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The Relationship Between Severity of Osteoarthritis and Sinovitis in Osteoarthritis Patients

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ABSTRACT

Osteoarthritis is a degenerative disease of the joint involving the cartilage, synovium, ligaments, and bones causing pain and stiffness in joints and altering daily activities. One cause of pain in knee osteoarthritis is stretching of joint capsule due to excessive corneal effusion on joints (synovitis). Synovitis leads to cartilage destruction that being responded by the formation of osteophyte, thus worsening the degree of osteoarthritis. The aim of this study is to prove the association of synovitis with osteoarthritis degree in knee osteoarthritis patients at General Hospital Dr. Mohammad Hoesin Palembang. This research was an analytical study using cross sectional design. The samples of this study were patients diagnosed with osteoarthritis in General Hospital Dr. Mohammad Hoesin Palembang period September 2017-November 2017. Out of 30 subjects, majority of patients (23,3%) were diagnosed with grade III knee osteoarthritis and grade II -grade III synovitis. There was significant association between the degree of knee osteoarthritis and the degree of synovitis (p=0,0020,r=0,553). Predominantly, the patients were found suffer from grade III knee osteoarthritis and grade II - grade III synovitis. There was significant association (p<0,05) with a moderate strength of correlation between synovitis and osteoarthritis grading in knee osteoarthritis patiens.

Key words: Osteoarthritis, Synovitis, Cartilage Destruction

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INTRODUCTION

Osteoarthritis (OA) is a degenerative disease in the joint that involves cartilage, lining the joints, ligaments, and bones causing pain and stiffness in the joint.

According to WHO, the prevalence of OA sufferers in the world reached 151.4 million people and 27.4 million people are in Southeast Asia [1, 2]. In Indonesia, the prevalence of OA is quite high at 5% under the age of 40, 30% at 40-60 years of age, and 65% over the age of 61 years [3]. Based on health surveys in Norway, the prevalence of pelvic OA is 5.8%, knee OA 7.3%, and hand OA 5.6% [4]. In Indonesia, knee OA diagnosed from radiological examination is also quite high, reaching 15.5% in males and 12.7% in women of all OA patients [5]. The changes seen in the radiological features of knee OA are grouped into five degrees by Kellgren and Lawrence based on the presence of osteophytes, joint space constriction, and the presence of sclerosis of the subcondral bone [6].

OA causes pain and disability in the sufferer to interfere with daily activities. Clinical features of OA are characterized by knee pain, morning stiffness, decreased joint function, crepitus, joint restriction, and bone enlargement [7]. Pain may be sourced from the strain of periosteum nerve fibers, intra-osseous hypertension, joint capsule strain, intra-articular hypertension, ligament strain, subcondral bone fracture, entesopathy, bursitis and muscle spasms [8]. So that OA patients in general experience functional disorders resulting in reduced quality of life, such as difficulty rise from sitting squat, stand or walk, up and down stairs or other activities that burden the knee. Due to its progressive chronicle, OA has

a large socio-economic impact. It is estimated that one to two million elderly people in Indonesia are disabled because of OA5.

One of the causes of pain in knee OA is the stretching of joint capsules due to excessive effusion. Joint fluid serves to reduce friction between cartilage on joint surface to prevent cartilage damage. In the joint fluid lubricin protein that serves as a lubricant and will stop secreted in case of injury or inflammation in joints (synovitis) [9].

The presence of synovitis is evidenced by OMERACT research through ultrasound examination obtained synovial thickening, hypoechoic looks, intra-articular tissue that is less compressible and increased Doppler [10] signal. Another study conducted by EULAR received 46% of 600 patients with knee OA under synovial hypertrophy or effusion. Synovial hypertrophy is a 4mm synovial thickening with or without fluid effusion [11]. Song's research also found that of the 41 patients with OA knees under study all found synovitis [12]. Kumm's study of 106 patients with knee OA <3 months of age 35-55 years with ultrasound received 87% had synovial thickening and suprapatellar effusion despite normal x-ray results [13].

Synovitis plays an important role in the degree of OA. Based on this, this study is intended to prove a synovitis relationship with osteoarthritis degree in knee osteoarthritis patients in General Hospital Dr. Mohammad Hoesin Palembang.

MATERIALS AND METHODS

Research desaign wass an analytic research with case series study to determine the relationship between synovitis and the severity of osteoarthritis in General Hospital Dr. Mohammad Hoesin Palembang. The research was conducted on September 2017-November 2017. The inclusion criteria were patients who were diagnosed with osteoarthritis and were willing follow the research. Meanwhile, the exclusion criteria were patients diagnosed with rheumatoid arthritis, gout arthritis. Sampling technique was done by non-probability sampling technique, accidental sampling technique.

Data analysis was performed using Statistical Package for SocialScience (SPSS) version 22.0 for Windows. Data analysis used was univariate analysis and bivariate analysis. Univariate analysis was performed to see the frequency distribution under study, both included in independent variable and dependent variable. The bivariate analysis used is the spearman correlation.

RESULTS

Table 1 showed the majority of osteoarthritis sufferers of female sex, age between 50-69 years, and have an obese. Patients with osteoarthritis at General Hospital Mohammad Hoesin Palembang, generally have the severity of osteorathritis II and III and the degree of synovitis II and III.

Table 1. Baseline Characteristic

Characteristic	N (30)	%
Age		
40-49	4	13.3
50-59	12	40.0
60-69	9	30.0
70-79	4	13.3
≥80	1	3.3
Sex		
Woman	25	83.3
Man	5	16.7
Grade of Synovitis		
Grade I	8	26.7
Grade II	12	40.0
Grade III	10	33.3
Body Mass Index		
Overweight	7	23.3
Obese I	7	23.3
Obese II	16	53.3
Severity of Osteoarthritis		
Grade I	0	0
Grade II	12	40
Grade III	16	53.3
Grade IV	2	6.7

Table 2: Corelation Severity OA and Synovitis

Grade Sinovitis	Severity Grade OA(%)					*P value**	r
	I	II	III	IV	Total		
I	0 (0)	6 (20)	2 (6,7)	0 (0,0)	8	0,002	0,553
II	0 (0)	5 (16,7)	7 (23,3)	0 (0,0)	12		
III	0 (0)	1 (3,3)	7 (23,3)	2 (6,7)	8		
Total	0	12	16	2	30		

Table 2 showed there was positive moderate coralation between severity of osteoarthritis and grade of synovitis (p=0,002, r=0,553).

DISCUSSION

The results showed that there was significant correlation (p <0,05) with moderate correlation (R = 0,553) between degree of synovitis with

degree of knee osteoarthritis in knee osteoarthritis patient with synovitis at General Hospital Mohammad Hoesin Palembang.

The results of this study were in line with the study of Carla *et al.,* (2012) stated that of 58 patients with knee OA experienced synovitis as much as 38% with osteoarthritis degree I-II and 83% experienced degree III-IV [14]. Mathiessen *et al.*, (2016) study showed that in 1078 patients with OA 28.7% with Kellgren & Lawrence 2 there was a synovial / hypertrophic effusion with ultrasound [15]. The Tarhan *et al.,* (2003) study also states that 19.9% of the synovial effusions are 2-3 times lower in people without osteoarthritis than in the presence of osteoarthritis [16]. The incidence of osteoarthritis was previously believed to be a cartilage disease. But now osteoarthritis is considered a comprehensive joint disease consisting of cartilage, bone and synovium. Several other previous studies have also shown synovitis plays an important role in the development of knee OA symptoms. A higher degree of synovitis increases the risk of knee OA severity [17].

Increasing levels of synovial biomarkers associated with synovial activity and hyaluronan serum. Another studies show that proinflammatory cytokines contribute to the pathogenesis of OA by increasing cartilage degradation. Some signs of inflammation include IL-1, IL-6, TGF-, TNF-alpha, IL-17 and VEGF increased in synovium with OA. And elevated levels of IL-17 synovial have been shown to correlate with the severity of knee OA. In addition, the inhibitor of TG- and BMP growth factors, reduces the synovial thickening and induces osteophyte formation. These osteophytic features can be seen in the radiographs that influence the assessment of the degree of osteoarthritis according to Kellgren Lawrence criteria [18]. The inflammation also produces pain and hyperalgesia in OA through various mechanisms. Synovitis increases the responsiveness of peripheral neurons which causes increased pain sensitivity, and contributes to increased pain in OA patients. So that knee OA accompanied by synovitis can increase pain in patient [19]. Synovitis is the strongest risk factor for the occurrence of knee osteoarthritis where the higher the degree of synovitis will increase the degree of osteoarthritis. However, synovitis may also occur in rheumatoid arthritis, gout, cancer and trauma [20].

CONCLUSION

There was significant association (p<0,05) with a moderate strength of correlation between synovitis and osteoarthritis grading in knee osteoarthritis patiens.

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