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CHONDROMALACIA OF THE PATELLA

A Follow-Up Study of 25 Cases Treated with Chondrectomy

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Degeneration of the patellar cartilage is a phenomenon described long ago (Büdingen 1906), and many studies on chondromalacia of the patella (ChP) have been published (Øwre 1936, Hinricsson 1939, Wi-berg 1941, Friberg 1941, Hirsch 1944). Nonetheless many etiological and therapeutic problems remain to be solved. The purpose of this study was to discuss these problems on the basis of a clinical series.

MATERIAL

The series consists of all ChP cases operatively treated at the Department of Orthopaedics and Traumatology, University Central Hospital, Helsinki, during the years 1952-1969. Follow-up examinations were carried out in 1970. The series comprises 35 patients treated by shaving of the degenerated patellar cartilage. Patellectomy was not performed in any case. In addition, the degenerated cartilage of the medial or lateral femoral condyle was removed in 7 and 4 patients, respectively, and the medial or lateral meniscus was removed in 9 and 3 patients, respectively, including a cyst in the lateral meniscus. A loose intra-articular fragment was removed in 9 cases, and partial synovectomy was performed in 2 cases. Sequelae of a healed fracture of the distal portion of the patella was observed in one case. Shaving of the cartilage of the under surface of the patella without any other procedures was performed in 10 patients only. Of the patients 20 were male and 15 female. At the institution of treatment the youngest patient was 14 and the oldest 55 years old, the mean age being about 33 years. The right knees numbered 18, the left 17.

Etiology

There had been no trauma in 14 cases, whereas 21 patients gave a history of some kind of injury to the knee joint. Twisting was the commonest trauma mechanism (18 cases). One patient had fallen from a height, and one had received a direct blow to the knee joint. A fragment of a shell was found in the extensor muscles of the knee

joint in one patient; it had been there since the war, or for about 19 years. A predisposition to luxation of the patella was observed in 2 patients. One of these could not remember any trauma in the past.

Preoperative Clinical Features

The duration of clinical symptoms from the onset to the times of operation ranged from 2 months to 13 years, the mean being 3 years. The initial treatment was conservative in all cases. If this proved unsuccessful the knee joints were operatively treated. Three patients experienced slight pain in the knee joint on walking for longer distances, especially on rough ground and stairs. The pain on walking was moderate in 25 cases and severe in 7. Compression of the patella against the femur was painful in 19 patients but the symptom was negative or uncertain in 11, and data were lacking in 5. Painful compression of the patella was invariably associated with crepitation. Painless crepitus was observed in 11 patients. Nineteen patients had experienced momentary locking of the knee joint, which had easily been relaxed. Effusion in the knee joint was observed in 18 patients. Instability of the tibio-femoral joint was not present in any cases. A predisposition to luxation of the patella was present in 2 cases. Movement of the knee joint was in general normal and the same as on the other side. Three patients showed slight limitation of flexion (by 10–20 degrees), and three showed increased limitation of flexion (by 40 degrees at most).

Preoperative Radiological Findings

The X-ray findings in the knee joint were normal in 15 patients. Unevenness of the under surface of the patella was observed in 3 cases, including one showing a healed fracture of the patella. A loose intra-articular fragment was found in one case. Slight osteoarthrotic changes, such as slight osteophytes, sharp tibial eminences, or slight narrowing of the joint spaces or osteosclerosis, were observed in 3 patients. Data were lacking in 11 cases. In 2 cases arthrography raised a suspicion of meniscal rupture. Tomography was not performed in any of the present cases.

RESULTS

All patients were followed up until the end of treatment. In addition, all patients were summoned to a follow-up examination 3–14 years

after operation, the average interval being 6.2 years. End-results were obtained in 25 out of the 35 cases. Postoperative complications were observed in 2 patients, i. e. slight wound infection in one and deep thrombophlebitis of the leg in the other.

Pain was not present in 9 patients. Nine patients experienced slight pain on walking for longer distances (several kilometres) and on stairs, or on squatting. Six patients experienced moderate pain and one patient experienced severe pain.

Walking was completely normal at follow-up examination in 19 patients whereas 6 patients walked with a marked limp. Three of these used a cane.

Squatting succeeded completely in 14 patients, to about half-way in 8 patients and less than half-way in 3 patients.

Effusion in the knee joint was observed in 5 patients, no effusion in 20 patients.

Crepitation of the patella was present in 19 cases and absent in 6. Crepitation was associated with moderate pain in 4 cases and slight pain in 6, whereas 15 patients experienced no pain when the patella was pressed against the femoral condyle.

Locking had occurred in four patients.

Instability of the tibio-femoral joint in slight flexion of the knee was observed in 2 cases, and in full extension in one case. The backward drawer symptom was noted in one instance. Luxation of the patella could be provoked in 2 cases.

Movement of the knee joint was limited in 6 patients. The limitation was moderate in 3 patients, flexion being between 100 and 90 degrees.

The *radiological finding* was normal in 10 cases. Slight arthrosis and unevenness of the under surface of the patella was observed in 10 cases. In one of these a small loose fragment was observed in the central posterior portion of the joint. Moderate or severe arthrosis was observed in 5 cases, and the changes clearly increased during the time of observation. Four of these patients were over 50 years old at follow-up. In spite of arthrosis the functional result was good in one patient, fair in two and poor in one.

The *subjective end-result* was good in 11 patients, better than the state before operation in 8 patients, about the same or worse than before operation in 6 patients. These 6 experienced pain in the knee. One of them showed sequelae to a fracture of the patella.

Functional end-result. The results were classified as good, fair or poor according to the follow-up results and the subjective opinion of

the patient. The result was considered good if the function of the knee joint was fully normal and painless, and crepitus of the patella was painless. The result was considered fair if exertion of the knee caused pain which was slight, although it was a source of discomfort during the patient's professional or other daily work, and if the state was better than before operation. The result was considered poor if the patient regarded the treatment as unsuccessful and this was corroborated by clinical examination. One case of re-operation is included among the poor cases. The results were good in 13 cases, fair in 8 and poor in 4. Ten patients were omitted from evaluation.

The *poor end-result* was attributed to severe arthrosis in two patients, who experienced moderate or severe pain in the knee joint. Of these patients one showed luxation of the patella, a tendency towards luxation having been observed even before operation. In the other patient a ruptured meniscus and a fragment from the femoral condyle were removed at the operation. This patient was 55 years old. In a third case pain was present on exertion and on squatting. There was effusion in the joint, and compression of the patella caused painful crepitus. Motion of the joint was good, and no arthrosis was observed at follow-up. Chondromalacia of the patella was the only diagnosis. Re-operation was carried out in one case because the knee joint was painful after the primary operation. At the second operation both menisci were found to be injured and were therefore removed. After this operation the knee joint has been symptomless. The results in the traumatic cases (16 patients) were classified as good in 10 cases, fair in 3 and poor in 3 cases. The results in the remaining 9 patients were good in 3 cases, fair in 5 and poor in one case.

Fourteen patients were able to continue in their previous professions. Five patients without a profession performed domestic work. Two patients had to change their professions and chose lighter work because of their knee symptoms. Four patients were retired at the time of follow-up.

DISCUSSION

The mean age of the patients in the present series was 33 years. According to Øwren's (1936) findings in an autopsy series chondromalacia (ChP) is most frequent in the age groups 20–35 years. Wiberg (1941) observed roentgenological changes due to ChP in nearly every 30-year-old patient. In our series roentgenological changes due to ChP were detected before operation in only three of 24 patients.

The role of trauma in the etiology of ChP is not beyond dispute, but many authors have considered it as important (e.g. Crock 1964, Bentley 1970). In an experimental study Hirsch (1944) reported that degeneration of the patellar cartilage was induced by trauma. In our series 21 of 35 patients gave a history of trauma to the knee joint. In 18 of these 21 cases the injury was due to twisting of the knee joint, without any blow to the patella. It may be assumed that the motion of the patella had been suddenly and severely disturbed, and that this had caused a locally increased mechanical stress on the patellar cartilage. According to many authors, exceptional mechanical stress on the patellar cartilage may be due to an unusual shape of this cartilage or of the femoral condyle (Wiberg 1941, Outerbridge 1961, 1964, Crooks 1967) or to rotatory instability of the knee joint (Hughston 1969). From the frequent occurrence of other lesions, such as meniscal rupture, luxation of the patella, and a loose body, which in our series were found in 25 of the 35 patients, the conclusion may be drawn that the deficient function of the joint associated with these lesions increased the progress of ChP. It is possible that in those patients who had a history of trauma, ChP was already present in a latent phase, and the trauma then led to aggravation of the disease and its symptoms. Certain studies seem to indicate that mild symptoms of ChP are quite common (Silverskiöld 1938, Wiberg 1941). The absence of known trauma in the etiology of 14 of the present 35 patients is more difficult to understand. The anatomy of the femorpatellar joint was not specifically examined. It is possible that anomalies in the anatomy or function of the femorpatellar joint were present in the cases in question. These possible etiological factors have previously attracted attention (e.g. Wiberg 1941, Outerbridge 1961, 1964, Crooks 1967, Hughston 1969). According to Rubacky (1963), chondromalacia of the patella may sometimes be hereditary.

The frequent occurrence of other lesions in the knee joint showing ChP (in 25 of 35 patients) shows that this possibility must be borne in mind when planning the treatment of ChP. In our opinion operative exploration of the joint must therefore be extensive. Preoperative arthrography is important because of the frequency of meniscal ruptures (12/35). Owing to the composition of the present series, we can hold no opinion concerning the value of conservative treatment of ChP. Many authors have stated that mild cases of ChP may be conservatively treated (Karlsson 1940, Cahen 1957, Devas 1961).

In our series ChP was treated only by shaving of the patellar carti-

lage. No patellectomy was made. The results may be considered as relatively satisfactory, since only 4 of 25 patients had poor results. Of these only one was a bare ChP case; the remaining three showed other lesions of the knee joint as well, which influenced the prognosis. In spite of deterioration of arthrosis during the observation time, the condition of the knee was better than before operation. This seems to indicate that it is important to treat the symptoms of ChP even though arthrosis, which may be symptomless, may be present in other parts of the knee. Shaving of the degenerated patellar cartilage is the operative method which we recommend. Many authors have done the same (Karlsson 1940, Wiles et al. 1956, 1960, Langenskiöld 1971) although others have found shaving of the cartilage unreliable (Bentley 1970). Some writers prefer patellectomy as an operative method either invariably (Cahen 1957) or at least in severe cases of ChP (Friberg 1941, Outerbridge 1961, 1964, Crooks 1967). At the time of follow-up no case in the present series had required patellectomy.

CONCLUSION

Indirect injury of the knee joint seems to be an important factor in the etiology of chondromalacia of the patella (ChP). ChP is often associated with other lesions of the knee joint, and this possibility must be borne in mind when planning the diagnosis and treatment. Shaving of the degenerated patellar cartilage was done with good results.

SUMMARY

A series of 35 patients showing chondromalacia of the patella (ChP) is presented. Twenty-five patients were followed up. A history of injury to the knee joint was elicited in 21/35 patients. Shaving of the degenerated patellar cartilage was done with good results. The result was poor in 4/25 cases. Other, concurrent lesions of the knee joint such as meniscal rupture, loose body and luxation of the patella were common (25/35 patients). This possibility must be borne in mind in the diagnosis and treatment of ChP. The presence of other lesions is likely to influence the prognosis.

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