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Research Paper

Characteristics of coexisting patellofemoral joint osteoarthritis and tibiofemoral joint osteoarthritis in an Indonesian population: A cross-sectional study at a tertiary teaching hospital

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ABSTRACT

Introduction: Historically, the diagnosis and treatment of osteoarthritis has been focused on the tibiofemoral joint solely. For the last two decades, the role of patellofemoral joint and its involvement on the degenerative joint disease has been investigated. To date, no data existed regarding patellofemoral osteoarthritis in our country, Indonesia.

Methods: We performed a cross sectional study comprising of patients diagnosed with knee osteoarthritis in Fatmawati General Hospital, a tertiary teaching hospital in Jakarta, Indonesia. The subjects underwent knee radiograph from anteroposterior, lateral and skyline views.

Results: A total of 66 subjects were included, 80% of the subjects were diagnosed with combined patellofemoral and tibiofibular joint osteoarthritis Kellgren-Lawrence grade III-IV. The Western Ontario and McMaster Universities Osteoarthritis Index score was measured 69.3 points, as this might be correlated with the advancement of the disease.

Conclusions: Combined patellofemoral and tibiofemoral osteoarthritis constitutes a large portion of patients with knee osteoarthitis.

1. Introduction

Osteoarthritis (OA), a complex and multifactorial disease characterised by progressive articular cartilage destruction, is the most common chronic joint disease affecting more than 100 million people worldwide [1,2]. This disease often results in functional limitations, reduced physical activity, and considerable pain which often lead to permanent disability and quality of life impairment [3,4]. As the population ages and the rate of obesity incerases, the prevalence of OA is projected to be double by the year 2020 [1].

Osteoarthritis commonly affects weight-bearing joints, such as the knee. Such synovial joint has tricompartmental structure comprising the patellofemoral (PF) joint as well as medial and lateral tibiofemoral (TF) joint, in which OA can occur in isolation or in combination [1,5]. Several studies have shown that patellofemoral joint osteoarthritis (PFOA) combined with tibiofemoral joint osteoarthritis (TFOA) commonly occurs [6,7], accounting for approximately 60% of symptomatic knee OA cases [6]. In fact, it has been found that mixed PFOA and TFOA occur more frequently (40%) than isolated PFOA (24%) or TFOA (4%) alone [6].

As far as we are concerned, only a few studies have investigated combined PFOA and TFOA. Szebenyi et al. [8] showed that PFOA coexisting with TFOA were more likely to be painful than knees with isolated TFOA or isolated PFOA. Englund and Lohmander [9] also reported more symptoms in patients with coexisting PFJ OA than in those with isolated TFJ OA after long-term meniscectomy. These studies indicate that it is important to recognized PFOA that coexists with TFOA, as knees with mixed-knee OA are more likely to be severe and are associated with a low quality of life [10].

To date, there are no data regarding PFOA that coexists with TFOA in our country. The objective of this study is to investigate demographic data regarding PFOA in particular and its relation to TFOA. We hope that by conducting this study, the characteristics regarding PFOA combined with TFOA could be investigated; thus, earlier diagnosis and treatment could be initiated.

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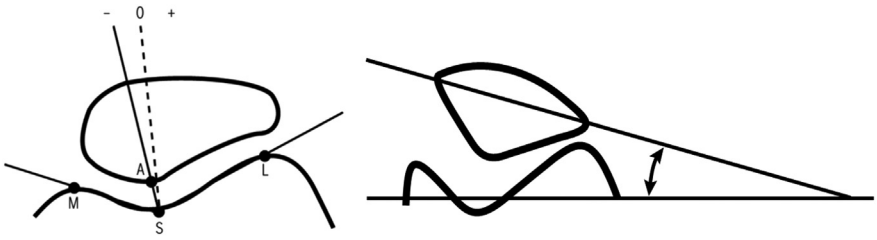

Fig. 1. Measurement of Sulcus angle, congruence angle and lateral patellofemoral angle.

2. Methods

This cross-sectional study was conducted between the period of October 2018 and April 2019 at Fatmawati General Hospital, Jakarta, Indonesia. We consecutively included patients older than 50 years of age who complained of knee pain for more than three months. Those with history of trauma or infection, known ankle and/or hip problem, previous surgery around the knee area, and immunology related disease were excluded from the study. Informed consent was obtained for all subjects. Ethical approval was granted before the start of the study.

All subjects underwent a standardized history taking, body mass measurement, and radiologic examination comprising of weight-bearing posteroanterior (PA), a supine lateral, and an axial skyline radiograph of the PF joint. To make sure the consistency of the radiograph, we prepared special fix contraption. Radiological and clinical evaluation were performed. TFOA and PFOA was assessed with Kellgren-Lawrence (KL) classification (Table 1) [11,12]. Morphologically, OA also develops from malalignment of its component that affecting normal kinematics. In PFOA, numerous factors can affect patellofemoral kinematics, including trochlear groove morphology, muscular and retinacular stretch, and tibial rotation [13,14]. We take that into consideration and tried to evaluate the PF joint morphological features (sulcus angle, congruence angle, trochlear depth, lateral patellofemoral angle) were also measured (Fig. 1). Clinical evaluation was performed using WOMAC scoring system.

3. Results

A total of 66 subjects consisting of 16 (24%) male and 50 (76%) females were included in this study. The mean age of the subjects was 63.1 years old. The mean WOMAC score was 69.3. The duration of pain ranged from more than 3 months to over 4 years. Fourty-three (65%) subjects had KL IV PFJ OA (Table 2).

4. Discussion

Knee OA is a leading cause of disability worldwide. Such disorder affects three compartments of the knee joint: PF joint as well as medial and lateral TF joint [15]. Recent studies demonstrated that those with coexisting PFOA and TFOA were more likely to have pain and functional disability as well as knee-specific impairment such as quadriceps weakness and restricted range of motion of the knee joint than those with isolated TFOA did [9,16–18]. However, to date, there are only a few studies regarding mixed PFOA and TFOA. In this study, we investigated the characteristics of patients diagnosed with mixed PFOA and TFOA.

In this study, all of the subjects were diagnosed with combined PFOA and TFOA, despite the initial inclusion criteria in which all patients complaining of knee pain more than three months were included. We found that the majority of the subjects had severe OA, with 43 (65%) and 38 (58%) knees diagnosed with TFOA and PFOA, respectively. The fact that most of them had severe OA is in line with previous findings that found combined OA seems to be more prevalent than isolated PFOA in people with symptoms of knee pain [7,22]. A population-based study found that radiographic PFOA was present in approximately 25% of individuals, and approximately 39% of individuals who reported knee pain. Importantly, a common sequence of development of knee OA begins at the PF joint, with subsequent progression to multi-compartment knee OA [37]. This may explain why most of the subjects in our study were in severe OA; perhaps they initially developed PFOA firstly before the disease continued to extend into the other compartments.

We found that the female-to-male ratio was 3:1. This is in accordance to an epidemiology study conducted by Allen et al. [23] and Parag et al. [24] who studied knee OA in India. As we know, our country shares similar socioeconomic features with India. The high

Table 1
Kellgren-Lawrence grading system for osteoarthritis.

Grade	Radiologic Findings
I	Doubtful narrowing of joint space and possible osteophytic lipping
II	Definite osteophytes and possible narrowing of joint space
III	Moderate multiple osteophytes, definite narrowing of joint space, some sclerosis and possible deformity of bone contour
IV	Large osteophytes, marked narrowing of joint space, severe sclerosis and definite deformity of bone contour

Table 2
Characteristics of the subjects.

	N = 66
Patient Characteristics	n (%)
Mean Age	63.1
Mean BMI	29.2
Male	16 (24%)
Female	50 (76%)
Mean WOMAC score	69,3
Radiological measurements	
TFOA	
KL 1	–
KL 2	6 (10%)
KL 3	17 (25%)
KL 4	43 (65%)
PFOA	
KL 1	–
KL 2	4 (6%)
KL 3	24 (36%)
KL 4	38 (58%)
Skyline morphological features	range (mean)
Sulcus Angle (SA)	125,1–148 (139,73)
Congruence Angle (CA)	6,4–47,1 (17,71)
Trochlear Depth (TD)	5,5–11,5 (8,58)
Lateral Patellofemoral Angle (LPFA)	4,6–24,6 (16,07)

mean WOMAC (69.3) score found in our study contributed by the late stage OA that our patients had.

The lack of early stages of OA (KL I) in the study is also a concern. It is believed to be caused by access to appropriate treatment is often limited and depends upon accessibility of healthcare services, insurance, availability of different treatment options, and the ability of the patient to pay for health care [24]. Thus, the patient were mostly found in late stage of OA.

Bruyere et al. [33] showed that different characteristic of OA patient responded differently to the treatment. In this case late stage OA patients have rather low respond to treatment and took longer time. Whilst from economic point of view, Xie et al. [34] showed that annual direct cost of OA patient reaches $1442 (more than 20 million IDR) per patient.

Skyline morphological evaluation showed that malalignment also occurred in our study. Approximately 9% of patients had abnormal sulcus angle and 32.2% had abnormal congruence angle. Those patients who had malalignment showed worst PFOA and higher score of WOMAC. These findings support that malalignment is a factor to PFOA. A few of our patients showed extreme results due to anatomic abnormalities. We could not identify whether malalignment of patella in exist in the early stage of OA as most of the patients were in advance stage of OA.

5. Conclusions

Combined PFOA and TFOA constitutes a large portion of knee OA. Further multicentre studies are required in order to reach larger population.

Ethical approval

Ethical Approval was received from Fatmawati Hospital, Jakarta, Indonesia (No. 02/KPP/VII/2019).

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None.

Author contribution

Ludwig AP Pontoh: study design, conceptualization.

Anggaditya Putra: data collections, data analysis, writing.

Ismail Hadisoebroto Dilogo: provided revision to scientific content of manuscript.

Toto Suryo Efar: data analysis and interpretation, provided revision to scientific content of manuscript, provided grammatical revisions to manuscript.

Declaration of Competing Interest

None declared.

Guarantor

Ludwig AP Pontoh.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ijso.2019.10.009.

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