a blood pressure of 235/110. Stated that for at least 10 years she had been troubled by pain in her fingers, which woke her at night, she had a "snapping" sensation in her fingers. Always more troubles with her right hand. The patient considered that her right thumb grip was weaker than the left. She had sometimes observed swelling and tenderness over the base of her right thumb, but these symptoms usually disappeared in a few days. Periodic pain in her shoulders, mostly the right shoulder. For this reason, she went to an orthopedic physician who recommended corset and roentgen treatment which had no effect, however. Examination also revealed severe mobility pain over the c.m.c. joint of the right thumb, and considerable pain on palpation over this joint and over the 1st dorsal sheath of the wrist. Slight atrophy over the right thenar musculature. Could not lift her right arm above the horizontal plane, was tender over her right biceps tendon. Roentgen: pronounced H.f.i., sella enlargement. Right shoulder: spur formations both on tub. majus and tub. minus (Fig. 4). Hands: Severe arthroses especially between mult. majus and metacarpale I with cartilage reduction, sclerosis and large bone overgrowth at the joints, resulting in H.n. and subluxation in the c.m.c. joint. The changes most pronounced on the right hand. November 10, 1971: Mors subita. Autopsy: hypophysis: increased eosinophilic cells in the anterior lobe, not tumour. Suprarenal glands: atrophic, P.A.D.: no suprarenal gland. tissue.

RESULTS

All cases showed roentgenological signs of bone overgrowth in the previously mentioned friction zones, where the tendons belonging to m. supraspinatus and the long head of the biceps pass. As a sign of a general bone proliferation, slight frontal hyperostoses were found in 2 cases, pronounced frontal hyperostoses in 3 cases. In all 5 cases, osteoarthrotic changes were found in the 1st c.mc. joint and in the distal interphalangeal joints of the fingers. Four of the patients stated that, for some time, they had had nocturnal paresthesia in their hands, as in cases of c.p.t. In 4 of the cases, examination revealed direct and indirect tenderness over the tendons of the 1st dorsal sheath of the wrist, similar to cases of tendovaginitis stenosans Quervain. Three of the patients had diabetes mellitus; the 4th patient showed decreased tolerance at glucose load.

DISCUSSION

In these patients with p.h.s., signs of a general bone growth in the form of cranial hyperostoses

and osteoarthroses were found. The fact that the latter changes can be of importance in the development of c.t.s. and tendovaginitis stenosans Quervain has been shown in previous reports (15). The material presented here lends further support to this opinion. It is of particular interest that the bone overgrowths and the symptoms that they give rise to predominantly are located on the same side as p.h.s., usually the right side. As is well known, an increased growth in most tissues has been observed in cases of genuine acromegaly. In agreement with this, cranial hyperostoses and osteoarthroses, sometimes with the above-mentioned localization, were found also in these cases. Furthermore, the well-known disturbance in the carbohydrate metabolism in acromegalic patients can be shown also in the present material. The symptoms which are found in postmenopausal women thus have remarkably "acromegalic" characteristics. This can be corresponded by an excessive function of the anterior lobe of the hypophysis and the present author therefore refers to it as *involutional acromegaly*. This general growth disturbance thus also includes the local bone overgrowth which previously has been stated to be of vital importance in the development of p.h.s. It should be mentioned in this connection that—just as is the case with respect to genuine acromegaly—there may appear a simultaneous thickening of the soft parts and fluid retention which may make the clinical picture rather varied.

Fig. 4. Case 5 (I. B.). Spur formations on the tuberosities.

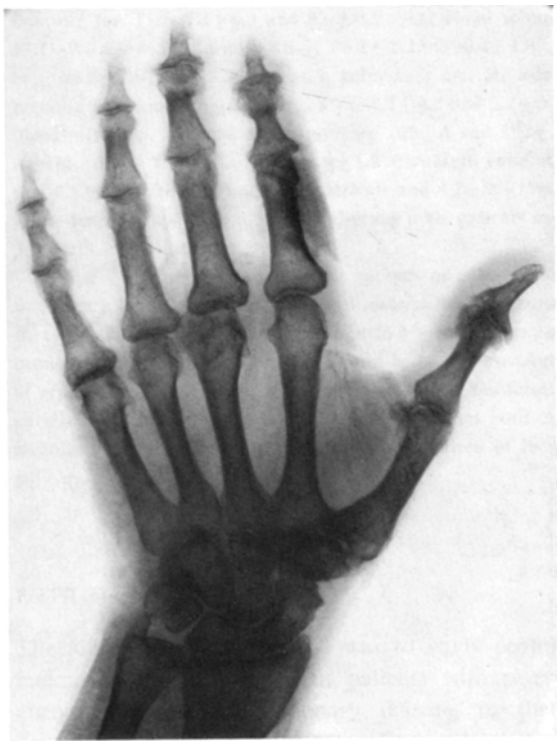

Fig. 3. Case 4. (H. L.). Osteoarthroses in the interphalangeal joints as Heberden nodes and in the first carpometacarpal joint. Osteophytes on os multangulum majus and os naviculare.

Against this background, the medical "clues" mentioned in the introduction with respect to the etiology of p.h.s. could be commented as follows:

1. The observed general growth of connective tissues makes combinations with tendovaginitis, c.p.t. etc. possible.
2. Simultaneously appearing endocrine dysfunctions in the form of diabetes or dysthyroidism respectively, can appear just as in the case of genuine acromegaly.
3. The predilection of p.h.s. to post-menopausal women is in good agreement with the more or

Table I

	1. M. M.		2. A. K.		3. O. K.		4. H. L.		5. I. B.	
Case no. ...	dxt.	sin.	dxt.	sin.	dxt.	sin.	dxt.	sin.	dxt.	sin.
P.h.s.		+	+		+		+		+	
Shoulder roentgen	+	+	+		+	(+)	+	(+)	+	
Carpus roentgen	+	+	(+)	(+)	+	+	+	+	+	(+)
H.n.	(+)	+	+	(+)	+	(+)	+	+	+	+
de Quervain symptoms		+			+		+		+	
C.p.t. symptoms	+	+	+	+	+		?		+	+
H.f.i.	+		(+)		+		(+)		+	
Diabetes	+		?		(+)		+		+	

(+) indicates a smaller degree of changes or a positive glucose tolerance test, respectively.

less physiologically appearing involutional acromegaly in such patients.

Finally, a reflection with respect to the treatment of p.h.s. Many of these patients are given local therapy in the form of steroid injections, roentgen therapy or surgery. Considering the opinion expressed here with respect to the etiology of the disease, the local therapy mentioned could, in suitable cases, be complemented by a more general therapy—hormone or radiation therapy, respectively—for the purpose of reducing the activity of the hypophysis. Applicable to the general treatment—in addition to this—is, of course, the primary effort to correct simultaneously appearing hormone disturbances such as diabetes mellitus and hyperthyreosis or hypothyreosis, respectively.

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