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A M E R I C A N C O L L E G E O F



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Costosternal Chondrodynia: A Variant of Tietze's Syndrome?*

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IN A RECENT 15-MONTH PERIOD, 89 patients with localized pain or tenderness in the anterior chest wall were seen at the Scott and White Clinic. The upper and middle costosternal cartilages were involved, but were without visible or palpable swelling. This condition, which heretofore has not been documented, has been considered as a distinct entity and has been termed *costosternal chondrodynia*.

ANALYSIS OF DATA

Most of the 89 patients were over 40 years of age (Table 1). The youngest was aged 15, and the oldest, 76 years.

TABLE 1—AGE RANGE
COSTOSTERNAL CHONDRODYNNIA (89 Patients)

Range (years)	Number of Patients
10-19	1
20-29	6
30-39	15
40-49	19
50-59	29
60-69	15
70-79	4

The *sites of involvement* are shown in Table 2. The predominantly affected areas are over the third, fourth, and to a lesser extent, the fifth costosternal junctions. The second costosternal junction is involved infrequently. The entire left side is affected about 50 per cent more often than the right side. Two or more junctions were tender in 78 patients. Bilateral tenderness was present in 39 patients. Only one junction was tender in 11 patients.

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In the *clinical histories* of two-thirds of the patients, the discomfort was recorded as either a definite chief complaint or a symptom prominent enough to be entered into the description of the present illness. The duration of symptoms was less than six months in 29, from six to 12 months in 17; from 12 through 24 months in 16; and from 30 months to several years in 13 patients.† In seven, the duration of symptoms was described as several years; and in four others, the duration was definitely stated to be four, five, seven, and 15 years, respectively. In one, symptoms had been present for only a few hours, and in another, for only one day.

Physical Examination: Tenderness was localized to the sites of involvement (Table 2). Swelling of a costosternal junction was

TABLE 2—SITES OF INVOLVEMENT
COSTOSTERNAL CHONDRODYNNIA (89 Patients)

Junction	Right	Left	Total
Sternoclavicular	2	3	5
Second costosternal	9	11	20
Third costosternal	40	44	84
Fourth costosternal	33	54	87
Fifth costosternal	8	28	36
Sixth costosternal	1	3	4
Totals	93	143	

not visible in any of the patients, but was palpated questionably in four. An additional observation of importance was *wincing tenderness* in 40 patients. This reaction was more than discomfort. Excruciating pain caused flinching withdrawal when the examiner applied direct pressure over the involved costosternal junctions.

Miscellaneous Clinical Features: Obesity was noted in 29 of whom 21 were women and eight were men. Twenty-one had musculoskeletal abnormalities such as general-

†Duration of symptoms not stated in 14 patients.

ized osteoarthritis or complaints other than costosternal chondrodynia. Obesity and osteoarthritis coexisted in nine of these 21 patients. Cough and infections of the upper respiratory tract were present in only 12 patients.

Therapy: Roentgen-ray therapy was the most frequent form of treatment (Table 3). The usual course consisted of a single

TABLE 3—RESULTS OF TREATMENT
COSTOSTERNAL CHONDRODYNTIA (89 Patients)

Type of Therapy	Improved	Unimproved	Unknown
Roentgen-ray therapy (56 patients)	37	1	22
Procaine hydrochloride (Novocain) injection, locally	1	—	—
Novocain plus steroid injection, locally	1	—	1
Heat, locally	4	2	—
Heat and aspirin	2	3	—
No treatment	3	1	24

dose, 300 r in air, over the involved costosternal area. If symptoms were severe or recent, the course of roentgen-ray therapy was given in two or three divided doses on successive days or on every other day.

Fifty-six patients received a total of 60 courses of roentgen-ray therapy—four received second courses. The results of therapy are known in 38 instances, and improvement was noted in 37 of these.

The four patients who received second courses of roentgen-ray therapy were asymptomatic and improved after the initial course. Three had slight tenderness on palpation, and a second course of therapy was given. When observed from two to ten months later, each was asymptomatic and without tenderness. The fourth patient developed respiratory infection with coughing, and symptoms of costosternal chondrodynia recurred. Four months after the second course of therapy, he was asymptomatic, but he had slight tenderness on palpation. All four were considered improved following their second course of roentgen-ray therapy.

Three patients had local injections with anesthetic and/or corticosteroid agents. Because many of the patients had several costosternal junctions involved, multiple punctures would have been required to relieve the symptoms.

DISCUSSION

Tietze's syndrome was the diagnosis given to the first patients seen in our series. As data accumulated, similarities were few between our patients' symptoms and those described in the literature for Tietze's syndrome or its synonyms (costochondritis, costal chondritis, chondropathia tuberosa). The only points of similarity were the unknown etiology, the benignity, and the duration of symptoms which could be present for several years.

Tietze's Syndrome: Tietze's syndrome has been defined as "an initially painful, usually tender, prominence of one or more of the upper costal cartilages for which no specific etiology can be found."¹ Only one costal cartilage is swollen in two-thirds of the patients; and in two-thirds of these, it is the second costal cartilage. The right and the left sides are affected with equal frequency.^{1,2} Only two of 96 patients had bilateral swelling.¹ The patients usually were young. In 83 patients, 61 were less than 40 years old, and half of these were between 20 and 30 years. Incidence relative to sex is almost equal. Cough or respiratory infection due to a cold, bronchitis or pneumonia was present in 51 of 65 patients where a definite statement had been made.

Tietze's syndrome occurs infrequently. In a review of the literature for the 33 years following the first report by Tietze in 1921, Kayser¹ found 159 cases. Seven of these cases occurred in North America. In 1959, Barnes and Graham² stated that only nine cases of Tietze's syndrome had been reported in the American literature. They added four cases, all of which had been detected within one year. Thirteen cases, which were detected within a two-year period, were reported from the Mayo Clinic.²

Therapy in Tietze's syndrome has been varied and nonspecific. Roentgen-ray therapy has been considered ineffective.^{1,2,4,5} Simple measures such as heat to the involved areas, analgesics, and reassurance have been beneficial in some instances.^{1,2} Injections of procaine or corticosteroid agents have been helpful in some patients.^{3,5,6} When these methods fail and the symptoms are severe enough, excision may be considered.^{7,9} Whenever a swollen costal cartilage has been excised or biopsied, disease has not been found in the cartilage.⁷

Costosternal Chondrodynia vs. Tietze's Syndrome: The differences between costosternal chondrodynia and Tietze's syndrome are several and are summarized in Table 4. The main points of dissimilarity are:

Factor of Comparison	Tietze's Syndrome	Costosternal Chondrodynia
Sex distribution	Male : Female 1 : 1	Male : Female 1 : 3
Age	Two-thirds of patients under 40 years	Two-thirds of patients over 40 years
Sites of involvement	Left and right—equal Sternoclavicular, 2nd & 3rd articulations. Under one-third, multiple	Left 50% more than right 3rd, 4th, and 5th articulations. Over 90% multiple
Obesity	?	One-third of patients
Associated cough or respiratory infection	83%	12%
Roentgen-ray therapy	Not beneficial	97% benefitted
Swelling	Definite, all patients	None
Incidence	About 159 cases in literature in 40 years	89 cases (Scott and White Clinic) in 15 months

(1) *The presence of swelling in Tietze's syndrome and its absence in costosternal chondrodynia.* Swelling is necessary for the diagnosis of Tietze's syndrome; whereas, none of the 89 patients with costosternal chondrodynia had visible swelling.

(2) *The sites of involvement.* In Tietze's syndrome, the swelling usually involves a single costal cartilage, the second costosternal junction. In costosternal chondrodynia, the tenderness extends over several costosternal junctions and usually involves the third and fourth junctions.

(3) *The response to roentgen-ray therapy.* In Tietze's syndrome, roentgen-ray therapy is ineffective; whereas, in costosternal chondrodynia, the response to roentgen-ray therapy is excellent.

The difference in frequency of diagnosis of the two conditions is striking. Costosternal chondrodynia was seen in 89 patients during a 15-month period at the Scott and White Clinic. During a 40-year period, 159 cases of Tietze's syndrome have been reported in the literature. Many authors state that Tietze's syndrome probably occurs more frequently, but each report consists of only one or, at most, a few cases. The type of pain in the anterior chest wall which we are designating as costosternal chondrodynia often has been mentioned vaguely in these articles, but the entity has never been documented in a detailed manner.

SUMMARY

Costosternal chondrodynia, a distinct clinical entity which has not been documented previously, is encountered frequently. Eighty-nine patients who had localized pain or tenderness which involved the upper and middle costosternal cartilages of the anterior chest wall were seen during a 15-month period at the Scott and White Clinic. Swelling was not visible or palpable. The response to roentgen-ray therapy was excellent.

Costosternal chondrodynia and Tietze's syndrome are two distinct entities. The essential features of each are almost opposite.

RESUMEN

La condrodinia costoesternal, es una entidad clínica que no ha sido estudiada antes y se encuentra con frecuencia. Se vieron 89 enfermos con dolor localizado o sensibilidad dolorosa en los cartílagos superiores y medios de la pared anterior del torax y se observaron durante 15

meses en la Clínica Scott and White. No se observó hinchazón a la vista o par palpación. La respuesta a roentgenerapia fué excelente.

La condroinia costoesternal y el síndrome de Tietze son dos entidades diferentes. La características esenciales de ambas son casi opuestas.

RESUME

La chondrodynie costosternale, entité clinique distincte qui n'a pas été antérieurement répertoriée, est fréquemment rencontrée. 89 malades qui avaient une douleur localisée ou une sensibilité qui atteignait les cartilages costo-sternaux supérieurs et moyens furent suivis pendant une période de 15 mois à Clinique Scott et White. On ne pouvait déceler aucune tuméfaction ni à la vue ni à la palpation. La réponse à la radiothérapie fut excellente.

La chondrodynie costo-sternale et le syndrome de Tietze sont deux entités distinctes. Les traits caractéristiques de chacune de ces affections sont presque opposés.

ZUSAMMENFASSUNG

Die costosternale Chondrodynie stellt ein wohl abgegrenztes klinisches Krankheitsbild dar, das bisher noch nicht festgelegt wurde und häufig auftritt. 89 Kranke mit umschriebenen Schmerz oder Druckempfindlichkeit, die die oberen oder mittleren costosternalen Knorpel der vorderen Brustwand betrafen, sahen wir während einer

Zeitspanne von 15 Monaten an der Scott und White-Klinik. Eine Schwellung war weder zu sehen noch zu tasten. Die Reaktion auf Röntgenbestrahlung war ausgezeichnet.

Die costosternal Chondrodynie und das Tietze'sche Syndrom sind zwei ganz verschiedene Krankheitsbilder, deren wesentliche Eigentümlichkeiten nahezu gegensätzlich sind.

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ACTION OF ETHIONIAMIDE ON EXPERIMENTAL TUBERCULOSIS IN GUINEA PIGS

The action of ethioniamide on tuberculosis of guinea pigs was studied with particular regard to the anatomic-histologic aspects. In the animal inoculated with "free" bacilli, ethioniamide produced, in all the doses employed (from 20 to 80 mg./kg.) an evident bacteriocidal effect by preventing the appearance of inoculation focus and tuberculin allergy. Inoculation with aggregated bacilli resulted in similar lesion only with the highest doses of this drug.

A definite sterilization of the animal could not be obtained by any doses. Treatment initiated after focus implantation (ten days after inoculation) stops

the progression of the disease in the body and causes delimitation of the focus. The beginning of treatment was often followed by rapid liquefaction of the caseous substance.

The treatment of a process already disseminated (30 days after inoculation) causes, according to the dose employed, an arrest of the disease or the involution of the more advanced focus and the resolution of the more recent ones.

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