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Korelasi Jumlah Cairan Sendi dengan Derajat Nyeri pada Pasien Osteoarthritis Genu

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Abstrak

Latar Belakang: Osteoarthritis (OA) adalah penyakit kronik yang ditandai dengan berkurangnya kartilago di sendi yang mengakibatkan tulang-tulang bergesekan. Gejala yang paling sering dirasakan pasien OA adalah nyeri dan kekakuan pada sendi. OA memicu terjadinya penumpukan cairan pada sendi. Cairan sendi secara tidak langsung berperan menimbulkan nyeri pada arthritis. Nyeri pada pasien OA dapat diukur menggunakan Visual Analog Scale (VAS). Penelitian ini dilakukan untuk mengetahui korelasi jumlah cairan sendi dengan derajat nyeri pada pasien OA genu.

Metode: Penelitian ini merupakan penelitian analitik observasional dengan pendekatan *cross sectional*. Sampel penelitian ini adalah pasien OA genu yang mengalami effusi sendi serta memenuhi kriteria inklusi dan eksklusi di Klinik Su'adah pada tahun 2018.

Hasil: Dari 80 pasien, didapatkan 73,8% pasien OA genu adalah perempuan dan 30% berusia 56-60 tahun, dan 80% memiliki IMT >25 kg/m². Rata-rata jumlah cairan sendi pasien OA sebanyak 18,59 mL (\pm 1,49) dan rata-rata derajat nyeri adalah 6,33 (\pm 0,24). Hasil analisis menggunakan uji korelasi *Pearson* menunjukkan bahwa terdapat korelasi positif lemah yang signifikan ($r=0,327$, $p=0,003$).

Kesimpulan: Terdapat korelasi positif lemah dan signifikan antara jumlah cairan sendi dengan derajat nyeri pada pasien OA genu.

Kata Kunci: osteoarthritis, jumlah cairan sendi, derajat nyeri, VAS

Abstract

Correlation of Joint Fluid Amount with Degree of Pain on Osteoarthritis Genu Patients

Background: Osteoarthritis (OA) is a chronic disease characterized by reduced joint cartilage resulting in friction between bones. The most common symptom among osteoarthritis patients is pain and stiffness in the joints. Osteoarthritis stimulates fluid buildup in the joints. Joint fluid indirectly plays a role in causing pain in arthritis. Pain sensation on osteoarthritis patients can be measured using the Visual Analog Scale (VAS). This study was conducted to determine the correlation of the synovial fluid quantity with the pain scale on patients with knee osteoarthritis.

Method: This study was an observational analytic study with a cross sectional approach. The sample of this study was patients with osteoarthritis genu who had joint effusion and fulfilled the inclusion and exclusion criteria at the Su'adah Clinic in 2018.

Results: From 80 patients, 73.8% of osteoarthritis genu patients are women, 30% are 56-60 years old, and 80% has BMI >25 kg/m². The average quantity of joint fluids of osteoarthritis patients is 18.59 mL (+ 1.49) and the average pain scale is 6.33 (+ 0.24). Statistic analysis using the Pearson correlation test showed that there is a significant, weak positive correlation of synovial fluid quantity with pain scale on patients with knee osteoarthritis ($r=0,327$, $p=0,003$).

Conclusion: There is a significant, weak positive correlation between synovial fluid volume with pain degree on patients with knee osteoarthritis.

Keywords: osteoarthritis, synovial fluid quantity, pain scale, VAS

1. Introduction

Osteoarthritis (OA) is a chronic disease characterized by reduced cartilage in the joints which results in the bones rubbing and causing stiffness, pain, and movement disorders.¹

OA is the most common joint disease in Indonesia as a developing country. The prevalence of OA in genu joints in Indonesia that appears radiologically reaches 15.5% in men and 12.7% in women aged between 40-60 years. OA patients are generally more than 50 years old. Women over 50 years have a higher prevalence than men in the same age group.²

OA patients mostly come for treatment with complaints of pain and stiffness in the affected joint. Pain arises during activity and disappears at rest. Patients usually complain of stiffness in the morning, which is usually less than 30 minutes.³

OA mostly leads to special disability or disability in elderly people. The prevalence of disability due to joint disease such as OA will increase by 2020, according to the Centers for Disease Control and Prevention (CDC) an estimated 11.6 million people will be affected by joint disease. The most common type of OA that causes disability is OA genu and OA pelvis. The risk for suffering from OA genu will increase in proportion to age or weight.⁴

Joint fluid indirectly plays a role in causing pain in arthritis. Joint fluid acts as a medium of transportation, swelling the joint capsule, and limiting joint function. Excess joint fluid makes the joints swell. Swelling of the joints interferes with the transport of nutrients between the cartilage and synovium, holding debris in the joint space and triggering recurrent inflammation.⁵ Inflammation releases pain mediators that stimulate nosireceptors which then cause pain.⁶

Pathophysiology of pain in OA is caused by mechanical trauma, proinflammatory cytokines, and joint fluid buildup. In pain caused by proinflammatory cytokines, the underlying pathophysiology is wear particles which make type A synoviocytes increase and trigger proinflammatory cytokines which then

trigger pain. In pain caused by the accumulation of joint fluid, the underlying pathophysiology is an increase in type B synoviocytes which will then increase hyaluronic acid in the joint fluid and will block the joint fluid, so that when the joint is moved it will trigger a nosiresptor that will trigger pain.⁷

Visual Analog Scale (VAS) is a pain measuring instrument that is a straight line which means that each end means "no pain" and "the greatest pain is felt".⁸ VAS is used to measure the pain intensity determined by the pain patient itself. VAS can express the magnitude of the pain, which is an advantage of VAS compared to the pain measurement tool.⁹ In its development, NRS resembles VAS, which is given the number 0-10. In several studies conducted to assess the intensity of postoperative pain, the scale used was recombination between VAS and NRS.¹⁰

This study aims to determine the correlation of the amount of joint fluid with the degree of pain in OA genu patients. This research is expected to assist practitioners in the management of OA patients.

2. Research Methods

The research that will be conducted is an observational analytic study with a cross sectional approach to see the correlation between pain and the amount of joint fluid in OA patients at the Su'adah Clinic. The study took place from July 2018 to January 2019. The inclusion criteria for this study were patients diagnosed with osteoarthritis genu with effusion and had pain in the knee. The exclusion criteria for this study were patients who had inflammatory joint disease or septic joint disease.

The research data was obtained primarily from meeting patients directly and secondary from medical records. Data will be processed with SPSS. Each data will be frequency distribution, and for the correlation of the amount of joint fluid with the degree of pain Pearson correlation test will be conducted.

3. Results

According to Table 1, most patients were female (73.8%) while men were (26.2%). The average age of 62.14 years with the most data is 56-60 years (30%). The average BMI of patients is 28.3 kg / m² with many patient data being obese or BMI > 25 (85%).

Table 1. Characteristics of OA genu patients with effusion

Characteristics	Knee	
	Osteoarthritis with Effusion	
	n (%) or Mean ± SD	Mode
Gender		
Male	21 (26,2%)	
Female	59 (73,8%)	
Age	62,14±0,845	56-60 (30%)
IMT	28,3±0,4	Overweight or >25 (85%)

According to figures 1 and 2, the amount of joint fluid was found to range from 1.5 to 59 mL, the average joint fluid of the patient was 18.59 mL, and the most frequent data was 30 mL (12.5%).

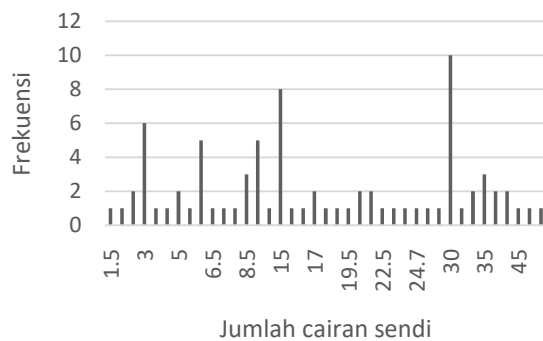


Figure 1. Graph of distribution of OA genu patients based on the amount of joint fluid

According to table 2 and table 3, the average pain level of patients is 6.33 and the highest degree of pain is 5 (18.5%).

Table 2. Correlation of the amount of joint fluid with the degree of pain

Variable	Amount of Joint Fluid	
	Corrletaion	Significance

	Coefficient (r)	(p)
Pain	0,327	0,003

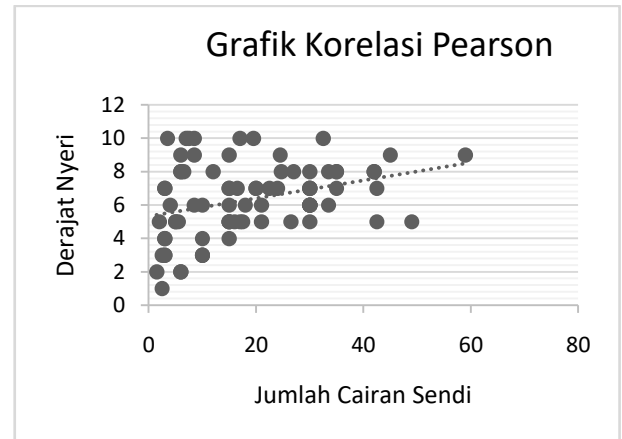


Figure 2. Graph of correlation of the amount of joint fluid with the degree of pain in OA genu patients

According to table 2 and figure 2, there is a weak correlation between the amount of joint fluid and the degree of pain (r = 0.327, p = 0.003).

Table 3. Size statistics for the distribution of OA genu patient data

Variable	n	Mean	Standard Distribution	Median	Minimum	Maximum
Amount of Joint Fluid	80	18,59	1,4920	15,5	1,5	59
Degree of Pain	80	6,33	0,244	6	1	10

Table 4. Distribution of OA genu patient subjects based on the degree of pain

Degree of Pain	n	%
1	1	1,3
2	3	3,8
3	6	7,5
4	4	5,0
5	15	18,8
6	12	15,0
7	14	17,5
8	12	15,0
9	6	7,5
10	7	8,8
Total	80	100

4. Discussions

In the results of the study it was found that the amount of joint fluid had a weak correlation with the degree of pain ($r = 0.327$, $p = 0.003$) in line with research that stated that there was a correlation between effusion and VAS in osteoarthritis knee patients. In this study it was found that not always the amount of joint fluid that many have a high degree of pain or vice versa, but there is a correlation found between the two variables.^{11,12}

There is a correlation between the amount of joint fluid and the degree of pain caused by the presence of nociceptors (pain receptors) in the joint capsule. The more joint fluid in the knee, the easier it will be to trigger nociceptor (Bullough, 2010). Tissue damage due to OA also makes hyperalgesia or increased sensitivity to nociceptors, which will make pain more quickly accepted. Nociceptors when stimulated, will turn stimuli into electrical energy and will be delivered by sensory nerves to the thalamus which will then be translated

into pain. Nociceptors can be stimulated by changes in pressure or extreme temperature changes, this is also the reason there are studies that say that there is a correlation between knee effusion and VAS when moving. At the time of the study, what was asked of the sample was the highest VAS felt, without looking at the position in the VAS.^{13,14}

The degree of pain varies from patient to patient due to the interaction of input pain with an endogenous analgesic system, endogenous analgesics such as enkephalin, endorphins, serotonin, and noradrenaline can suppress pain impulses.¹⁵ According to the study, joint pain originates from the nerves in the synovium or joint capsule. Synovitis produces excess joint fluid and will stimulate nerve endings in the synovium, the nerve endings will be stimulated due to pressure from joint fluid, which will then signal pain to the brain, so OA patients will feel pain.¹⁶

5. Conclusion

There is a weak and significant correlation between the amount of joint fluid and the degree of pain in patients with osteoarthritis genu.

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