Profile and Frequency of One Hundred Ankle Osteoarthritis Cases in an Indonesian Tertiary Hospital

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Abstract

Osteoarthritis is one of the most common cases in orthopedics and traumatology clinic. Ankle osteoarthritis is less common than osteoarthritis of hip and knee. Limited data and literature resulted in suboptimal treatment strategy. The purpose of this study was to describe the profile and frequency of ankle osteoarthritis at Dr. Hasan Sadikin General Hospital Bandung, a tertiary referral hospital in Indonesia. A cross-sectional descriptive observational study was conducted on all patients diagnosed with ankle osteoarthritis enrolled in the medical record database at Dr. Hasan Sadikin General Hospital Bandung, Indonesia in November 2020–November 2021. Results showed that the majority of the patients were female (52%), aged ≥60 years old (44%), graduated from senior high school education (56%), and housewives (30%). The 100 patients were proportionally distributed with most of them were categorized as suffering from secondary osteoarthritis with post-trauma predominance. From the perspective of body mass index, 85% patients were classified as above normal. As many as 76% of patients presented to the hospital in an advanced stage. With the high rate of posttraumatic ankle osteoarthritis, concerns should be given more to the ankle trauma management, as well as to the population with high body mass index. Increased health promotion for general population and health care providers is also needed to reduce the tendency of late presentation at the health care facility.

Keywords: Ankle, frequency, osteoarthritis

Introduction

Osteoarthritis is defined as a degenerative joint disease caused by changes in the articular cartilage.[1] Currently, osteoarthritis is considered a disease of the entire joint, including changes in the articular cartilage, subchondral bone, ligaments, capsule, and synovial membrane, which ultimately leading to joint failure.[1] Depending on the etiology, osteoarthritis is divided into primary (idiopathic) and secondary.[2] The main signs associated with osteoarthritis include pain, temporary morning stiffness, and crepitus in the joint movement leading to instability and physical disability, thereby impairing quality of life.[1] To determine the severity and progression of osteoarthritis, it can be evaluated using radiographic images such as MRI and CT.[3]

The prevalence of osteoarthritis has been reported to range from 12.3% to 21.6% in the literarure.[4] Clinically diagnosed osteoarthritis incidence rates for knee, hip, and hand were 6.5, 2.1, and 2.4/1,000 person/year, respectively, according to a recent Spanish study involving over 3 million individuals.[4] In comparison to osteoarthritis of the knee, hip, and joints, the prevalence of ankle osteoarthritis is lower (3.4% in the general population).[5] Ankle osteoarthritis is a chronic problem that affects roughly 1% of the population, with an estimated case prevalence of 30/100,000 people, and accounts for 2–4% of all osteoarthritis cases.[6] In a previous epidemiological study conducted by the University of Iowa, 639 patients with ankle osteoarthritis were identified, of which 445 (70%) were post-traumatic, 76 (12%) were rheumatic and 46 (7%) were idiopathic (primary).[7]

However, according to the literature, the prevalence of osteoarthritis and the pattern of afflicted joints differed by race and ethnic groups.[3,8] Prevalance disparities by race and demography

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imply distinct cultural and environmental factors. As a result, due to disparities in ethnicity, activity, and lifestyle depending on population demographics, this research must be conducted in Indonesia. It's crucial to know the prevalence of ankle osteoarthritis in Indonesia because there had been no previous research on the subject in Indonesia to our knowledge. The aim of this study was to find out frequency of ankle osteoarthritis at the Orthopaedic and Traumatology Clinic, Dr. Hasan Sadikin General Hospital Bandung in November 2020–November 2021. Knowing the frequency will allow the health care provider to arrange a strategy for early detection, intervention, and treatment.

Methods

This study used a cross-sectional study design and was descriptive-observational. The total sampling method was used to determine the sample size. Patients were diagnosed with ankle osteoarthritis based on AORC ICD-10-CM at Orthopaedic and Traumatology Clinics, Dr. Hasan Sadikin General Hospital Bandung from November 2020–November 2021. Patients with inaccessible medical records and incomplete data were excluded. If the medical record is incomplete, it was still possible to include. During the study period, one hundred medical records met the criteria for ankle osteoarthritis were reviewed, including referral patients and patients treated at the Orthopaedic and Traumatology Clinic, Dr. Hasan Sadikin General Hospital Bandung. The data were described and presented in frequency and percentage population-based on socio-demography, clinical, and radiographical as well, as shown in Fig.1.

The ethical clearance for this research was obtained from the Health Research Ethics Committee of the Faculty of Medicine, Universitas Padjadjaran with ethical number 690/UN6.KEP/ EC/2021.

Figure showing; in stage 1 no joint space narrowing but early sclerosis and osteophyte formation, stage 2 narrowing of the joint space medially, stage 3a joint space limited to the facet of medial malleolus with subchondral bone contact, stage 3b joint space advanced to the roof of the talar dome with subchondral bone contact, stage 4 joint space with complete bone contact.[9]

Results

A total of 100 patients were registered in the medical records and met the inclusion criteria. The distribution of ankle OA based on socio-demographic data in table 1 revealed that the majority of the patients were female (52%), and male (48%) respectively. According to the patient age, the majority of the patients were ≥ 60 years old, accounting for 44% of the total. The age group of < 40 years accounted for 31% of the total, while the age group of 40-59 years accounted for 25% of the total. The majority of the patients had a high school education, accounting for 56%, and a bachelor's degree (S1) accounting for 37%. The majority of the patients were housewives, accounting for up to 30% of the total. The second-largest occupations are office workers and other occupations, each accounting for 20% of the total. Other occupations include merchants (12%), factory workers (10%), teachers (7%), and military or police (1%).

The distribution of the frequency of ankle OA based on clinical data showed in Table 2 demonstrates that secondary type OA affected up to 62% of the patients. Patients with primary type OA, on the other hand, made up 32% of the total. The right side of the ankle was the side
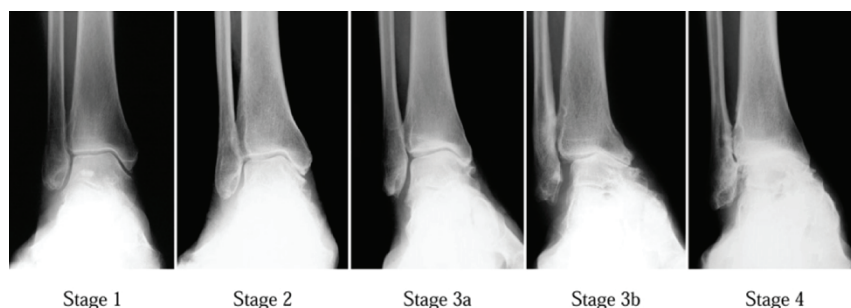

Figure Takakura Radiological Classification for Ankle Osteoarthritis [9]

Table 1 Frequency Distribution based on Socio-demography

Characteristic	Frequency	Percentage
Sex		
Female	52	52%
Male	48	48%
Age group (years)		
≥ 60	44	44%
< 40	31	31%
40–59	25	25%
Educational Profile		
High School	56	56%
Bachelor (S1)	37	37%
Diploma	4	4%
Elementary School	2	2%
Master (S2)	1	1%
Occupation		
Housewife	30	30%
Office staff	20	20%
Other	20	20%
Merchant	12	12%
Factory worker	10	10%
Teachers	7	7%
Military/Police	1	1%

of the ankle that affected the majority of the patients, with OA affecting up to 59% of them. A total of 38% of patient had OA in their left ankle. Patients who have OA in both ankles have the lowest rate of OA, at 3%. As much as 93% of the patients had no congenital abnormalities in their lower extremities. However, as much as 7% of patients have congenital abnormalities. The sorts of abnormalities in the seven patients with congenital abnormalities were as follows (Table 2). Table 2 shows that the majority of patients with congenital abnormalities in the lower extremities had a CTEV of 43%. Equinus (29%), flatfoot (1%), and varus (1%) are the other types of congenital abnormalities.

The majority of the patients, up to 59%, had no history of lower extremity trauma. Patients with a history of trauma made up 41% of the total. The types of trauma experienced by the 41 patients with a history of trauma were as follows (Table 2). The majority of individuals with a history of lower extremity trauma, as many as 29 persons, suffered fractures (71%). Dislocation (15%) and ankle sprain (5%) are two other types

of trauma. The remaining 9% of patients did not have any information about the ankle trauma they experienced. Based on nutritional status, it was discovered that the majority of the patients with type I obesity as high as 52%. Obesity type II has the lowest, accounting for up to 3% of the patient. Other nutritional categories, such as overweight and normal, represented 30% and 15%, respectively, of the patient. Patients with comorbidities in their ankle osteoarthritis were found to have a 67% comorbidity rate. Patients without comorbidities, on the other hand, made up 33% of the population. The types of comorbidities were reported as follows for the 68% of individuals who had comorbidities (Table 2).

Diabetes mellitus was reported to be the most common comorbid, according to table 2. Out of 68 patients with comorbidities, 29 had diabetes mellitus. Neoplasia and autoimmune are the least common types of comorbidities, with only 1 patient suffering from each. According to Takakura Stage, the majority of the patients had stage 3a ankle OA, which accounted for 31% of the total. Patients with stage 3b, which account for up to 26% of all cases, are the second most common. Stage 2 (22%) and stage 4 (19%). The stage group with the lowest percentage of population is stage 1 (2%). When it came to complaints about how long they had been in pain before going to the hospital, it was discovered that the majority of the patient (41%) had been in pain for >12 months before going to the hospital. Another 40% experience pain during 6 - 12 months. Meanwhile, patients who experience pain 1–6 months are the least (19%).

Discussion

The frequency in the last one year of ankle osteoarthritis patients in this study was (n=100). Most of the patients in this study were elderly, which is consistent with previous studies.[10]we sought to analyze this disabling condition in a large, well-characterized, community-based cohort of older individuals. Methods. Cross-sectional data, including ankle radiographs, were from the most recent data collection (2013–2015 The most important risk factor for osteoarthritis, according to the literature, is aging.[11] Aging has been linked to the progression of OA joint degeneration through a number of cellular mechanism.[11] Female patients with diagnosed ankle osteoarthritis were found to be more prevalent than males in this study. Female

Table 2 Frequency Distribution Based on Clinical

Characteristics	Frequency	Percentage
Types of OA		
Secondary	62	62%
Primary	38	38%
Ankle side		
Right	59	59%
Left	38	38%
Right & Left	3	3%
Congenital abnormalities		
Doesn't exist	93	93%
Exist	7	7%
Types of congenital abnormalities		
CTEV	3	43%
Equinnus	2	29%
Flatfoot	1	145
Varus	1	14%
History of trauma		
Doesn't exist	59	59%
Exist	41	41%
Types of trauma		
Fracture	29	71%
Dislocation	6	15%
No description	4	9%
Ankle sprain	2	5%
Nutritional status (BMI)		
Normal	15	15%
Overweight	30	30%
Obese I	52	52%
Obese II	3	3%
Comorbidity		
Exist	67	67%
Doesn't exist	33	33%
Types of comorbid		
Dm	29	-
Hypertension	19	-
Arthritis	14	-
Other infections and osteomyelitis	12	
Charcot		
Tuberculosis	9	-
Heart disease	9	-
Autoimmune	2	-
Neoplasia	1	-
	1	-
Takakura Stage		
Stage 1	2	2%
Stage 2	22	22%
Stage 3a	31	31%
Stage 3b	26	26%
Stage 4	19	19%
Duration of pain (months)		
>12	41	41%
6–12	40	40%
1–6	19	19%

patients with osteoarthritis have been found to have a higher rate than male patients in previous studies.[12,13] This is possible due to menopause which results in a decrease in estrogen production.[13] Reduced estrogen levels play a role in systemic predisposition and can exacerbate osteoarthritis symptoms by increasing pain sensitivity.[13] Differences in bone strength, alignment, ligament weakness, pregnancy, and neuromuscular strength can all contribute to gender disparities.[13]

High school and housewives are the most common educational and occupational profiles found in this study. We were unable to compare the frequency of ankle osteoarthritis in this study to previous studies of occupational and educational level because studies of associations between occupational/activity exposure and ankle osteoarthritis are frequently limited by methodological weakness of case-control studies and limited literature studies of educational level and ankle osteoarthritis.[14] However, unlike osteoarthritis of the knee and hip, primary ankle osteoarthritis is not the most common etiology, accounting for only 7–9% of cases; secondary causes of the ankle (rheumatoid arthritis, hemochromatosis, hemophilia, and osteonecrosis) account for 13%.[6,7]

As a result, a traumatic event accounts for 75–80% of all cases, with fractures around the ankle (malleolus, distal tibia, talus).[6,7] The findings of this study show that the number of patient identified with primary ankle osteoarthritis is lower than the number of patients diagnosed with secondary ankle osteoarthritis. However, the majority of the patients in our study had no lower-extremity traumatic incident. This is where the findings differ from prior research that claimed that post-traumatic history was the leading cause of ankle osteoarthritis.[6] Among this investigation, fractures were the most common type of traumatic event in ankle osteoarthritis patients. This is consistent with prior research, which found that the secondary type of ankle osteoarthritis caused by a traumatic event in the form of a fracture, which is the most common etiology.[6]

The majority of patients had OA on the right side of the ankle, according to the findings of this study. This is in line with prior study that indicated that the majority of ankle osteoarthritis patients had right-sided ankle osteoarthritis.[15] Congenital abnormalities that result in improper load distribution inside the joint raise the likelihood of developing osteoarthritis significantly.[3] Because the mechanical alignment of the ankle determines how much load is distributed during activity.[3] It was discovered in this study that patients with no congenital abnormalities in the lower extremities were shown to be more dominant in this study those compared with had congenital abnormalities in the lower extremities. CTEV is the most prevalent type of lower extremity congenital abnormality seen in this study. This is consistent with prior research, which indicated that patients with ankle osteoarthritis who had a history of congenital abnormalities were few, as the most common etiology for ankle osteoarthritis was post-traumatic.[7] Unfortunately, due to a lack of literature, the authors were unable to compare the frequency of the different types of congenital abnormalities found in ankle osteoarthritis.

The majority of the patients in this study had type I obese nutritional status. This is in line with prior research, which found that patients with ankle osteoarthritis have a high BMI of 31 kg/m^2 (obese type I).[10]we sought to analyze this disabling condition in a large, well-characterized, community-based cohort of older individuals. Methods. Cross-sectional data, including ankle radiographs, were from the most recent data collection (2013–2015 Obesity promotes damage to cartilage, ligaments and other supporting systems by putting a load on the joints during activity.[3] Adipokines, adiposity-related glucose and lipid imbalance, as well as chronic inflammation, may all play a role in the development of ankle osteoarthritis.[3] The findings of this study show that patients with comorbidities had a higher rate of ankle osteoarthritis than those without. The most common type of comorbidity in this study is diabetes mellitus (DM). Due to lack of literature, we are unable to compare the findings of this investigation to previous studies on comorbidity, type comorbid, and ankle osteoarthritis. However, earlier research has found that type 2 diabetes, independent of age or BMI, predicts the onset of severe osteoarthritis.[16] Meanwhile, according to Takakura Stage, the majority of the patients in this study were in stage 3a of ankle osteoarthritis. This differs from earlier studies, in which the majority of ankle osteoarthritis patients were classified as grades 1 and 2 by Takakura stage severity.[17] The early, intermediate, and late stages of the disease can be determined by understanding the degree of severity, and this information can be used to identify appropriate treatment options.[15]

The majority of the patients in this study had been suffering from chronic pain for

more than a year before going to the hospital. Which condition indicated that OA is a chronic condition.[18] The reason for this is that bringing up pain symptoms contributes to the development and alterations of the bones or joints, which necessitate progress.[12] The benefits of this research in the future are expected to increase the knowledge of researchers and clinicians regarding the frequency of ankle osteoarthritis at the Orthopedics and Traumatology Clinic, Dr. Hasan Sadikin General Hospital Bandung in November 2020–November 2021. In addition, it is also expected to increase awareness of the causes of osteoarthritis in Indonesia, especially West Java, as well as to develop appropriate and adequate early diagnostics and interventions.

This study has several limitations. First, this study was cross-sectional. All data obtained by the authors do not represent the actual conditions that occur because a lot of data is not yet available in the central medical record database. Second, the cross-sectional study design did not help determine the association between osteoarthritis and the ankle. However, behind the deficiencies previously mentioned, in conclusion that all forms of risk factors are based on socio-demographic and clinical factors such as gender, age, last education, occupation, provincial origin, type of osteoarthritis, side of ankle pain, history of trauma, congenital abnormalities, nutritional status (BMI), comorbidities, severity (Takakura stage), and duration of pain should be warning signs of ankle osteoarthritis. Furthermore, it can be used as the knowledge that is expected to increase awareness, develop diagnostic strategies, and adequate early intervention. Therefore, there are no disabilities or poor quality of life. As a recommendation in this study. First, for further study, it is necessary to add i.e. ankle osteoarthritis registry. Second, the fracture was the most common type of trauma in osteoarthritis of the ankle, it that must be treated adequately and must be considered because many things are related to osteoarthritis of the ankle. Third, results of the frequency data research that have been obtained need to be explored further for future research and supported by existing articles.

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