FROM THE ORTHOPAEDIC CLINIC, GOTHENBURG (HEAD: PROFESSOR ERIK SEVERIN)

ARTHRITIS IN THE MANUBRIOSTERNAL JOINT AFTER TRAUMA

By

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Arthritis in the manubriosternal joint without any sign of affection in other joints is a rare occurrence. On going through the literature one finds this disease pattern so seldom described that the publication of one case here may be considered justified.

The manubriosternal joint is often attacked by Bechterew's disease, and in most cases the changes are combined with discomfort from the joint (Romanus). *Savill* reports changes in the joint in 72 % of 61 cases of spondylitis anchylopoetica. *Romanus* gives similar figures, while *Soloway & Gardner* report a considerably lower incidence. In polyarthritis too, it is not unusual that the manubriosternal joint is affected, and this is one of the points made clear by *Bogdan & Clarke.*

The joint between the corpus and the manubrium sterni is on the border line between synarthrosis and diarthrosis, and is also called Synchondrosis superior sterni. It is formed by two surfaces covered with hyaline cartilage, separated by a disc of fibrous cartilage. A synovial joint cavity may exist, but as a rule no joint cavity can be observed macroscopically. The level of the cartilage in the joint varies between 6–10 mm. In 6 % ossification of the joint may be encountered (*Zimmer*), which probably does not mean any reduction in function. Increased incidence of ossification with increase in age is said not to occur. From an anterior view on the X-ray the joint may show variation in form. The joint space may thus be biconvex or biconcave or run obliquely, and sometimes it may be irregular (*Zimmer*). The joint permits slight mobility, and as a rule a mild, elastic springiness on thorax movements while breathing. A certain similarity has been

Fig. 1[1].
X-ray examination of the manubriosternal joint, 22/7 1955, without definite changes.

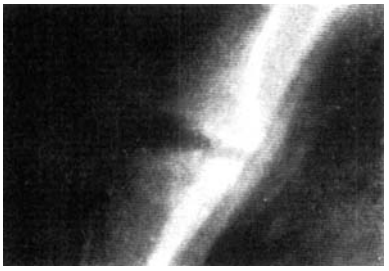

Fig. 2[1].
X-ray examination of the manubriosternal joint 14/8 1957, shows an arthritis with jagged edges to the articular surface and with stratification.

pointed out between an intervertebral disc and the manubriosternal joint. Sometimes the sternum is also called the anterior spinal column.

Personal case: 34 year old hospital porter. Previously healthy. In March, 1955, the patient was struck a heavy blow by a lift door on the upper part of the sternum. He had small local discomfort for a short period. He went sick for a week. Gradually the patient suffered pain at the transition between the corpus and manubrium sterni. X-ray of the manubriosternal joint 22/7, 1955, was negative (Fig. 1). In the summer of 1956 a swelling began to arise at the level of Ludwig's angle. Owing to local pain the patient had difficulty in carrying and lifting heavy objects. He received X-ray and short-wave treatment without any improvement. In August, 1957, the trouble increased so much that the patient had to go sick. X-ray examination 14/8, 1957, showed an arthritis process in the manubriosternal joint. By comparison with the X-ray picture July, 1955, obvious changes had occurred. The borders of the arthricular surfaces were jagged and there was stratification both ventrally and dorsally in the joint space (Figs. 1 and 2). X-ray examination of the lumbosacral back and sacroiliac joints showed no sign of Bechterew's disease.

On 28/11, 1957, a test excision was performed at Surgical Clinic II, Sahlgrenska Hospital, Gothenburg; it was then found that the cartilage had been forced up, but otherwise no pathological change was appa-

[1] The X-rays were kindly placed at our disposal by the senior doctor of Sahlgrenska Hospital's radiological-diagnostic dept. II, C. J. Hansson.

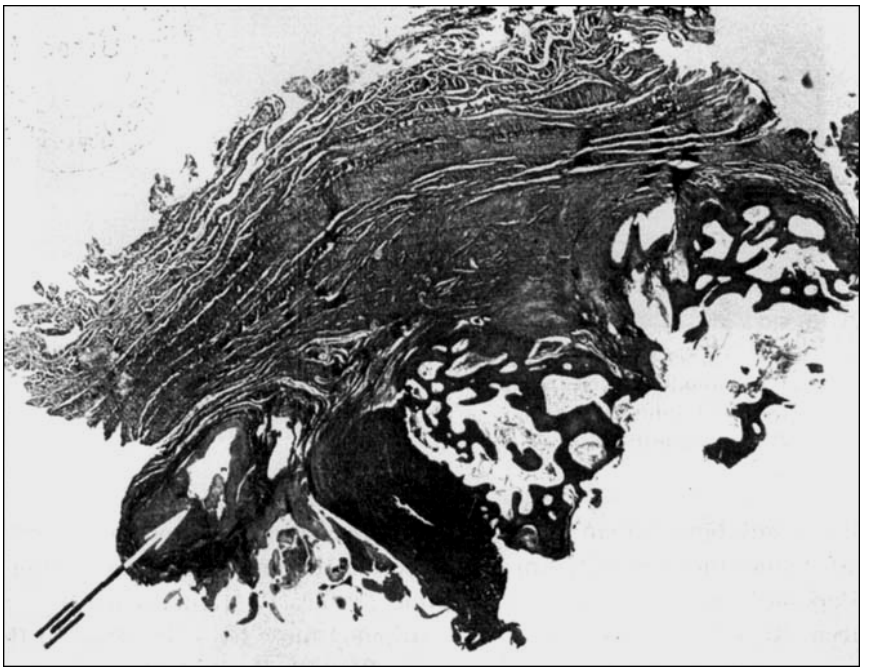

Fig. 32.
Downwards to the right (arrow) a cavity resembling a joint cavity, bordered on one side by cartilage recalling articular cartilage in structure. The cartilage surface is covered by granulation tissue which towards the cavity grades into inflammatory cell-infiltrated synovial membrane. (Hx-van Gieson × 10).

rent in the form of tumour formation or inflammatory reaction on macroscopic inspection, Microscopic examination showed non-specific arthritis.

Biopsy: The excision from the syndesmosis between the manubrium and the corpus sterni, the size of the tip of the little finger, shows part of a cavity at its border. To this is attached quite a thick, capsule-like, fibrous membrane. On the inner side of this there is rich vascular tissue, corresponding to the synovial membrane and covered with a high, swollen, epithelium-like layer of cells, plainly inflammatory, irritated mesothelium. The synovial membrane is the seat of intensive, chronic inflammation with rich, newly-formed vessels, infiltration of round cells, and particularly tight masses of leucocytes. Furthermore the synovial membrane forms papillary processes, often completely or partially fibrin-bound, apparently necrotic. Yet there were no footholds for specific inflammation.

Adjoining the cavity there is a section of cartilage, fairly regular with a structure resembling joint cartilage. The synovial membrane in the granulation tissue extends like a pannus over the cartilage surface. Below the cartilage cancellous bone begins,

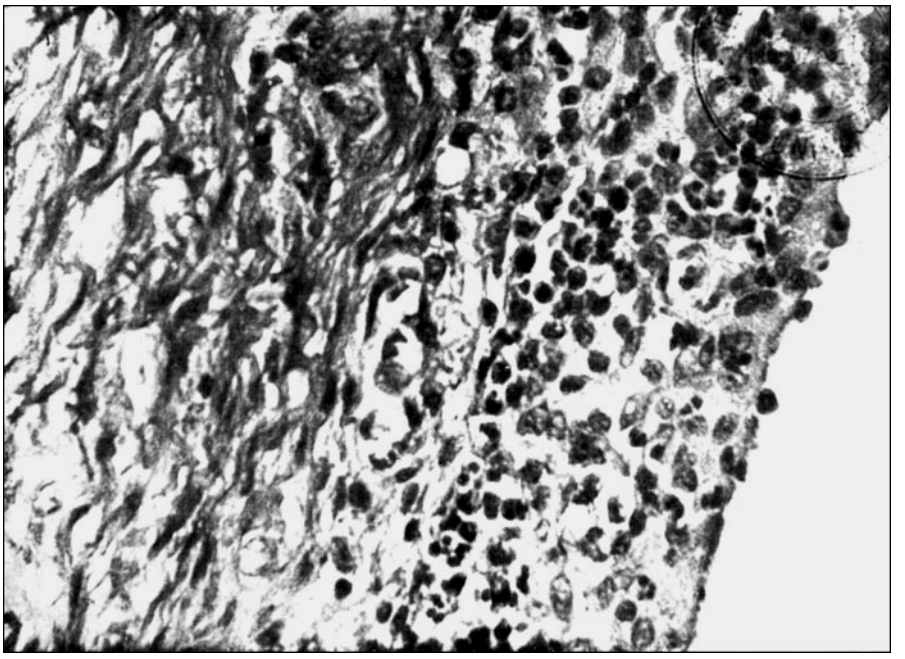

Fig. 4 [2].
Synovial membrane infiltrated with leukolymphocytes and outside this a capsule-like fibrous tissue. (Hx-van Gieson × 490).

regular but with fine fibrillar marrow with isolated inflammatory cells. Sparse bone destruction and new bone formation, particularly at the edges of the cavity resembling a joint cavity (Professor J. Mellgren, Pathological Institute 1, Sahlgrenska Hospital, Gothenburg.—Figs. 3, 4 and 5).

In February, 1958, the discomfort still remained the same, and the patient then came to us. He had local pain if he carried or lifted heavy objects and also when coughing and breathing deeply, and was unable to work. Repeated S.R. examinations were normal, and also other blood examinations Hb, red, white, diff., WR and antistreptolysin titer. At the clinical examination an extremely tender swelling was found over the manubriosternal joint, (Fig. 6). Owing to the lasting and severe discomfort resection and arthrodesis were performed 12/2, 1958. An elevation of the cartilage was found at the manubriosternal joint, but no inflammatory changes could otherwise be observed macroscop-

[2] The microphotographs were kindly placed at our disposal by Professor Jan Mellgren, Pathological Institute I, Sahlgrenska Hospital, Gothenburg.

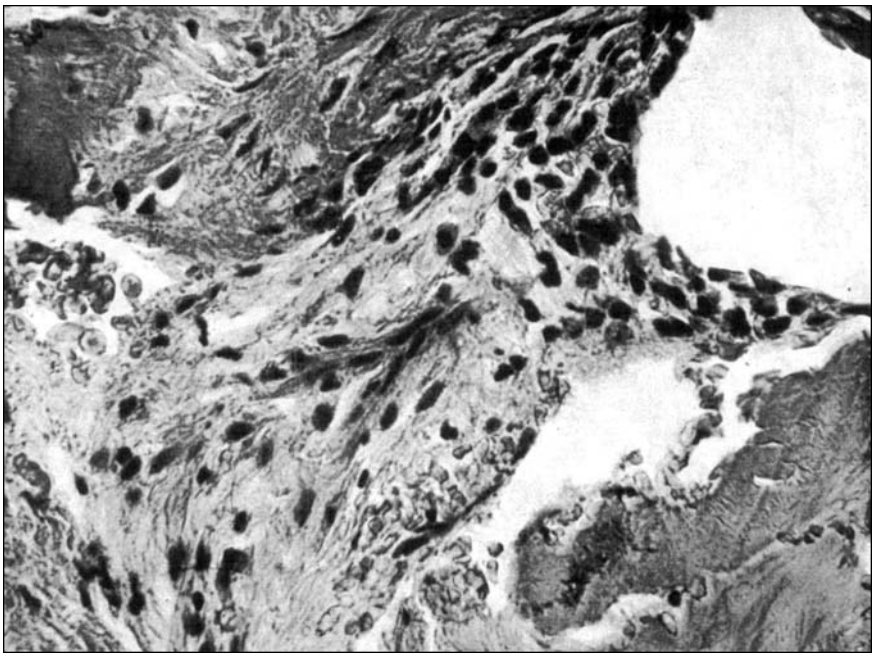

Fig. 52.
Lacunar bone destruction with numerous osteoclasts. In addition capillarised connective tissue with isolated inflammatory cells in the medullary cavities between the bone trabeculae. (Hx-van Gieson × 490).

ically. The joint was chiselled away and two bone grafts from the iliac crest were established between the manubrium and the corpus sterni and then the resection gap was filled with bone chips. Pathological-anatomic examination of the microslide showed as before an arthritis of non-specific type. The postoperative course was uncomplicated. The patient improved rapidly and in the beginning of May, 1958, he could take up lighter work. At the follow-up in September, 1958, he was completely free from discomfort and could perform heavy work without local pain. There was no tenderness above the manubriosternal joint. X-ray examination then showed that a partial synostosis existed between the corpus and manubrium, but the resection gap was only partly filled with newly-formed bone (Fig. 7).

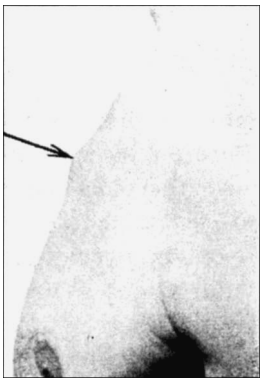

Fig. 6.
Profile photograph of the thorax. Very marked elevation over the manubriosternal joint.

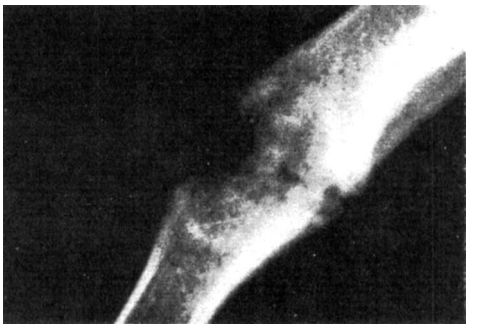

Fig. 7.
X-ray examination of the manubriosternal joint, 23/9 1958. By means of operation a partial synostosis was achieved dorsally between corpus and manubrium. A bone graft is glimpsed longitudinally in the centre of the resection gap.

DISCUSSION

Fisher & Light, who describe two cases of their own, two men aged forty, maintain that an arthritis in the manubriosternal joint without changes in other joints is an unsual happening. Otherwise I have only found this disease described by *Reiter,* three cases, and *Zimmer,* two cases. *Liévre & Baumann* have indeed described nine cases with a clinically rather similar disease pattern, but in these individuals no or merely slight radiological changes were found, and in two cases operated on the histological picture was normal. *Lièvre & Baumann* regarded their cases as arthrosis and not as an infection, and there-

fore their cases cannot definitely be considered as arthritis. Drawing the borderline between arthritis and arthrosis can of course indeed be difficult.

In diseases of the manubriosternal joint the symptom as a rule is localized pain over the sternum, accentuated by exertion and deep breathing. These cases may therefore be misinterpreted as angina pectoris, and this has been described by *Söderström, Bogdan & Clark* and also *Fisher & Light*. If one is aware that an arthritis may exist in this joint the diagnosis is indeed not difficult.

As to the etiology, *Reiter* considers that trauma may be the cause, and two of his cases were submitted to test excision. At the histological examination the changes were interpreted as traumatically conditioned. In the slides torn bits of the cartilage layer could be observed with degeneration of the cartilage, in which there were irregular cracks and in these could be found broken-off, entwined cartilage lamellae. In the adjoining bone comparatively numerous osteoclasts were seen, indicating increase of regeneration, often in addition seams of newly-formed, uncalcified bone. There were no signs of any osteomyelitic process of specific or non-specific nature. However, no trauma was stated in any *Reiter*'s three cases, but it was considered that it might have been a question of small everyday trauma. The three cases were men between 25–38 years of age with hard manual work. *Reiter* points out the similarity with the Tietze syndrome, now regarded as an injury due to over-exertion. It is only a question of a different localisation. In the Tietze syndrome a painful swelling is found at the transition between cartilage and bone at the first and second rib bone.

In the case described by me above a clear trauma is present, but it is possible to decide from the histological picture alone whether the arthritis is traumatically conditioned or not. In parenthesis it may be said that the injury was approved by the insurance company as the result of an accident.

In his two cases *Zimmer* states, referring to two women, 34 and 61 years old, that the histological examination showed an osteoarthritis of degenerative type. In these cases the X-ray favoured a destructive process.

Short wave and radiological treatment and injection of a local anesthetic are stated in the literature to be capable of soothing the pain in the arthritis cases described. *Reiter* performed an arthrodesis on one of his cases, but unfortunately there is no information about the result.

Lièvre & Baumann in their arthrosis cases performed resection of the joint in two patients, and one of these became well again and the other was improved.

The treatment of an arthritis of the manubriosternal joint ought first of all to be conservative. With persisting discomfort and when the patient is incapacitated by his complaint, operation may be tried with joint resection to gain healthy tissue and arthrodesis of the joint.

SUMMARY

Arthritis of the manubriosternal joint without other joint changes is a rare disease. The author describes such a case confirmed both radiologically and pathologically. The arthritis occurred following a trauma. The resection and arthrodesis of the manubriosternal joint were performed with good result.

RESUME

L'arthrite de l'articulation manubriosternale sans autres modifications articulaires est une maladie rare. L'auteur décrit un cas de ce genre confirmé radiologiquement et pathologiquement. L'arthrite est apparue à la suite d'un trauma. La résection et l'arthrodèse de l'articulation manubriosternale ont été pratiquées avec un bon résultat.

ZUSAMMENFASSUNG

Arthritis des manubriosternalen Gelenkes ohne Veränderungen in anderen Gelenken ist eine seltene Erkrankung. Der Verfasser beschreibt einen solchen Fall, der sowohl röntgenologisch als auch pathologisch-anatomisch bestätigt wurde. Die Arthritis entstand nach einem Trauma. Resektion und Arthrodese des manubriosternalen Gelenkes wurden mit gutem Erfolg ausgeführt.

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