

JAROMIR JARECKI

Epidemiologia pierwotnych zmian zwyrodnieniowych stawów kolanowych u pacjentów po 40. roku życia

Epidemiology of primary gonarthrosis in patients aged over 40 years

Streszczenie

Wprowadzenie. Choroba zwyrodnieniowa jest najbardziej powszechną patologią dotyczącą stawów. Związana jest ze starzeniem. Stanowi przyczynę bólu i niepełnosprawności osób starszych. Ma charakter postępujący, cechuje się występowaniem okresów zaostrzeń i remisji.

Cel. Celem pracy jest ocena pacjentów po 40. roku życia z pierwotnymi zmianami zwyrodnieniowymi stawów kolanowych, a także kliniczna ocena stawu kolanowego w rozwijającej się gonartrozie.

Materiały i metody. Grupę badaną stanowiło 51 pacjentów z pierwotnymi zmianami zwyrodnieniowymi stawu kolanowego. Przy ocenie pacjentów wykorzystano ankiety, skalę radiologiczną oraz badanie kliniczne.

Wyniki. Średnia wieku wyniosła 61,76 lat. W grupie badanej było 38 kobiet i 13 mężczyzn. 22 osoby to mieszkańcy miast, a 19 osób to mieszkańcy wsi. Większość stanowiły osoby niepracujące. Średnia wartość indeksu masy ciała (BMI) wyniosła 30,3. Nadwaga i otyłość występowała u 82% pacjentów. Częściej zmiany obejmowały prawy staw kolanowy. Prawie połowa pacjentów korzystała z pomocy lasek.

Dyskusja. Choroba zwyrodnieniowa stawów towarzyszy ogólnoustrojowym procesom starzenia się. Nie do końca wyjaśniono, czy pierwotny defekt dotyczy chrząstki, czy warstwy podchrzęstnej. Częściej zmiany zwyrodnieniowe obserwowano u kobiet. Może wiązać się to ze zmianami hormonalnymi. W grupie badanej w 82% przypadków stwierdzono nadwagę lub otyłość. Na postęp zmian zwyrodnieniowych wpływają także ogólnoustrojowe zaburzenia metaboliczne. Inną hipotezą może być zmiana przenoszenia obciążenia w stawie, związana z zaburzeniem osi mechanicznej. Powstawanie zmian zwyrodnieniowych może zależeć od predyspozycji genetycznych.

Wnioski. Pierwotna choroba zwyrodnieniowa stawów kolanowych występuje u osób starszych, głównie płci żeńskiej. Pacjenci są długo leczeni zachowawczo. Często występuje niestabilność złożona strzałkowo-czołowa, ograniczenie ruchomości stawu oraz trzeszczenia stawowe. Dominuje szpotawość stawu kolanowego.

Summary

Introduction. Arthritis is the most common joint pathology. It depends on aging and gender and causes pain and general disability of older people.

Aim. The aim of the study is the assessment of patients aged over 40 years with primary gonarthrosis in developing gonarthrosis.

Materials and methods. The studied group covered 51 patients with primary gonarthrosis. During evaluation of the patients' questionnaires, radiological scales and clinical examination were used.

Results. Mean age was 61.76 years. In the studied group women prevailed (38 versus 13 men). Twenty two (22) people lived in the cities and 19 in rural area. The majority of studied patients did not have a job. Mean body mass index (BMI) was 30.3. Overweight was present in 82% of the patients. More frequently the changes were observed in the right knee joint. Almost half of the patients used sticks.

Discussion. Arthritis is connected with general aging process. It remains unclear, if the primary defect is located in cartilage or subchondral bone. The disease is more frequent in women, which may be related to hormonal changes. In the studied group overweight was present in 82% of the patients. General metabolic disorders may influence the progression of the disease. Another hypothesis is with relation to a change in mechanical axis of the lower limb. The development of arthrosis is connected with genetic predisposition.

Conclusions. Primary gonarthrosis is observed in elder women. Patients are treated medically for prolonged period of time. Complex instability of the knee, decreasing range of motion and swelling are often observed. Varus deformity of the knee prevails.

Słowa kluczowe: pierwotna choroba zwyrodnieniowa, kolano, epidemiologia.

Key words: primary osteoarthritis, knee, epidemiology.

INTRODUCTION

Arthritis is the most common joint pathology. It is usually combined with ageing inducing pain and disability; yet also young people may be affected [1]. The disease has no race or sex preponderance worldwide; however the significant differences exist in arthritis incidence of particular joint between male and female or particular ethnic group [2].

Similarly to other joints, gonarthrosis has progressive inclination and is characterised by the period of exacerbations and afterwards remissions, mainly in early phase of the disease. During joint degeneration flexion and extension can be limited. Also joint outline is enlarged comparing to the normal. At the same time quadriceps muscle declines, mainly its medial head, and soft tissue juxta-articular tension expands. When the cartilage damage is advanced, the joint line is asymmetric and the subchondral bone performs enhanced sclerotisation, the joint relents deformation in varus (medial part of the joint) or valgus direction (lateral part of the joint).

Changes located in patellofemoral joint are characterised by less mobility of the patella, crepitation under the patella during movement and pain.

When the arthritic changes are highly advanced the joint becomes unstable in frontal and sagittal plane. Joint effusion, Baker cyst in popliteal fossa, mainly in posteromedial part of the joint, and free bodies may appear [2].

AIM

The aim of the study is the evaluation of patients aged over 40 with primary gonarthrosis and clinical data developing knee arthritis changes.

MATERIALS AND METHODS

Population-based study covering 51 subjects who were hospitalized because of primary gonarthrosis in Orthopaedic and Rehabilitation Department of Medical University of Lublin and Orthopaedic and Traumatology Department Voivodship Hospital in Lublin in years 2004-2007. In every patient primary knee arthroplasty was performed.

The stage of joint degeneration was assessed using Kellgren-Lawrence radiological scale. On the basis of the interview and examinations, data concerning the age, place of living, gender, job, side of degeneration knee, active daily living before operation, time from primary symptoms to operation day and if the patient used crutches, were collected.

In clinical data knee joint shape, anatomical axis (varus/valgus), range of motion, crepitation incidence, stability in frontal and sagittal plane, palpable pain, swelling, height and body mass were measured.

RESULTS

Mean age in the studied group was 61.76 years (min. 40, max. 84). In this group women (38 patients) and city inhabitants (22 persons v. 19 persons living in the country) prevailed.

The majority of patients (70%) were retired (pensioners/annuitants).

Mean body mass index (BMI) was 30.3 (min. 20, max. 42). In the studied group overweight was present in 82% of patients.

Left or bilateral knee joint was affected more frequently comparing to the right one. Moderated physical activity with short walks or small physical effort featured majority of patients. In the studied group the time between first disease symptoms and surgery was 1-10 years. Most of the patients had been under medical treatment for prolonged period. Almost half of them used one or two crutches.

During clinical examination knee effusion was noted in 66.67% cases. In 20 patients limitation in extension was up to 10°. In 7 persons this limitation exceeded 10°. In 24 remaining cases limitation in extension was not present. In the studied group different limitations in flexion of the affected knee was observed. In 6 cases this shortage valued up to 10°, in 13 cases 11-20°, and in 13 patients exceeded 30° of total flexion. In 19 patients flexion limitations were not observed. Joint crepitations were present in all patients. In 33 patients they were localised mainly under the patella and in medial knee compartment and in more advanced stages of the disease (in 15 patients) they were detected over whole knee joint. Crepitations in lateral compartment were noted in 3 patients. In the analyzed group the varus knee deformation prevailed (44 patients). In 7 cases valgus deformation was observed. Instability in knee joint was present in 38 patients (74.51%). Stability in frontal plane was assessed during 20° knee flexion. The joint was stable in frontal plane in 25 persons. In 16 patients instability I° was detected, in 7 persons – II°, and in 3 – III°. Stability in sagittal plane was evaluated using Lachman test. In 22 patients sagittal knee instability was undetectable. In 15 cases knee instability was assessed as I°, in 7 – II°, in 7 – III°. In studied group medial knee pain was reported by 30 patients. In 3 persons the ailments prevailed in the lateral side. In 18 cases the pain was reported in both compartments during the examination. In the studied group in 15 persons I° stage of osteoarthritis according to Kellgren-Lawrence scale was detected, in 2 – II° and in 6 persons III° stage was observed. In 28 patients knee changes were assessed as IV° stage.

DISCUSSION

Osteoarthritis used to be treated as the diseases connected with general aging processes [3].

It remains unclear if primary defect observed in osteoarthritic changes concerns the cartilage or subcartilage line. Osteoarthritic changes according to the definition are not connected with inflammatory processes [4]. However, some authors have reported inflammation of synovium. Among the important mediators influencing the progression of osteoarthritic changes there are proinflammatory cytokines produced excessively, activated chondrocytes and infiltrating inflammatory cells [5].

The main problem in studies on osteoarthritis remains the late diagnosis in advanced stages with severe pain and changes detected radiologically. Early diagnosis is difficult because of scant disease symptoms [6].

In this study the osteoarthritis prevailed in elderly people. This relationship may be connected with decreased capacity of cartilage tissue to adapt to mechanical load and disturbances in its homeostasis processes [7].

In the studied group the frequency of osteoarthritis in women was significantly higher comparing to men. According to the literature data, up to 45 years of age, the number of men with knee osteoarthritis prevails, afterwards this relation suddenly changes. In NHANES I study the incidence of osteoarthritis in women as compared to men was 5:1 [8, 9]. In own results this percentage was a bit smaller and was 3:1. This difference may be connected with a small number of patients in our studied group.

Higher incidence of osteoarthritis in women may be related to hormonal changes. Zhang et al. detected estrogen receptors on the chondrocytes surface. They also reported the lower incidence of osteoarthritis in women after menopause in case of estrogen supplementation [10].

In group of 82% cases obesity or overweight were detected and it seems to be an important risk factor of gonarthrosis development. Some authors have previously reported the relationship between overweight and the onset of arthritic changes observed in radiological images [11-15]. Cartilage damage may be in this case the result of exceeding of its mechanical resistance. Body mass reduction dramatically decreases the risk of gonarthrosis changes development. Reduction of BMI by 2 units (that means reduction body mass by 5.1 kg) lasting 10 years declines the gonarthrosis risk by 50% [16].

Other hypothesis may be the change in load spread in the knee joint connected with disturbances of its mechanical axis. Sharma and Felson described the relationship between overweight and arthritis induced by perturbation of joint mechanical axis. The explanation may be located in anatomical structure of knee joint, which is a hinge joint. Similar dependences are not observed in spheroid hip joint. If the load in the joint increases e.g. as a result of overweight, pressure forces in deformed joint may be doubled or even tripled for reduced joint area in comparison to the joint with preserved symmetry [17, 18].

In the own study joint varus desaxation predominated and pain was localised by patients mainly in medial knee part which results from primary deterioration of joint cartilage and in more advanced stages also bone tissue in medial knee compartment. Because of destruction and increasing joint deformation the instability may develop, which was observed in 75% in the studied group. It is a complex fronto-sagittal instability resulting from relaxation or complete destruction of anterior crucial ligament and also loosening of periarticular tissues. However, occurring pain is not induced by cartilage deterioration because this tissue has neither own vascularity nor innervations [19], but is the result of destruction of subcartilage and bone layer, improper ligament, joint capsule tension or synovial membrane irritation. In these structures multiple nociceptive ends are located, which are responsible for pain impulses conduction [20].

The relationship between BMI and arthritic changes particularly in knee joint may be modified by past injury or damage. Englund and Lohmander confirmed in their study that obese patients (BMI > 30 kg/m²) after total meniscectomy were more likely to develop arthritic changes in X-rays than patients with BMI 25 kg/m² [21].

Except for biomechanical aspect, general metabolic disorders caused by overweight seem to influence the progression of arthritic changes. Leptins, small polypeptides, which

regulate energetic balance on hypothalamic level, may be the link between overweight and arthritis. The leptin concentration in serum strictly correlates with fat mass and its level decreases with body mass loss [22].

The study by Figenshau confirmed the presence of leptin receptors in mature human chondrocytes [23]. Leptins may also indirectly influence the arthritic changes progression by evoking changes in bone matrix [24].

Both obesity and arthritis may be related to genetic predispositions. Epidemiologic and genetic studies prove that arthritic changes may be produced by many genes [25, 26]. However, Manek's study did not reveal the relation between BMI and gonarthrosis in genetic predisposed patients [27].

The studied group was characterized by moderated level of physical activity, which may be due to overweight or developing knee joint insufficiency, increasing ailments or advanced age.

It was noted that (30%) of patients with arthritic changes were operated after 5 years after diagnosis and in 25% of the patients, this period exceeded 10 years. This may be connected with prolonged usage of analgesic drugs or different ways of medical treatment. The different explanation is aversion or fear of patients before total knee replacement or connected with operations risk. Because of these factors patients with IV degree of knee joint degeneration according to Kellgren-Lawrence scale dominated in our study.

In the studied patients joint swelling was observed. It is connected with synovial hyperplasia, enhanced joint fluid synthesis or existing subclinical inflammation of changed joint.

Additionally, in patients the limitations in knee movement was observed in both flexion and extension. It is the result of increased amount of synovial fluid, which causes excessive tension, pain caused by movement, progressive knee deformation, unfitness of artificial surfaces and forming osteofites.

Characteristic features of gonarthrosis are crepitations. In early stages they are present under patella and in medial knee compartment, later in whole joint. In our study these changes were correlated with joint shape and pain.

CONCLUSIONS

1. Primary gonarthrosis dominates in elder persons, and women.
2. Patients are medically treated for prolonged time.
3. Combined instability in sagittal-frontal plane, limitations in joint movement and joint crepitations are present.
4. Varus knee deformation is frequently observed.

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Informacje o Autorze

Lek. med. JAROMIR JARECKI – Klinika Ortopedii i Rehabilitacji, Uniwersytet Medyczny w Lublinie.

Adres do korespondencji

Jaromir Jarecki
20-144 Lublin, ul. Bazylianówka 99/5