Acta orthop. scand. 46, 919–925, 1975

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SYNOVIAL CHONDROMATOSIS

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Accepted 4.vi.75

Synovial chondromatosis is a rare disease when considered in the specific sense that it is a condition in which islands of cartilage are produced by the synovial membrane. This cartilage is produced in submesothelial foci (Aegerter & Kirkpatrick 1968) where the cells undergo metaplasia to chondroblasts. These foci become pedunculated and may be separated from their pedicles as loose bodies in the joint. Synovial chondromatosis may be confused with other causes of loose bodies such as degenerative joint disease, tuberculous arthritis, osteochondritis dissecans and neurotrophic arthritis. In cases with a characteristic X-ray picture the diagnosis may be easy, but if the X-ray is normal, the patient is often deprived of the proper treatment. Therefore we have found it justifiable to publish a report on this condition based on patients seen in our ward, outlining the symptoms and clinical signs.

MATERIAL

The report studies 22 patients, seven females and fifteen males, with synovial chondromatosis diagnosed at the Orthopaedic Hospital in Aarhus during the period 1960–1973. Sixteen patients, five females and eleven males, were operated on. Age distribution is shown in Figure 1. The localization was in the knee for fourteen cases, in the hip for six and in the elbow for three. The investigation is retrospective and the results of treatment were ascertained on the basis of the notes two and a half years on average after the operation or after the first visit in the case of those not operated on. In the group operated on, the diagnosis was established by biopsy in seven cases, and microscopy showed numerous cartilaginous foci in the synovial membrane. In nine cases the macroscopic changes during the operation were entirely characteristic with loose bodies being discovered and roughness of the synovial membrane being felt. Cases with multiple free bodies, but without changes in the synovial membrane were excluded. In the group not operated on, the diagnosis was made from a characteristic X-ray with several free bodies and periarticular calcification. The patients were seen by various physicians in the outpatient clinic, both before and after treatment.

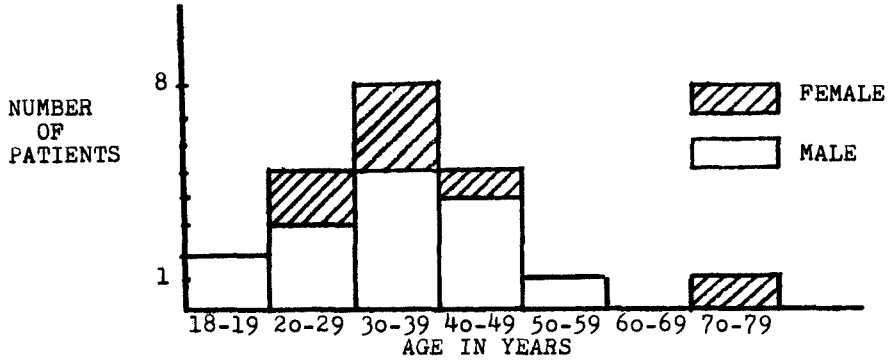

Figure 1. Age distribution.

RESULTS

The patients had frequently had symptoms for several years before the diagnosis was established (3 years and 2 months on average). The most frequent complaints were joint pain, swelling and a sensation of stiffness of the joint (Table 1) while the most frequent physical signs were limited movement, swelling and crepitation (Table 2). In the group operated on, we found characteristic X-rays in nine cases, in six cases there were normal X-rays and in one case a free body was found in the X-ray without periarticular calcification (Table 3). In two of the

Table 1. Symptoms.

	Pain	Stiffness	Swelling	Loose bodies	Locking
Knee	13	6	11	3	3
Hip	6	0	0	0	1
Elbow	3	3	1	0	2

Table 2. Physical signs.

	Tenderness	Synovial thickening	Swelling	Crepitus	Limitation of movement	Loose bodies
Knee	5	2	6	7	9	6
Hip	0	–	–	–	6	–
Elbow	1	0	1	1	3	1

Table 3. X-ray changes in the group operated on.

	Loose bodies without periarticular calcifications	Loose bodies and periarticular calcifications	No abnormality
Knee	1	3	6
Hip		3	0
Elbow		3	0

Table 4. Operative treatment.

	Removal of loose bodies	Removal of loose bodies and partial synovectomy
Knee	5	5
Hip	0	3
Elbow	3	0

Table 5. Results in the group operated on.

	No or negligible symptoms	Unchanged symptoms	Recurrence
Knee	5	2	3
Hip	1	1	1
Elbow	2	–	1

cases with normal X-rays, it was possible to detect a free body clinically.

In seven cases without characteristic X-rays the diagnosis was confirmed at the operation. Four of these patients were operated on because of a suspected lesion of the meniscus and three because of a suspected free body. The group not operated on only included patients with characteristic X-rays. In no case was the diagnosis established on physical findings alone. In the group not operated on, one patient did not want an operation; in another case it was decided not to operate because of advanced age while four patients had only negligible symptoms.

Eight patients were treated by simple removal of the free bodies and in eight patients partial synovectomy was performed as well (Table 4). The disease recurred in five patients (Table 5). In one case this happened after 10 years, but as the patient had few and intermittent

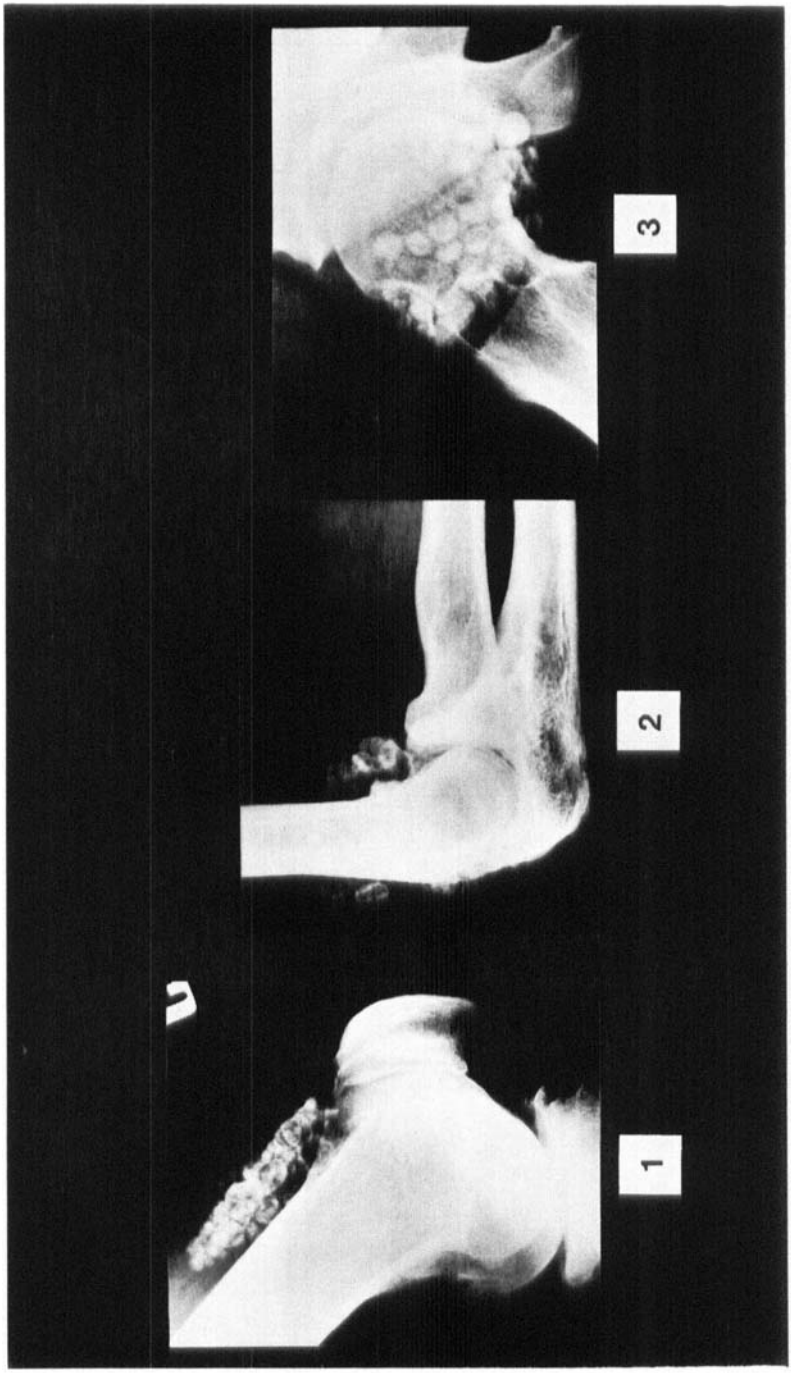

Figure 2. Three typical cases of synovial chondromatosis verified by biopsy.

symptoms, no indication was found for reoperation. Two patients were offered a further operation, but declined. One patient had a second operation and improved whilst in the remaining case treatment was deferred.

DISCUSSION

The condition has been given various names, synovial osteochondromatosis, synovial osteochondromata, osteochondromatosis, joint chondroma, diffuse enchondroma and synovial chondrometaplasia. The authors feel that synovial chondromatosis is a convenient name, because the report includes cases without X-ray changes, but with a positive biopsy or characteristic changes in the synovial membrane at the time of operation. The disease is seen most frequently in the third, fourth and fifth decades and is seen twice as often in men as in women. It is frequently localized in the knee joint, but may appear in any joint and bursa. Age distribution and localization in our patients is in accordance with the findings of other authors (Jeffreys 1967, Murphy et al. 1962).

The aetiology is unknown. Barnett et al. (1961) hold that the disease is due to reactivation of residual embryonal cells, while others claim that it could be a benign neoplasm (Jones 1924, Jaffe 1958, McIvor & King 1962). Our material gives no opportunity to reach conclusions about aetiology, but neither trauma nor infection were reported on in the notes. It seems reasonable to consider the condition to be a benign neoplasm. There are differences of opinion concerning the diagnostic criteria. Mussey & Henderson (1949) made a positive diagnosis even if the synovial membrane was not active at the time of operation provided they found four or more free bodies in the joint. Murphy et al. (1962), McIvor & King (1962) and Paul & Leach (1970) insist on involvement of the synovial membrane while Jaffe (1958) demands that there should be a histological proof of activity in the cartilaginous foci. The diagnosis can possibly be established on an X-ray if there are several free bodies and periarticular calcification. Multiple free bodies, but without periarticular calcification can be seen in osteochondritis dissecans, neurotrophical arthopathies and degenerative arthritis. Jaffe (1958) holds that the diagnosis is inconclusive if on X-ray there are multiple free bodies and possible irregularities of the joint, or alternatively one or more defects in the bone. Bone destructions may still occur as shown by McIvor & King (1962) and Bloom & Pattinson (1951) who hold bone defects localized in the neck of the femur to be

characteristic of synovial chondromatosis localized in the joint. If the X-ray is normal, as it was in six cases in the group operated on in our report, the diagnosis can be difficult, because of the often uncharacteristic symptoms and physical findings.

The disease is selflimiting because the metaplastic activity ceases. McIvor & King (1962) contend that no treatment except total synovectomy could possibly lead to a cure if this were not true.

The small number of cases in our report excludes the possibility of comparing the results in the group where synovectomy was performed with the group where only simple removal of free bodies was carried out. Simple removal of free bodies can be curative as confirmed by Jeffreys (1967). Murphy et al. (1962) and Jaffe (1958) found synovectomy desirable, but the operation is often difficult to perform—for example, in the hip joint.

Murphy et al. (1962) point to one case and McIvor et al. (1962) to four cases where total synovectomy was attempted after luxation of the hip joint. In this material luxation of the hip was performed in one case and an extensive, but partial synovectomy was carried out. As a rule there is no indication for this traumatic manoeuvre, as there is a risk of necrosis of the femoral head. Generally one can advise removal of all free bodies and excision of that part of the synovial membrane which is accessible.

SUMMARY

A report is given of 22 patients suffering from synovial chondromatosis. Sixteen patients were operated on. The aetiology and diagnostic criteria are discussed with regard to the literature. The X-ray may be characteristic or may alternatively be normal. The symptoms and the physical signs are outlined. If an indication for treatment is found, removal of all free bodies and excision of the accessible part of the synovial membrane is advised.

REFERENCES

Aegerter & Kirkpatrick (1968) *Orthopedic diseases.* W. B. Saunders Company, Philadelphia, London, Toronto.

Barnett, C. H., Davies, D. V. & MacConaill, M. A. (1961) *Synovial joints.* Longmans, Green, London.

Bloom, R. & Pattinson, J. N. (1951) Osteochondromatosis of the hip joint. *J. Bone Jt Surg.* **33**-B, 80.

Jaffe, H. L. (1958) *Tumors and tumorous conditions of the bones and joints.* Lea and Febiger, Philadelphia.

Jeffreys, T. E. (1967) Synovial chondromatosis. *J. Bone Jt Surg.* **49**-B, 530–534.

Jones, H. T. (1924) Loose body formation in synovial osteochondromatosis with special reference to the etiology and pathology. *J. Bone Jt Surg.* **6**, 407–458.

McIvor, P. R. & King, D. E. (1962) Osteochondromatosis of the hip joint. *J. Bone Jt Surg.* **44**-A, 87–97.

Murphy, F. P., Dahlin, D. C. & Sullivan, C. R. (1962) Articular synovial chondromatosis. *J. Bone Jt Surg.* **44**-A, 77–85.

Mussey, R. D. & Henderson, M. S. (1949) Osteochondromatosis. *J. Bone Jt Surg.* **31**-A, 619.

Paul, G. R. & Leach, R. E. (1970) Synovial chondromatosis of the shoulder. *Clin. Orthop.* **68**, 130–135.

Key words: chondromatosis capsularis; synovial chondromatosis; synovial osteochondromatosis; synovial chondrometaplasia; loose body formation; osteochondromatosis

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