STENOSING TENOSYNOVITIS AT THE RADIAL STYLOID PROCESS
(DE QUERVAIN'S DISEASE)*

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DE QUERVAIN,[9] a Swiss surgeon in Kocher's Clinic at Bern, Switzerland, in 1895 was the first to report cases of tenosynovitis affecting the common sheath of the abductor pollicis longus and extensor pollicis brevis tendons at the radial styloid, a condition still known as "de Quervain's disease." In a recent review of cases of tenosynovitis and paratendinitis at the Mayo Clinic it was found that stenosing tenosynovitis at the radial styloid accounted for 34 per cent of all the nonspecific types of tenosynovitis and paratendinitis of the wrist and hand and that it is much commoner than previously recognized. For example, from 1935 to 1940 only 16 cases of de Quervain's disease were diagnosed at the clinic, and operation was performed on only two of the patients.[5, 6] However, from 1940 through 1948, 112 cases were diagnosed and 40 patients underwent operation. Many of the remaining 72 patients had only a minor form of the disease and responded quickly to conservative treatment.

ANATOMIC AND PHYSIOLOGIC CONSIDERATIONS

The tendons of the abductor pollicis longus and extensor pollicis brevis muscles occupy the first compartment on the dorsum of the wrist. This compartment or canal is formed in a groove on the styloid process of the radius. It is covered with a heavy ligament lined with synovium and averages 1¼ inches in length. Often not only these two tendons are present but, as pointed out by Bunnell,[1] also an aberrant tendon. Occasionally the compartment is bifid. Murphy recently reported two instances of double compartments.

ETIOLOGIC DATA

Anomalies of the tendons or their sheaths in the first compartment render them more susceptible to trauma; this is especially true of women, for their wrists normally angulate further than those of men. It is probably for this reason that stenosing tenosynovitis at the radial styloid is three times as common among women as men. Trauma is usually of a chronic nature, although in a small percentage of cases it is acute; for example, a blow or the sudden strain of gripping or lifting. Chronic trauma often takes the form of prolonged exertion or unaccustomed muscular effort. Hammer[4] stated that the tendons of human beings will not tolerate over 1500 to 2000 manipulations per hour. Diack[2] and Patterson[8] pointed out that occupations and avocations which require repeated abduction of the thumb under stress of grasping motions combined with adduction of the thumb and ulnar deviation of the wrist, for example, typewriting, knitting, fly casting, golfing, piano playing and work on grinding and buffing machines, cause this condition.

PATHOLOGIC CHANGES

Pathologic changes vary in degree only and are dependent on the chronicity of the disease and perhaps to a lesser extent on the location and etiologic factors. In mild cases, the changes may be slight. In severe cases the sheath may be three or four times thicker than usual. It may be brownish or

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reddish and may have lost its normal pearly luster. Deposits of fibrin and adhesions may be present within the sheath. The tendons may be flattened and thinned out at the point of constriction, and at times they may be frayed and covered with granulation tissue. Beyond the point of constriction the tendons may be bulbous. In some of the cases there is a proliferation of the synovial lining. Yet in others the synovial layer seems to have been worn away and may be almost entirely absent. In all cases the fibrous tissue increase can be seen microscopically. This fibrous tissue is in varying degrees of maturity depending on the length of time since onset of the disease. Likewise, the vascularity of the tissue varies from case to case and seems to have a definite relationship to the duration of the disease. Myxomatous degeneration may or may not be present. Marked fibrosis and collections of hemosiderin suggest acute trauma as an etiologic factor. Occasionally, in the microscopic sections nerves may be seen about which there is marked fibrosis and scattered collections of lymphocytes. This finding may explain the pain which persists so steadily in cases of de Quervain's disease. In the more chronic cases the dense connective tissue is often hyalinized and occasionally actual cartilage cells can be seen (Figs. 1 and 2).

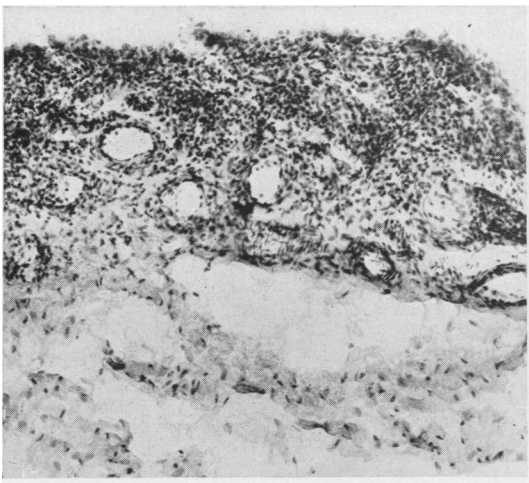

FIG. 1

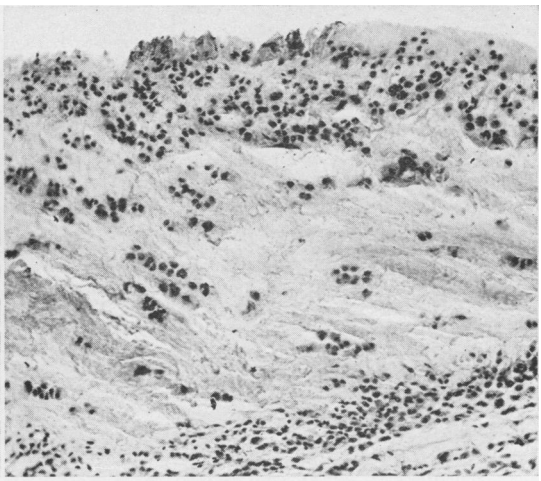

FIG. 2

FIG. 1.—Nonspecific tenosynovitis showing irregular layer of synovial cells, layer of young lymphocytes and fibroblasts with numerous blood vessels, and an older layer of fibrous tissue (hematoxylin and eosin, 85).

FIG. 2.—Nonspecific tenosynovitis showing hyalinized layer with numerous chondroblasts, a layer of young connective tissue cells and a layer of older connective tissue (hematoxylin and eosin, 85).

SYMPTOMS AND SIGNS

Pain is the predominant symptom and varies in degree with the severity of the inflammatory reaction. The pain about the radial styloid is often of a neuritic type; it may extend up the forearm or into the thumb and has been mistaken for various forms of neuralgia. As a rule, tenderness is present over the radial styloid. Swelling which tends to obliterate the anatomic snuff box is usually present. This may be discernible only when the involved wrist is compared with the normal one. There may be a slight increase in the local heat of the overlying skin. Likewise, there may be some redness. There is usually an associated

FIG. 3.—(A) Demonstration of Finkelstein's test in a case of stenosing tenosynovitis before operation. Note expression of intense pain. (B) Demonstration of test one month after surgical unroofing of the sheath of the abductor pollicis longus, extensor pollicis brevis and an aberrant tendon. Patient does not experience pain.

weakness of the affected wrist and hand, this weakness being due to pain. Motion of the involved wrist and thumb may be decreased. The patient is often disabled and may complain of dropping articles because of pain or insecure grip. Crepitation and snapping or locking are practically never present in cases of stenosing tenosynovitis at the radial styloid process. Roentgenograms do not usually show any evidence of abnormality. The one finding which is always present and which I believe is almost pathognomonic of the disease is a positive reaction to the so-called Finkelstein's[3] test. In this test the patient's thumb is placed in the palm of his hand and the examiner grasps the patient's fingers and forces the wrist into ulnar deviation. The pain over the radial styloid is excruciating. This test can be performed without pain a week or two after operation and temporarily so after local block with procaine hydrochloride (Fig. 3A and B).

DIFFERENTIAL DIAGNOSIS

Stenosing tenosynovitis at the radial styloid process must be differentiated from the various arthritides with which it seems most often confused and also from a neuritis of the superficial branch of the radial nerve, a rare location for a neuritic process. Also fractures, sprains, ganglia, avascular necrosis and cysts of the carpal bones, senile processes arising from the capsule of the joint and other forms of tenosynovitis must be differentiated from de Quervain's disease.

TREATMENT

The treatment of stenosing tenosynovitis at the radial styloid process resolves itself

into nonsurgical and surgical methods. It would be a mistake to call surgical treatment of this condition radical, for it seems to have been proved rather definitely that this is often the most conservative form of therapy. If the disease is of short duration, treatment should consist of light roentgen therapy and immobilization, although diathermy and other forms of physical therapy may occasionally be more beneficial than roentgen therapy. Approximately 72 per cent of these patients will be relieved of their pain (Table I). If, however, the patient does not respond in three or four weeks to the simpler forms of treatment, or if the disease is of chronic duration, surgical intervention is the most conservative therapy. The operation is simple and can be carried out with the use of local infiltration anesthesia. This may also be used as a diagnostic procedure, for, as previously mentioned, after adequate local infiltration of procaine hydrochloride, the patient reacts without pain to Finkelstein's test. A transverse incision is made over the radial styloid for a distance of about 1½ inches. The superficial branch of the radial nerve is visualized in the anatomic snuff box and is retracted gently toward the dorsum of the hand. The common sheath of the abductor pollicis longus and extensor pollicis brevis tendons, which is stenosed, then is probed and completely unroofed for a distance of about 1½ inches. I have not found is necessary to remove the aberrant tendon if one is present (Fig. 4). Occasionally the first compartment on the dorsum of the wrist is bifid, and if so, both divisions or compartments must be unroofed (Fig. 5). After this, the subcutaneous tissues and skin are sutured. The wound is dressed with a two-inch bandage placed between the thumb and the second metacarpal so as to maintain the thumb in abduction. The distal phalanx of the thumb need not be splinted. Free motion of the thumb is allowed after one week. After one to two weeks the patient usually can return to his former occupation. Of the 40 surgical cases at this clinic from 1940 through 1948, follow-up studies were made in 34; it was found that 91.2 per cent obtained good or excellent results (Table II). Three of the results were classified as fair, although these patients too were relieved of their pain. However, they had the following complications: (1) an incisional neuroma of the superficial branch of the radial nerve; (2) persistent numbness in the web of the thumb, again owing to injury of the radial nerve and (3) a painful thick scar in an instance in which a longitudinal rather than a transverse incision was used. I do not know of any operative procedure that can be more gratifying to the patient and to the physician and which is more conservative than that which is carried out in de Quervain's disease. Patients are no longer treated for months, but rather it is urged that they undergo operation at a comparatively early date if the disease is

TABLE I.—Analysis of Results of Nonsurgical Treatment of Tenosynovitis at the Radial Styloid Process 1940 Through 1948.

Results*	Cases†	Per cent
Good	38	71.7
Fair	8	15.1
Poor	7	13.2

* Average duration of symptoms 11 weeks; 14 had symptoms for less than one week.

† Condition of 19 patients not traced; one had bilateral involvement.

TABLE II.—Analysis of Results of Surgical Treatment of Tenosynovitis at the Radial Styloid Process 1940 Through 1948.

Results*	Cases†	Per cent
Good	31	91.2
Fair‡	3	8.8

* Average duration of symptoms: 24 weeks.

† Condition of six patients not traced.

‡ Pain relieved, but incisional neuroma of superficial radial nerve, persistent numbness in web of thumb and painful thick scar were present.

of a severe nature or if the symptoms have been present for a long time.

SUMMARY AND CONCLUSIONS

Stenosing tenosynovitis at the radial styloid process (de Quervain's disease) is more common than is generally recognized and is often misdiagnosed as neuritis or arthritis. It is generally conceded that the condition is due to trauma, but in most instances an anomalous tendon or a bifid compartment is present which predisposes to development of the condition. A positive reaction to Finkelstein's test in the presence of roentgenograms which do not show evidence of any abnormality is almost pathognomonic of the syndrome. The most conservative therapy for patients who have had the disease for a long time or for those who do not respond in two or three weeks to roentgen therapy and immobilization or to physical therapy and immobilization is surgical "unroofing" of the first compartment on the dorsum of the wrist; this compartment contains the abductor pollicis longus and the extensor pollicis brevis tendons. A transverse incision should be used and care should be taken to avoid injury to the superficial branch of the radial nerve. It is not necessary to remove the aberrant tendon if one is present, but it is important to unroof both sheaths if the compartment containing the tendons of the abductor pollicis longus and extensor pollicis brevis is bifid.

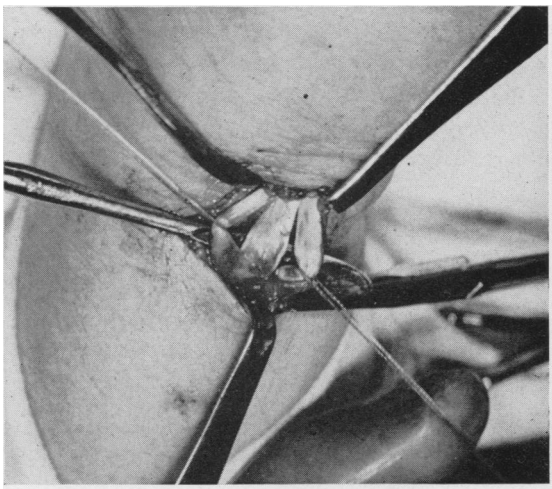

FIG. 4

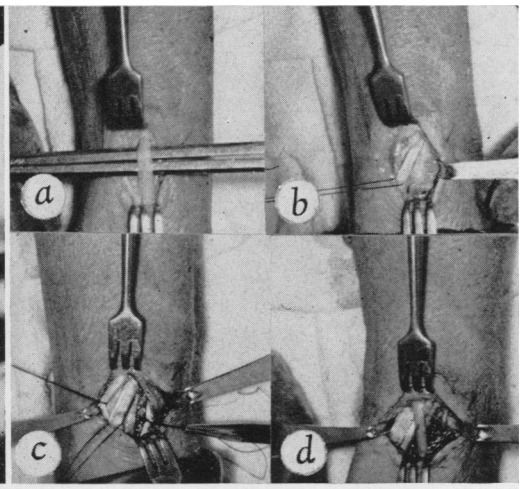

FIG. 5

FIG. 4.—A case of de Quervain's disease showing the three tendons occupying the first compartment on the dorsum of the wrist rather than the normal two.

FIG. 5.—Relationship of the superficial branch of the radial nerve to the abductor pollicis longus and extensor pollicis brevis tendons. This case also demonstrates a bifid compartment. (A) Superficial branch of radial nerve shown in anatomic snuff box. (B) Nerve is retracted. Tendon of extensor pollicis brevis unroofed in a separate sheath. (C) Tendon of abductor pollicis longus and an aberrant tendon in a separate sheath. Tendon of extensor pollicis brevis is retracted to the right with a silk thread and is visible in lower right hand quadrant of the wound. (D) The three tendons unroofed in the bifid compartment and the superficial branch of the radial nerve have been allowed to fall into their normal relationship.

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