Diagnostic criteria of knee osteoarthritis in rheumatology outpatient clinic, Dr. Sardjito Hospital, Yogyakarta

N Kertia, DN Wachid, PN Krishnan

Division of Rheumatology, Department of Internal Medicine, Gadjah Mada University School of Medicine/Sardjito Hospital, Yogyakarta

ABSTRACT

Background: Osteoarthritis (OA) is a chronic condition characterized by the breakdown of joints cartilage. Approximately 25% of persons 55 years of age or older have knee pain on most days and about half of them have radiographic OA in the knee. Prevalence of knee OA increases with age and it is more common in women than men. It is not easy to establish the diagnosis of knee OA since other knee disorders have similar clinical signs and symptoms.

Objective: The purpose of this study was to observe the diagnosis pattern of knee OA in rheumatology outpatient clinic at Dr. Sardjito Hospital based on clinical and radiographic criteria of American College of Rheumatology (ACR).

Method: The design of this study was cross-sectional. Data of the patients with knee OA were investigated from their medical records.

Results: There were 212 subjects diagnosed with knee OA during the year 2000–2010. Most of the subjects (90.56%) were more than 50 years old. Women were more frequent affected by OA than men. All of the subjects (100%) had knee pain. Crepitus was found in 98.11% subjects. Morning stiffness less than 30 minutes was found in 86.79% subjects. Osteophyte appearances were found in 79.72% subjects.

Conclusion: Knee pain, crepitus, and age more than 50 years old were the most frequent criteria used to diagnose knee OA. Morning stiffness less than 30 minutes and osteophyte appearances were also frequent in knee OA.

Osteoarthritis (OA) is one of the most common form of arthritis in primary care practice.[1] As the most common form of arthritis, it becomes a major contributor to functional impairment and reduced independence in elderly. Osteoarthritis of the hip and knee are two of the most important causes of pain and physical disability in community-dwelling adults.[2] Approximately 25% of persons 55 years of age or older have knee pain on most days and about half of them have radiographic OA in the knee, which the group are considered to have symptomatic OA. Prvelance of knee OA increases with age and it is more common in women than men.[3] Pain associated with OA is the chief complaint of most patients, prompting them to seek medical attention. Pain can originate from synovial membrane, joint capsule, periarticular muscles, ligaments, periosteum, and subchondral bone.[1]

Osteoarthritis is traditionally thought of as a non-inflammatory type of arthritis, despite inflammatory mechanisms may occur.[1] It is a complex disease which pathogenesis includes the contribution of biomechanical and metabolic factors, altering the tissue homeostasis of articular cartilage and subchondral bone, determine the predominance of destructive over productive processes. A key role in the pathophysiology of articular cartilage is played by cell-extracellular matrix (ECM) interactions, which are mediated by cell surface integrin. Abnormal integrin expression alters cell-ECM signaling and modifies chondrocyte synthesis, with the following imbalance of destructive cytokines over regulatory factors.[4]

Variables from medical history, physical examination, laboratory tests, and radiographs were used to develop sets of criteria that have different investigative purposes. Based on the American College of Rheumatology (ACR) clinical and radiographic criteria, knee OA can be diagnosed if there is knee pain with at least one of the three (age >50 years, stiffness <30 minutes, crepitus) and osteophytes in radiograph.[5]

METHODS

The design of this study was cross-sectional. It was conducted by collecting data from medical records from year 2000 to 2010 in rheumatology outpatient clinic of Dr. Sardjito Hospital. All subjects whom diagnosed with knee OA were included in the study. The data was processed and then compared based on the ACR clinical and radiographic criteria, age dispersion, gender, and common sites of affected knee .

RESULTS

This research consists of 212 subjects who had been diagnosed with knee OA from year 2000 to 2010. Almost patients (90.56%) were more than 50 years old. The highest age group who suffered from OA was 61-70 years (39.62%). The lowest was <41 years old with 2.36%. Full description of age distribution of the patients is enclosed in table 1 and figure 1.

Table 1 Distribution of patients with knee osteoarthritis according to age group

Age group	Number of patients	%
<41	5	2.36
41-50	15	7.08
51-60	54	25.47
61-70	84	39.62
71-80	48	22.64
>80	6	2.83
Total	212	100.00%
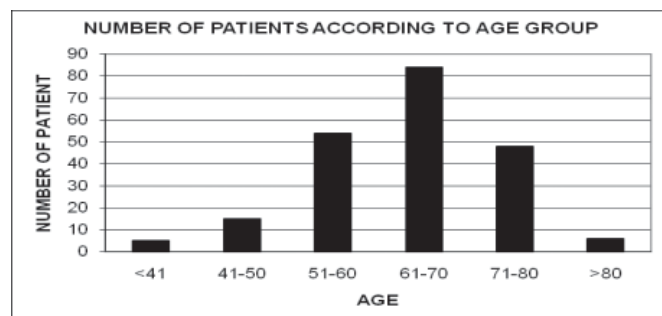
Figure 1 Number of patients according to age group

As shown in table 2, total women with knee OA was two times more than men. Overall women have higher distribution in all age groups, except for >80 years old group, which both of women and men have the same number. The highest number of women suffered from OA was in the age group of 61-70, which was 59 patients (27,83% of total patients).

Table 2 Gender distribution according to age group

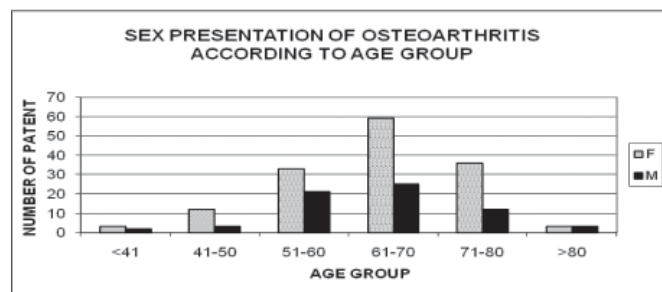| Age Group	Gender	
	F	M
<41	3 (1,41%)	2 (0,94%)
41-50	12 (5,66%)	3 (1,41%)
51-60	33 (15,56%)	21 (9,90%)
61-70	59 (27,83%)	25 (11,80%)
71-80	36 (17,00%)	12 (5,67%)
>80	3 (1,41%)	3 (1,41%)
Total	146 (68,87%)	66 (31,13%)

Figure 2 Gender presentation according to age group

Table 3 shows the distribution of symptoms and signs suffered by OA patients. These criteria are useful for diagnosing knee OA. From table 3, it is shown clearly that all of the patients had pain on the knee, while 208 patients (98,11%) had crepitus on active motion. Moreover, 184 patients (86.79%) had morning stiffness less than 30 minutes, while 28 patients

(13.21%) had more than 30 minutes. From radiographic examination, 169 patients (79.72%) had osteophytes in their X-ray image, while 43 patients (20.28%) had no osteophyte appearence but there were subchondral sclerosis or joint space narrowing appearences.

**Table 3** Clinical presentation and radiographic data of knee osteoarthritis

Pain on the knee	Absent	0 (0,00 %)
	Present	212 (100,00%)
Crepitus on active motion	Absent	4 (1,89%)
	Present	208 (98,11%)
Morning stiffness	≥ 30 minutes	28 (13,21%)
	< 30 minutes	184 (86,79%)
Osteophytes	Absent*	43 (20,28%)
	Present	169 (79,72%)

*subchondral sclerosis or joint space narrowing were present

Table 4 and figure 3 show that most of patients had bilateral OA (64,15%).

Table 4 Side of the affected knee in patients with osteoarthritis

Side	Number of patients
Right knee	36 (16,98%)
Left knee	40 (18,87%)
Bilateral	136 (64,15%)
Total	212 (100,00%)
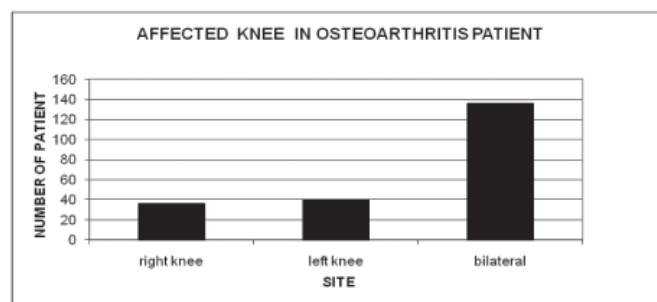
Figure 3 Affected knee in osteoarthritis patients

DISCUSSIONS

Osteoarthritis is a type of arthritis caused by the breakdown and eventual loss of cartilage of one or more joints. Cartilage is a protein substance that serves as a "cushion" between the bones of the joints. As a degenerative arthritis, it often begins in the 40s and 50s and affects almost all people to some degree by age 80.[2] It is consistent with this study that majority of patients (90.56%) with knee OA were more than 50 years old.

Primary OA is mostly related to aging. Within aging process, the water content of cartilage increases, while the protein make up of cartilage degenerates. Eventually, cartilage begins to degenerate by flaking or forming tiny crevasses. In advanced cases, there is a total loss of cartilage cushion between the bones of the joints. Repetitive use of the worn joints over the years can irritate and inflame the cartilage, causing joint pain and swelling. Therefore, it is reasonable that all subjects (100%) had knee pain. The pain associated with OA is the chief complaint of most patients, prompting them to seek medical care.[2]

The cause of pain in patients with knee OA remains unclear. Osteoarthritis has been considered as a disease which characteristic pathologic feature is loss of hyaline articular cartilage; however that tissue contains no pain fiber. Pain fibers are present in several other structures, that are often affected by pathologic processes in knee OA, including joint capsule, ligaments around the knee joint, the outer third of the meniscus, periosteum, and possibly the synovium.[6]

Osteoarthritis affects women more often than men and its prevalence and incidence increase after menopause. Many experimental, clinical, and epidemiological studies suggest that loss of estrogen at the time of menopause increases a woman's risk of getting OA. This was also supported by some preclinical studies which had been conducted on rats. Ovariectomy induced acceleration of cartilage degradation and erosion in rats indicate that estrogen deficiency accelerates cartilage turn over and increases cartilage surface erosion.[7] In this study, total number of women suffered knee OA was two times more than men.

Osteophytes can form early in the development of OA and can be seen prior to joint space narrowing. Osteophytes can have a significant clinical impact and can be a source of pain and loss of function. The latter is mainly through nerve compression, limitation of joint mobility, and obstruction of tissues and organs ossification. Osteophytes are so common as a radiographic feature of OA that they have been used to define the presence of the disease. They most often appear at the margins of the joint, originally as outgrowths of cartilage and subsequently undergo endochondral ossification.[8]

Crepitus on active motion have become one of the criteria used to diagnose OA. Crepitus on active motion simply means noise or "creck" sensation feeling by the observer's hand when there is movement of the leg in lay mans term.[9] Based on the collected data, 98.10% of the patients had crepitus on active motion.

Morning stiffness is a frequent symptom in arthritis patients. More severe joint inflammation is related with longer symptom of morning stiffness. Because OA is a degenerative and mild joint inflammation, the morning stiffnes in OA is mostly not longer than 30 minutes.[10] This research found that 184 patients (86.79%) had morning stiffness less than 30 minutes, while only 28 patients (13.21%) had at least 30 minutes morning stiffness.

CONCLUSIONS

The conclusions of this research are:
1) Most of the patients with knee OA were more than 50 years old
2) Women were mostly affected by knee OA compared to men
3) Pain was the main symptom suffered by all of the patients
4) Crepitus on active movement of the knee was the most frequent sign in knee OA
5) Most of the patients suffered morning stiffness less than 30 minutes
6) Most of the patient showed positive result of osteophytes in x-ray examination, while others showed joint space narrowing or subchondral sclerosis.

SUGGESTION

Since this data shows a little bit differences compared to ACR clinical and radiographic criteria for OA, we suggest the criteria for diagnosis of knee OA should be built depend on the epidemiological studies of each area in the world.

REFERENCES

1. Bernard R. Management of osteoarthritic knee pain. J Am Osteopath Assoc 2005;105(9):523-528.
2. Corti M, Rigon C. Epidemiology of osteoarthritis: Prevalence, risk factors and functional impact. Aging Clin Exp Res 2005;15(5):359-363.
3. Felson DT, Naimark A, Anderson J, Kazis L, Castelli W, Meenan RF. The prevalence of knee osteoarthritis in the elderly. The Framingham Osteoarthritis Study. Arthritis and Rheumatism 2006;30(8):914-918.
4. Iannone F, Lapadula G. The pathophysiology of osteoarthritis. Aging Clin Exp Res 2003;15(5):364-372.
5. Altman R, Asch E, Bloch D. Development of criteria for the classification and reporting of osteoarthritis. classification of osteoarthritis of the knee. Diagnostic and Therapeutic Criteria Committee of the American Rheumatism Association. Arthritis Rheum1986;29:1039-1049.
6. Wojtys EM, BeamanDN, Glover RA, Janda D. Innervation of the human knee joint by substance-P fibers. Arthroscopy 1990;6:254-263.
7. Hoegh AP, Tanko LB, Andersen TL, Lundberg CV, Mo JA, Heegaard AM. Ovariectomized rats as a model of postmenopausal osteoarthritis: Validation and application. Arthritis Res Ther 2004;6:169-180.
8. Peter M, van der Kraa WB, van den Berg WB. Review: Osteophytes relevance and biology. Osteoarthritis and Cartilage 2007;15: 237-244.
9. Felson DT, Lawrence RC, Dieppe PA. Osteoarthritis: New Insights. Part 1. The disease and its risk factors. Ann Intern Med.2000;133:635-46.
10. Dieppe PA. Osteoarthritis: Clinical Feature. In: Klippel JH, Stone JH, Crofford LJ, White PH, editors. Primer on the rheumatic diseases. 13th ed. Arthritis Foundation: New York; 2008. p. 224-228.