OSTEO-ARTHritIS OF THE STERNO-CLAVICULAR JOINT*

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According to Langen (1934), who made an extensive study of the pathology of degenerative processes in the sterno-clavicular joint in 200 necropsies, it may be involved from the age of 20 and constantly shows signs of osteo-arthritis after the age of 50.

However, few authors seem to have made clinical observations of degenerative disease at this site (Bonola and Mastragostino, 1954; Westermann, 1942).

Having noticed the precocity and functional severity of involvement of this joint in two cases in which surgery was performed, we became interested in the clinical and pathological picture of the disease and also made a study of material brought to necropsy.

Material

The first group of patients was discovered among fifteen who complained precisely and exclusively of pain in the sterno-clavicular joint; eight of them proved to have sterno-clavicular osteo-arthritis (Table I).

**Table I**

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Number of Cases</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Proved</td>
<td>Probable</td>
<td>Total</td>
</tr>
<tr>
<td>Tuberculosis</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Staphylococcal Infection</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Rheumatoid Arthritis</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Osteo-Arthritis</td>
<td>2</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>Undetermined</td>
<td></td>
<td></td>
<td>2</td>
</tr>
</tbody>
</table>

A further group of four patients was found among 200 successive cases of rheumatism seen in the outpatient department. A careful clinical examination of the sterno-clavicular joints showed that 82 patients showed one or more of the following abnormalities: asymmetry, creaking, hypertrophy, tenderness, painful limitation of movement. The 200 cases were classified in four groups (peripheral rheumatoid arthritis, rheumatoid spondylitis, generalized osteo-arthritis, other rheumatic conditions), and among the 25 cases of generalized osteo-arthritis were 21 with abnormal sterno-clavicular joints. Four of these patients volunteered the information that the joint was painful (Table II).

**Table II**

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>No. of Patients</th>
<th>Clinically Abnormal</th>
<th>Painful</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peripheral Rheumatoid Arthritis</td>
<td>29</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>Rheumatoid Spondylitis</td>
<td>12</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Generalized Osteo-Arthritis</td>
<td>25</td>
<td>21</td>
<td>4</td>
</tr>
<tr>
<td>Backache, Fibrositis, Psychogenic Rheumatism, etc</td>
<td>134</td>
<td>51</td>
<td>0</td>
</tr>
</tbody>
</table>

This study is based on these twelve spontaneously painful cases of sterno-clavicular osteo-arthritis, in all of whom radiological evidence of the degenerative process was found.

It is difficult to estimate the true frequency of this form of osteo-arthritis; it is not usually painful, but most of the physical abnormalities found by clinical examination (such as asymmetrical hypertrophy with or without tenderness) appeared to be due to osteo-arthritis at this site. The frequency of these abnormalities increased with age (Table III), as did the frequency of degenerative lesions in the necrotic series reported by Langen (1934).

**Table III**

<table>
<thead>
<tr>
<th>Age Group (yrs)</th>
<th>18-29</th>
<th>30-39</th>
<th>40-49</th>
<th>50-59</th>
<th>60-69</th>
<th>70+</th>
</tr>
</thead>
<tbody>
<tr>
<td>200 Necropsies</td>
<td>3</td>
<td>17</td>
<td>48</td>
<td>63</td>
<td>81</td>
<td>100</td>
</tr>
<tr>
<td>(Langen, 1934)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>200 &quot;Rheumatic&quot;</td>
<td>17</td>
<td>31</td>
<td>28</td>
<td>50</td>
<td>63</td>
<td>75</td>
</tr>
<tr>
<td>Patients (Present series)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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CLINICAL DATA.—Our twelve patients were all women, ten between the ages of 49 and 66, and the other two aged 30 and 33 respectively. Six had Heberden's nodes and the others had osteo-arthritis at various sites, four of them in the spine or the knee. In all cases the osteo-arthritis of the sterno-clavicular joint was unilateral, on the right side in seven and on the left in five.

The pain was usually moderate, localized to the joint, and of short duration (days or weeks). The two younger patients, however, had very severe and long-lasting pain (1½ and 4 years respectively). The pain radiated in three directions, to the lateral aspect of the neck, to the shoulder joint, and to the breast, and was increased by active motion of the shoulder, particularly abduction, and by pressure upon the joint.

Among the physical signs, firm hypertrophy of the proximal end of the clavicle was constantly and easily found. In six cases passive mobilization of the shoulder produced aching and creaking in the sterno-clavicular joint. The movement of the joint itself seemed to be slightly limited, but in one case the joint was very loose.

RADILOGICAL DATA.—In order to obtain a satisfactory and comparative antero-posterior view of both sterno-clavicular joints, standard techniques are usually insufficient, and we therefore used the technique described by Zimmer (1939) and/or tomography.

General enlargement of the proximal end of the clavicle was observed in each of our twelve cases. Condensation of the clavicular end was seen in ten cases; it was limited, thin and subchondral, or diffuse and spotted. In seven cases an osteophyte was growing outwards from the inferior margin of the end of the clavicle. We also looked for signs of narrowing of the joint space, but this was very difficult to see.

CLINICAL COURSE.—The course of sterno-clavicular osteo-arthritis may be comparable to that of Heberden's nodes. It may be painful for a few days or weeks during the early stages of development, and may be complicated sooner or later by transitory aching and swelling. We saw many cases which were completely asymptomatic, but in a few undoubted cases the pain was severe and long-lasting in spite of medical and physical treatment.

PATHOLOGICAL DATA

The basic lesions have been described by Langen (1934). The lesions are cartilaginous with fibrillation and fraying, followed by fissures progressing from the joint surface to the bone. Nests of newly-formed chondrocytes appear near the border of these fissures. This stage is followed by a proliferation of the subchondral connective tissue of the marrow spaces, which crosses the subchondral plate into the deeper part of the cartilage, which is invaded, destroyed, and replaced by this fibrovascular tissue. Finally, this new tissue becomes ossified to form new bone and osteophytes. This picture closely resembles that of osteo-arthritis in any joint.

Sokoloff and Gleason (1954) have confirmed this description, and have also suggested the possibility of cystic necrosis of the subchondral bone.

In our own material, comprising two operated cases and 22 joints obtained by necropsy, cartilage fraying, irregular chondrocytic proliferation, and rupture of the calcified line by medullary connective tissue were perfectly seen (Figs 1, 2, and 3). In one of the operated cases (Fig. 3) there was cystic formation in the subchondral bone, and an increase in the number and thickness of the bone trabeculae of the end of the clavicle, which accounted for the remarkable condensation seen in the x-ray plate.

Fig. 1.—Case 1, a woman aged 33, proximal end of left clavicle, showing cartilage fibrillation and irregular proliferation of chondrocytes. Haematoxylin and eosin × 60.
OSTEO-ARTHRITIS OF THE STERNO-CLAVICULAR JOINT

Fig. 2.—Case 1, showing disruption of cartilage by fibrovascular tissue from marrow space. Haematoxylin and eosin ×115.

Among the 22 necropsy specimens of joints, which were x-rayed before decalcification, were two with severe osteo-arthritis which presented the same bony condensation.

In two joints, clefts or pseudo-cystic cavities were seen in the centre of the articular cartilage.

Treatment

In all cases but two, simple measures (aspirin, phenylbutazone, and/or local injection of hydrocortisone acetate) were sufficient to cause the pain to disappear completely.

In the two cases in young women, in spite of medical treatment and x-ray therapy in one and the use of a plaster cast in the other, very severe pain persisted and it was finally decided to perform a resection of the proximal end of the clavicle end (Figs 4 and 5, overleaf). This was an easy procedure and the functional result was very good. Each case was followed for 18 months after the operation.

Surgery is very rarely indicated in sterno-clavicular osteo-arthritis, but it is well to know that it may be resorted to in severe cases.

Pathogenesis

The aetiology of osteo-arthritis includes mechanical, genetic, and dystrophic factors.

The first must play an important part, since the sterno-clavicular joint is subjected to constant pressure in the orthostatic position.

It is generally agreed that a genetic factor is present in Heberden's nodes and in generalized osteo-arthritis (Stecher, 1955). In our experience the sterno-clavicular joint is clinically abnormal in most cases of generalized osteo-arthritis (in 21 cases out of 25 in our series), and this joint is usually one of the affected sites.

Dystrophy during growth favours the development of spinal osteo-arthritis, and may also affect the development of sterno-clavicular osteo-arthritis. The nucleus of ossification of the proximal end of the clavicle is the last to appear, and growth may continue until the 28th year. This growth may be interrupted, particularly by heavy work, and this may cause non-development or maldevelopment of the clavicular end, as in the case of Friedrich (1924) and in one of our necropsy cases. In fifteen of our
61 "rheumatic" patients under 40 years of age, the sterno-clavicular joint was clinically abnormal, and in four of them the joint was painful on pressure and movement. In three of these patients the growth of the spine had been disturbed, and in the fourth the tarsal scaphoid was maldeveloped.

**Summary**

Osteo-arthritis of the sterno-clavicular joint was found in twelve patients who complained of pain in this region. In two cases the pain was so severe and intractable that surgical resection was performed with a good result. These were early cases of osteo-arthritis in women aged 30 and 33 years respectively. The diagnosis was proved by histological examination.

The pathological data in these twelve patients were reinforced by the study of 22 cases coming to necropsy.

**REFERENCES**


**Ostéo-arthrite de l’articulation sterno-claviculaire**

**RÉSUMÉ**

L’ostéo-arthrite de l’articulation sterno-claviculaire fut trouvée chez douze malades se plaignant de douleur dans cette région. Dans deux cas cette douleur fut si sévère et rebelle au traitement, qu’on procéda à la résection chirurgicale, avec un bon résultat. Il d’agissait de cas du début d’ostéo-arthrite chez des femmes âgées de 30 et 35 ans, respectivement. Le diagnostic fut confirmé à l’examen histologique.

Les données pathologiques chez ces douze malades furent renforcées par l’étude de 22 cas d’autopsie.

**Osteoartritis de la articulación esterno-clavicular**

**SUMARIO**

La osteoartritis de la articulación esterno-clavicular fue encontrada en doce enfermos manifestando dolor en esta región. En dos casos el dolor fue tan grave e intractable, que se procedió a la resección quirúrgica con buen resultado. Se trató de casos de osteoartritis temprana en mujeres de 30 y 35 años de edad, respectivamente. El diagnóstico fue confirmado histológicamente.

Los datos patológicos en estos doce enfermos fueron reforzados por el estudio de 22 casos de autopsia.