

TIETZE'S SYNDROME

BY

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Little has appeared about this condition in recent years in Great Britain, but our experience suggests that it may be more common than supposed, and may need to be considered in a differential diagnosis of chest pain.

Tietze (1921) described a condition of painful non-suppurative swelling of the costochondral or sternoclavicular joints. The following criteria should be met:

- (1) Painful and tender enlargement in the region of one or more of the costosternal junctions;
- (2) This enlargement should not have been present previously, and should regress without therapy.

Tietze found no other abnormal findings, and the condition was self-limiting and of unknown aetiology.

A revival of interest occurred at the beginning of the second world war, when Gill, Jones, and Pollak (1942) described the syndrome in five young soldiers. He noticed the persistence of the symptoms and absence of pathological changes.

Geddes (1945) observed a series of 35 cases in Canadian soldiers who were otherwise in good physical condition. Deane (1951) described seven cases, and Kayser (1956) was able to review 159 cases in the world literature, with special attention to 24 in which biopsies were taken.

The latest review is that of Karon, Achor, and Janes (1958), who reported their findings in six females and seven males, in whom the symptoms of swelling had persisted for from 3 days to more than 3 years.

Present Investigations

Three cases recently studied are described below:

Case 1, a previously fit but slightly obese male aged 25, complained of pain in the right anterior region of the

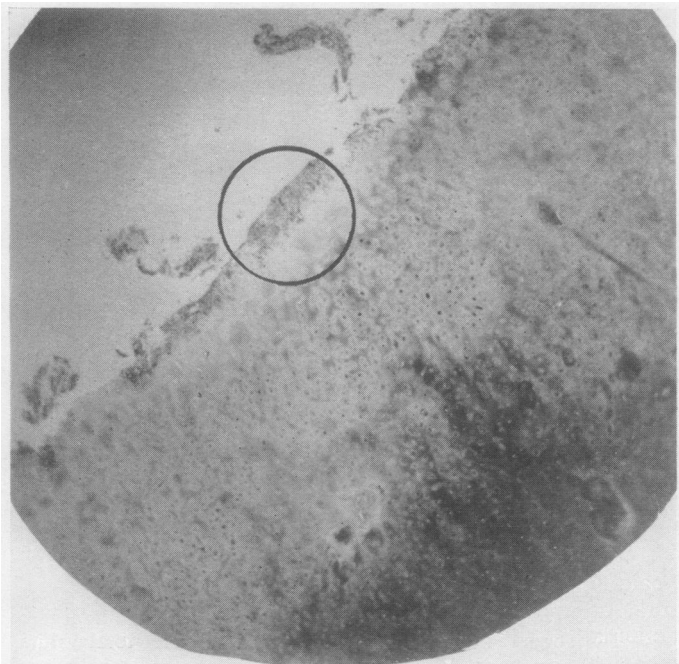
chest for 2 months. This had followed an upper respiratory tract infection and unproductive cough. Shortly after this, he had noticed tender swellings over the right second, third, and fourth costosternal junctions. These had persisted despite local application of heat and a course of achromycin.

At this time the patient was in normal health apart from the swellings. The erythrocyte sedimentation rate was 54 mm./hr (Westergren), and the total white cell count 14,700/c.mm., with 43 per cent. lymphocytes. There was a pyrexia of 99.4° F. An oval, tender swelling, 3 in. by 2 in., was fixed to the deep structures over the second right costochondral junction, and these changes were found to a lesser degree over the third and fourth costosternal junctions. A diagnosis of Tietze's syndrome was made, but in view of a persistent slight pyrexia and raised erythrocyte sedimentation rate not previously found in this condition, a full series of investigations were carried out.

Laboratory Tests.—A chest radiograph and tomography of the costochondral junction showed no abnormality. The Wassermann reaction and Kahn test were negative. The blood cholesterol, uric acid, and electrolytes were normal. The agglutination tests for *Brucella abortus* and *B. melitensis*, typhoid, and paratyphoid showed no rise in the antibodies to these infections. The Paul Bunnell reaction was negative. There was no increase in the cold agglutinins. The Rose-Waaler test was negative, and the antistreptolysin titre was only 90 Todd units/c.mm.

Therapy.—Local pain and swelling persisted, and continued to be accompanied by a mild pyrexia with a raised erythrocyte sedimentation rate and lymphocytosis. Because of this, oral prednisolone 5 mg. three times daily was prescribed, and within 3 days there was a marked improvement, with disappearance of pain, diminution of the swelling, and a fall in the temperature and erythrocyte sedimentation rate.

Biopsy.—A biopsy of the third costal cartilage was taken through a transverse anterior chest incision. The surrounding soft tissue and perichondral tissue was oedematous. The costal cartilage appeared normal, but buckled readily on exposure nearest the junction with the



sternum. The cartilage was removed, together with some granulomatous tissue found beneath it. Microscopically the costal cartilage was normal, but in the surrounding soft tissue and ligament there was a chronic inflammatory round cell infiltration (Figs 1-4). There was no evidence of tuberculosis.

Figs 1-4.—Photomicrographs showing normal cartilage surrounded by tissue in which there is a chronic inflammatory round cell infiltration.

Fig. 1. $\times 20$ Cartilage.

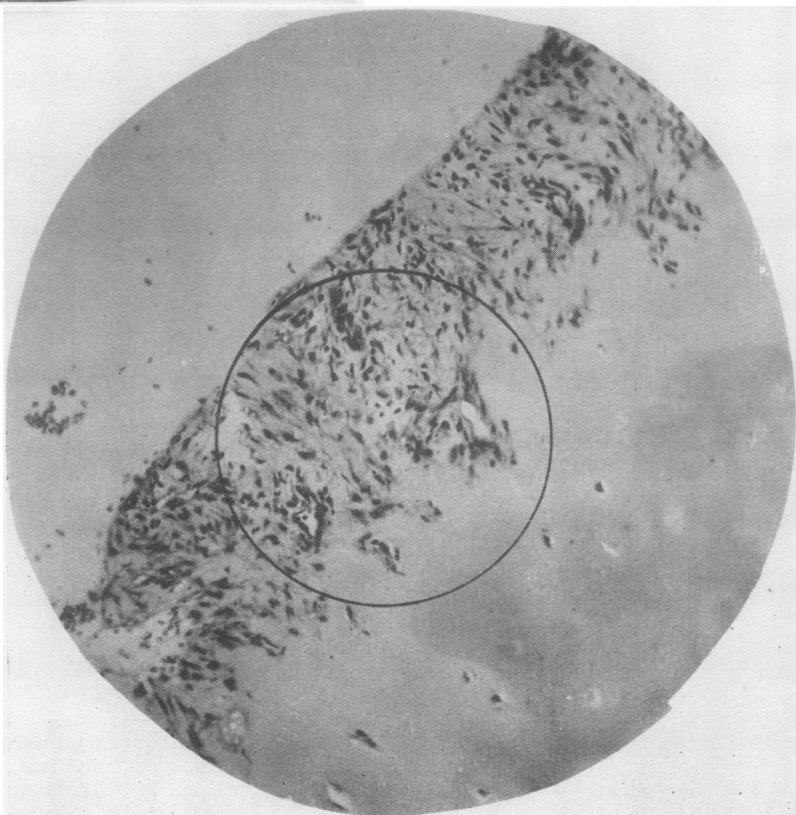


Fig. 2. $\times 120$ Perichondrium.

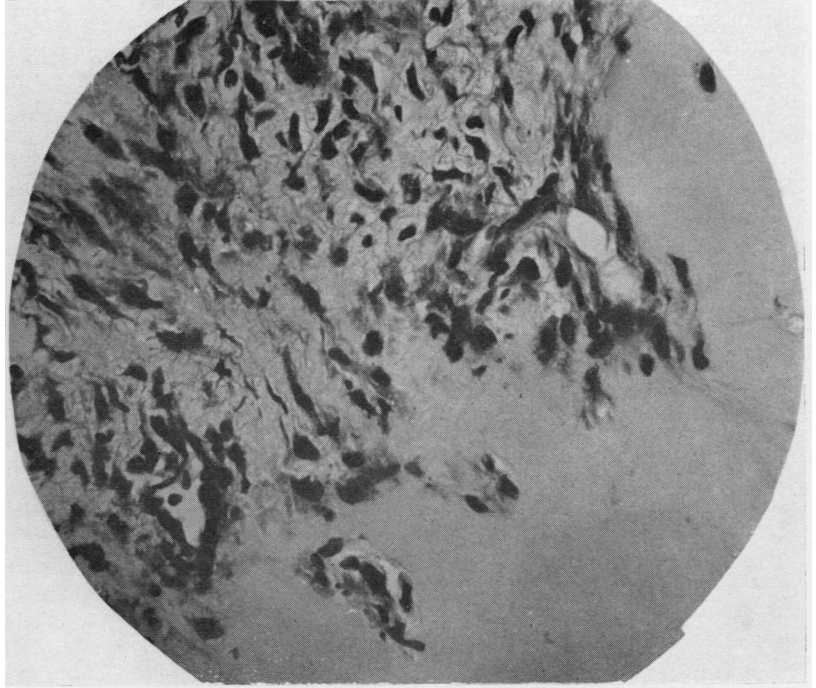


Fig. 3. $\times 300$ Detail of Fig. 2.

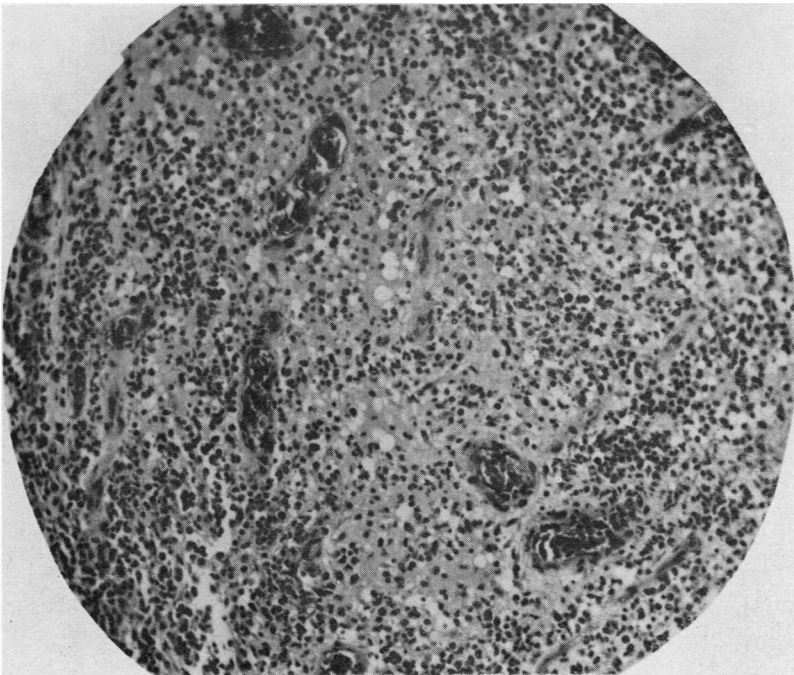


Fig. 4. $\times 120$ Detached adjacent tissue showing inflammatory infiltration.

Result.—Recovery was rapid, and when seen 8 weeks later the patient had become symptom-free with no recurrence of the swelling; the erythrocyte sedimentation rate and differential white cell count were normal.

Case 2, an 18-year-old male, complained of occasional chest pain over a swelling that had appeared insidiously some 7 weeks previously with no antecedent illness or trauma. Examination showed no abnormality except for a small, palpable, tender swelling over the region of the second and third right costosternal junctions.

A radiograph of the chest was normal, and the haemoglobin estimation, white cell count, and erythrocyte sedimentation rate were normal. The patient said that the condition was improving, and 8 weeks later all signs and symptoms had completely cleared.

Case 3, a 50-year-old male, complained of right anterior chest pain of 2 months' duration. He attributed this to riding a frisky horse when not feeling well after an upper respiratory tract infection. The pain and tenderness had persisted, but had been considerably relieved by a course of radiant heat. A small, tender lump had been noticed, and he was anxious about it.

The patient had a mild generalized bronchospasm and there was a small, tender, smooth, fusiform lump over the second right costosternal junction; it was attached to deep structures, and was rubbery in consistency.

A radiograph of the chest was normal. The Wassermann reaction and Kahn test were negative. The Rose-Waaler and blood uric acid estimations were normal. The patient was given a further course of radiant heat, the swelling gradually subsided, and he has had no further trouble.

Discussion

Twenty cases reported in detail in the literature, and a further 47 occurring in series, have been studied, in addition to three reported above. It is likely that the syndrome is more common than would appear from the frequency of case reports. This may be due to unawareness of the diagnosis, but symptoms and signs are often trivial, and our second patient had not even mentioned his symptoms at his initial medical examination.

Pain is the most usual symptom. This is situated in the front of the chest, and occurs most commonly on the left side. It may be of acute or gradual onset, and may vary from a dull ache to a severe pain which is sometimes described as crushing or boring in nature. It may resemble pleuritic pain, and the time of day, posture, nature of work, and the existence of intercurrent illness may affect its severity. It may become worse on movement, or on increased respiratory excursion. This, if it accompanies exercise, may lead to confusion with anginal pain, but it is usually clearly differentiated by its persistent character.

The patient may also notice a lump. This usually lies over the sternoclavicular or costosternal joints on either side, as far down as the ninth rib. One or more swellings may occur, and they vary from about 1 cm. in diameter, to a fusiform swelling 10 cm. or more in length. There is no erythema of the overlying skin, which is usually tender on palpation. Kayser noted that in 69 per cent. of patients in his series only single swellings were present, whereas in the other 31 per cent. there were multiple swellings. Of 66 swellings, equal numbers were right- and left-sided, and the commonest site was the second costosternal junction. Considerable variation in the duration of the swelling has been noted. It may last for only a few days, or it may persist, varying in size, for over a year.

In most cases reported, the erythrocyte sedimentation rates and white blood cell counts were normal. Frey (1956) found that in four of his cases a lymphocytosis was present. Examination of the blood for the presence of cold agglutinins showed no abnormality. The blood chemistry was reported to be abnormal by de Haas (1952), in that the serum uric acid was 4.5 mg./100 ml. and the cholesterol was 300-400 mg./100 ml. This was not confirmed later, and Klages (1957) found no abnormality in the blood urea, total protein, fasting blood sugar, calcium uric acid, cholesterol, inorganic phosphorus, or the liver function tests. One of our three cases had a raised erythrocyte sedimentation rate and lymphocytosis.

Radiography of the chest is normal, though occasional deposits of calcium are noted; tomography of the affected area and electrocardiography, done when pain was the dominant symptom, have shown no abnormality.

The findings in biopsy specimens from 24 cases have been summarized by Kayser (1956). It is difficult to assess these findings, as in many cases the biopsy was limited to the costal cartilage itself, and did not include the surrounding soft tissues; in no case was the interarticular sternocostal ligament examined. No abnormality was found in six specimens examined. In the majority of specimens, the cartilage was normal microscopically and macroscopically. Five specimens were said to show swelling, pallor, or buckling. In three cases the cartilage was abnormal, chondroma, fibrotic change, and degeneration being reported. It is therefore possible, as Kayser suggested, that disease of the cartilage does not occur, and in our case it was normal. In seven specimens, abnormality of the surrounding soft tissues was found, varying from round-cell infiltration with thickening of the perichondrium to fibrosis.

No particular age or sex distribution has been noted. Cases have been reported in Western Europe, Japan, and in the United States, where it occurs in both the white and black races. It was first noted by Gill and others (1942), and later confirmed by Geddes (1945), that the syndrome is frequently preceded by respiratory infection, usually of the upper respiratory tract, but in some, by bronchitis or pneumonia. Thus Kayser (1956), in his review of the world literature, showed that 51 of 65 cases where a specific inquiry had been made had had a recent respiratory infection and that the other fourteen cases had not. Cough is a possible factor, but the swellings appear in some cases before the patient develops a cough and the marked unilateral occurrence in any individual would not seem to support this theory.

Whilst respiratory infection may be coincidental, it is interesting to speculate on the similar findings of Rose (1957) in the relationship of respiratory infection to polyarteritis nodosa. On the other hand, Düben (1952), in all the ten cases in his series, found no evidence of previous upper respiratory tract infection.

Tietze considered the condition to be a dystrophy of the cartilage, secondary to tuberculosis or malnutrition, although no change was found in the cartilage taken by biopsy from one of his cases. No evidence of tuberculosis has ever been shown, while malnutrition is unlikely because of the frequency of the syndrome in well-nourished young men in Geddes' series. Beck and Berkheiser (1954) thought that the interarticular sternocostal ligament contracted and caused a buckling of the cartilage. Motulsky and Rohn (1953) suggested that trauma of this ligament gave rise to a clinical picture analogous to a sprain in a peripheral joint. Bernreiter (1956) thought that trauma was the most likely cause. Buckling of the cartilage seems an improbable cause, as it has been reported in relatively few cases and may occur in normal people after retraction of the perichondrium for biopsy purposes. It is difficult to see how buckling of even a few relatively small costal cartilages could produce the marked swelling of 10 cm. length sometimes seen.

In our case, the swelling was due to round-cell infiltration and thickening of the surrounding soft tissue. The rapid response to local and systemic corticosteroids might suggest that a local disease of cartilage is present.

Diagnosis.—The recognition of this syndrome allows the early and complete reassurance of the patient. It has to be distinguished from diseases

of the costal cartilage such as osteochondritis, chondroma, or malignant change in the cartilage or chest wall. The pain may have to be differentiated from that due to pulmonary or cardiac disease. The syndrome may occasionally simulate such miscellaneous conditions as Hodgkin's disease, multiple myelomata, syphilitic periostitis, presternal oedema of mumps, herpes zoster, rheumatoid arthritis affecting the second to fifth costosternal joints, typhoid, paratyphoid, and brucellosis. In women, this syndrome may give rise to considerable anxiety when it occurs beneath breast tissues, as it may appear to be a neoplasm.

Treatment.—This consists of local measures and reassurance. In mild cases, radiant heat is often sufficient. Procaine infiltration has been tried with temporary relief. Celio and Nigst (1956) reported the successful relief of pain with a local injection of 20-37.5 mg. hydrocortisone. Frey (1956) treated one patient with thyroid extract and obtained some improvement. In one of our patients with severe local symptoms and evidence of systemic upset, an excellent response was made to prednisolone in doses of 15 mg. daily for 7 days.

Summary

Three cases of Tietze's syndrome are reported, with the biopsy finding in one case.

The symptomatology in 67 cases from the literature and the pathological findings in 24 biopsies are discussed. It is concluded that the pathological changes occur not in the cartilage but in the soft tissues. The aetiology of the condition is unknown; its possible causation is discussed. Successful therapy with local and systemic corticosteroids is reported.

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Syndrôme de Tietze**RÉSUMÉ**

On relate trois cas de syndrôme de Tietze, y compris le résultat de la biopsie dans un cas.

On discute la symptomatologie dans 67 cas trouvés dans la littérature et les résultats anatomo-pathologiques des 24 biopsies. On conclut que les altérations anatomo-pathologiques surviennent non pas dans le cartilage mais dans le tissu mou. L'étiologie de cette affection n'est pas connue; on en discute les causes probables. On relate le succès du traitement corticostéroïde, local et général.

Síndrôme de Tietze**SUMARIO**

Se relatan tres casos de síndrome de Tietze, incluyendo el resultado de la biopsia en un caso.

Se discute la sintomatología en 67 casos encontrados en la literatura y los resultados anatomo-patológicos de 24 biopsias. Se concluye que las alteraciones anatomo-patológicas no ocurren en el cartílago, sino en el tejido blando. La etiología de esta afección se desconoce; se discuten sus causas probables. Se relata el éxito terapéutico con corticosteroides locales y generales.