



Original Article

The Predictors of Response to Intra-Articular Steroid Injections in Patients with Osteoarthritis of the Knee, in Jos University Teaching Hospital Jos Plateau State.

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ABSTRACT

Intra articular steroid injection is one of the armamentariums available for the clinical treatment of osteoarthritis. However, response to this modality varies in different patients, hence the need to determine which patients are likely to have a good response to IASI. This is a randomized controlled trial study. Patients with osteoarthritis of the knee who met the inclusion criteria were randomly divided into two groups. Baseline parameters were measured for each subject, before 40 mg methylprednisolone acetate mixed with 2 % lignocaine was injected into the knee either via the palpation technique or the ultrasound guided technique. VAS and WOMAC were calculated at 2weeks, 4 weeks, and 3 months post IASI administration. Each participant was followed up for 3 months. There was no significant difference between the sonography group and the conventional palpation technique group except in alcohol consumption with P values of 0.025, respectively. This study shows that intraarticular steroid injection is effective in reducing the WOMAC and VAS score by 50% in the first two weeks after the steroid injection in 78.4% using WOMAC and 100% using VAS score for the subjects in both groups. We found an association that could predict 50% reduction in pain at 3 months. These variables are age, sex, alcohol, medial collateral ligament laxity, radiographic score, and range of motion. However, after running a logistic regression, none of the variables identified could predict the response at 3 months.

INTRODUCTION

Osteoarthritis (OA) is a long-term chronic disease characterized by the deterioration of cartilage in joints which results in bones rubbing together and creating stiffness, pain, and impaired movement¹. It is a degenerative joint disorder, a public health burden since it is one of the most common joint diseases all over the world and a common presentation in most outpatient clinics, particularly common among

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elderly people. The Global Burden of Diseases (GBD) for OA has increased, globally, knee OA was ranked as the 11th highest contributor to global disability and 38th highest in Disability-adjusted life year DALYs. According to the World Health Organization in 2010, among 289 diseases, OA has become the eleventh leading cause of years lived with disability, an increase from sixteenth to eleventh within only 10 years. Osteoarthritis is more common in women than men, but the prevalence increases dramatically with age. 45% of women over the age of 65 have symptoms while radiological evidence is found in 70% of those over 65. Osteoarthritis of the knee is a major cause of mobility impairment, particularly among females.

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OA was estimated to be the 10th leading cause of non-fatal burden in the world in 1990, accounting for 2.8% of total Years of healthy life lost due to disability YLDs, around the same percentage as schizophrenia and congenital anomalies. In the Version estimates for the Global Burden of Disease 2000 study, published in the World Health Report 2002, OA is the 4th leading cause of YLDs at global level accounting for 3.0% of total global YLDs.²

In Africa most prevalence studies are hospital based even at this the burden of OA is enormous, in urban settings in South Africa the prevalence of OA was 55.1%, and in rural settings, all in South Africa, ranged from 29.5%, 29.7%, up to 82.7% among adults aged over 65 years.³ The prevalence of OA of the knee is 80% in Egypt. In Nigeria OA is the leading cause of disability with the prevalence of OA in the urban setting ranging from 60% - 80% and in the rural setting 19.6%.⁴

The burden of OA is huge as it can be seen from a global perspective through to the local regional level. This reflects the huge number of patients that have failed the analgesic treatment and are not candidates for surgery or have refused surgery. American College of Rheumatology (ACR) has conditional recommendations for the use of intra-articular steroid injection in patients with OA knees who have not responded to full dose of Acetaminophen⁵. Intra articular steroid injection (IASI) has been widely used in the management of symptomatic knee OA, one of the most affected joints. There is evidence of short-term benefit of IASI to provide pain relief for up to 3 to 4 weeks. However, there is disagreement on the long-term benefit of therapy. Data from the published trials indicate, however, that there is significant variation in both the magnitude and duration of response to steroid injections. As an example, the magnitude of pain improvement measured using a visual analogue scale (VAS) on a 0-100 scale varied between a mean change of 16.2-35.7 mm, while the duration of pain relief varied between 1 and 8weeks^{5,6}. The reason for variation in response is unclear, but may be related to disease factors, treatment, or patient-related factors. If factors consistently associated with response to steroids could be identified, steroid injections might be better targeted to those most likely to respond. A systematic review of the published literature was done to determine whether there are patients, treatment or disease-related factors that predict either the magnitude or duration of response to IASI in knee OA.

However, there is a large variation in both the extent and duration of response to steroid injections, e.g., some patients respond very well,

and some have a poor response⁷⁻⁹The reason for variation in response is not yet clear. This could be due to disease-related factors, treatment or patient-related factors or any comorbidity like obesity¹⁰. There is paucity of data on the predictors of response to intraarticular steroid injection in the world and none in our setting. If the predictors of response are well recognized, as the main aim of this research, then one can appropriately select patients for IASI, and determine which patients will respond to IASI and which will not.

METHODOLOGY

The study was a randomized controlled trial study, conducted in the Surgical Outpatient Clinic (SOPC) of Jos University Teaching Hospital, JUTH. The hospital is in Jos, the capital city of Plateau State, North Central Nigeria, It provides primary, secondary, and tertiary care to the population of Plateau and the neighbouring states of Nasarawa, Benue, Kaduna, Bauchi, Gombe, Adamawa and Taraba states.

A study of the records of patient in the surgical outpatient clinic revealed an average presentation of 3 new patients presenting with Osteoarthritis of the knee per week. A total population sampling was done over a period of 6 months. The inclusion criteria are patients within the age of 30 to 80 years, with osteoarthritis of the knee diagnosed based on ACR clinical classification criteria with or without radiological support and who are not responding to conventional treatment of OA such as NSAIDs, acetaminophen and physiotherapy for more than 3 months. Written and verbal informed consent of patients and their willingness for return visits to hospital or telephone interviews was obtained. The exclusion criteria are known hypersensitivity to Depo Medrol 40mg and 2% Lidocaine. All patients were recruited voluntarily into the study after obtaining a written informed consent. The participants were randomly assigned to either a conventional injection by anatomic palpation or to sonographic needle guidance group using random numbers generated by Microsoft Excel. Relevant history, physical examination (body mass index and detailed musculoskeletal examination) was obtained from each subject. Also, each had knee radiograph done and data filled into an interviewer administered questionnaire. Prior to administration of intra-articular steroid injection (IASI), visual analogue scale (VAS) score, Western Ontario, and McMaster Universities Osteoarthritis Index (WOMAC) score and baseline parameters were measured for each

subject. Under proper aseptic conditions 40 mg methylprednisolone acetate mixed with 2 % lignocaine was injected. Following the injection, patients were advised to observe 24hour bed rest at home. VAS and WOMAC were calculated at 2 weeks, 4 weeks, and 3 months post IASI administration.

The cut off values for WOMAC score were 50 % or more improvement in WOMAC score as compared to the initial WOMAC before IASI as responders, and less than 50% improvement in initial WOMAC score as non-responders. For VAS 50 % or more improvement in VAS score was categorized as responders, and less than 50 % was categorized as non-responders at 3 months.

Each participant was followed up (monthly phone calls and during clinic visits) for 3 months and documenting health related outcomes during this period. Data was collected using pre-tested interviewer administered semi-structured questionnaire comprising of the following sections: socio-demographic characteristic of the subjects including telephone contact and detailed descriptive home address, follow-up clinical examination parameters.

RESULTS

A total of 52 patients who met the criteria were recruited for the study and were randomly divided into

Socio-demographic characteristics

Table: 1 Demographic characteristics of patient in the two cohort groups

Characteristics	Study group		Total	χ ²	P-value
	Palpation n=26 f (%)	Sonography n=22 f (%)			
Age					0.523 ^F
<40	2(100.0)	0(0.0)	2(4.2)		
40-59	16(50.0)	16(50.0)	32(66.7)		
60-79	8(57.1)	6(42.9)	14(29.2)		
Mean ± SD	53.6±11.8	53.4±7.8	53.5±10.1		
Sex				0.071	0.791
Male	8(57.1)	6(42.9)	14(29.2)		
Female	18(52.9)	16(47.8)	34(70.8)		
Education					0.025 ^F
Primary	5(29.4)	12(70.6)	17(35.4)		
Secondary	13(61.9)	8(38.1)	21(43.8)		
Higher	8(80.0)	2(20.0)	10(20.4)		
Occupation					0.283 ^F
Business	2(50.0)	2(50.0)	4(8.3)		
Civil servant	9(60.0)	6(40.0)	15(31.3)		
Housewife	5(33.3)	10(66.7)	15(31.3)		
Lecturing	2(100.0)	0(0.0)	2(4.2)		
Trading	8(66.7)	4(33.3)	12(25.0)		
BMI					0.511 ^F
Normal	2(33.3)	4(66.7)	6(12.5)		
Overweight	10(62.5)	6(37.5)	16(33.3)		
Obese	14(53.8)	12(46.2)	24(54.2)		
Systemic Hypertension				0.336	0.526
Yes	12(50.0)	12(50.0)	24(50.0)		
No	14(58.3)	10(41.7)	24(50.0)		
Alcohol				5.035	0.025 [*]
Yes	6(33.3)	12(66.7)	18(37.5)		
No	20(66.7)	10(33.3)	30(62.5)		
Smoking					0.827 ^F
Yes	4(66.7)	2(33.3)	6(12.5)		
No	22(52.4)	20(47.6)	42(87.5)		

F=fishers Exact; Y=Yates Correction

two groups, the first group which had intra-articular steroid injection using palpation technique had 26 patients while the second group which had injection under ultrasound guidance had 22 patients, 4 patients from this group were lost to follow up, giving an attrition rate of 15.4%. About 95% of the patients were above the age of 40 years old. There was a predominance of females in the two cohort groups with a male to female ratio of 3:7.

DISCUSSION

The finding in this study with mean age of subjects with 53.5±10.1 and majority (95%) in the 40 -79 years age is reflective of the fact that the prevalence of osteoarthritis increases with age from the fourth decade peaking at age 60 years. This has been well documented from other studies^{6,11} The male to female ratio in this study is 3:7. This also supports the fact that the disease occurs more in women⁶. 54.2% of the combine group are obese and only 12.5% have normal body mass index. There is no significant difference between the sonography group and the conventional palpation technique group except in alcohol consumption, with a P value of 0.025.

Table:2 Overall Outcome of Intra-Articular Steroid Injections in The Study

Outcome	Total	Percent
WOMAC		
2 weeks		
Poor	10	21.6
Good	38	78.4
6 weeks		
Poor	11	22.9
Good	37	77.1
3 months		
Poor	25	52.1
Good	23	47.9
VAS		
2weeks		
Poor	0	0.0
Good	48	100.0
6 weeks		
Poor	9	18.8
Good	39	81.3
3 months		
Poor	21	43.8
Good	20	56.3

Good outcome, 78.4% and 100% for WOMAC and VAS respectively at 2 weeks and a gradual reduction to 47.9% and 56.3% for WOMAC and VAS respectively at 3 months.

This study shows that intraarticular steroid injection is effective in reducing the WOMAC and VAS score by 50% in the first two weeks after the steroid injection in 78.4% using WOMAC and 100% using VAS score for the subjects in both. This supports the fact that intra articular steroid injection is effective in the management of patients with osteoarthritis of the knee joint, it is in keeping with several studies which support it use.¹²⁻¹⁴ The duration of response to intra articular steroid is variable, many studies have shown that intraarticular steroid injection is statistically and clinically significant at reducing pain in the short term. A recent systemic review¹⁰

Table: 3 Association between background characteristics and Outcome at the end of study Based on WOMAC

Characteristics	Outcome		Total	χ^2	P-value
	poor n=25f (%)	Good n=23f (%)			
Age					0.003 ^{Fa}
<40	0(0.0)	2(100.0)	2(4.2)		
40-59	13(40.6)	19(59.4)	32(66.6)		
60-79	12(85.7)	2(14.3)	14(29.2)		
Sex					0.016 ^{Y*}
Male	3(21.4)	11(78.6)	14(29.2)		
Female	22(64.7)	12(35.3)	34(70.8)		
Education					0.845 ^F
Primary	9(52.9)	8(47.1)	17(35.4)		
Secondary	12(57.1)	9(42.9)	21(43.8)		
Higher	4(40.0)	6(60.0)	10(20.4)		
Occupation					0.060 ^F
Business	0(0.0)	4(100.0)	4(8.3)		
Civil servant	7(46.7)	8(53.3)	15(31.3)		
housewife	10(66.7)	5(33.3)	15(31.3)		
Lecturing	0(0.0)	2(100.0)	2(4.2)		
Trading	8(66.7)	4(33.3)	12(25.0)		
BMI					0.362
Normal	2(33.3)	4(66.7)	6(12.5)		
Overweight	7(43.8)	9(56.3)	16(33.3)		
Obese	16(61.5)	10(38.5)	26(54.2)		
Systemic Hypertension					>0.999 ^Y
Yes	13(54.2)	11(45.8)	24(50.0)		
No	12(50.0)	12(50.0)	24(50.0)		
Alcohol					<0.001 ^{Y*}
Yes	3(16.7)	15(83.3)	18(37.5)		
No	22(73.3)	8(26.7)	30(62.5)		
Smoking					0.156 ^Y
Yes	1(16.7)	5(83.3)	6(12.5)		
No	24(57.1)	18(42.9)	42(87.5)		

identified only 11 studies out of 696 trials due to stringent inclusion and exclusion criterion. In all these studies, one of the three tools (WOMAC/VAS/OARSI) was used to see the response to IASI¹⁵. In this study, we used both WOMAC and VAS to assess the outcome of IASI in knee OA patients over 3 months. It showed that IASI was effective in reducing pain in the first two weeks in 78.4% and 100% using WOMAC and VAS respectively, at six weeks post injection using WOMAC was 77.1% and VAS 81.3%, at 3 months WOMAC was 47.9% and VAS 56.3%.

Table:4 Association between Knee examination parameters and Outcome at the end of study Based on WOMAC

Characteristics	Outcome		Total	χ^2	P-value
	poor n=25 f (%)	Good n=23 f (%)			
Joint line tenderness					0.139 ^Y
Present	21(47.7)	23(52.3)	444(91.7)		
Absent	4(100.0)	0(0.0)	4(8.3)		
Joint effusion				1.273	0.259
Present	16(59.3)	11(40.7)	27(56.3)		
Absent	9(42.9)	12(57.1)	21(43.7)		
Medial collateral ligament				8.694	0.003
Lax	16(76.2)	5(23.8)	21(43.8)		
Normal	9(33.9)	18(66.7)	27(56.3)		
Lateral collateral ligament					>0.999 ^Y
Lax	3(50.0)	3(50.0)	6(12.5)		
Normal	22(52.4)	20(47.6)	42(87.5)		
Radiology					<0.001
Grade 1	1(6.3)	15(93.8)	16(33.3)		
Grade 2	9(69.2)	4(83.3)	13(32.4)		
Grade 3	3(42.9)	4(57.1)	7(14.6)		
Grade 4	12(100.0)	0(0.0)	12(25.0)		
Range of motion					0.001*
30	7(100.0)	0(0.0)	7(14.6)		
35	2(100.0)	0(0.0)	2(4.2)		
40	5(71.4)	2(28.6)	7(14.6)		
45	4(66.7)	2(33.3)	6(12.5)		
50	6(46.2)	7(53.8)	13(27.1)		
55	0(0.0)	2(100.0)	2(4.2)		
60	1(9.1)	10(90.9)	11(22.9)		

This finding is similar to a study done in Pakistan, where about 16.1% of the subjects had about 50% reduction in pain up to the third month using WOMAC and about 38.7% had more than 50% reduction in pain using VAS^{6,16}

It is obvious there is a large variation in both extent and duration of response to steroid injections, this study looked at the demographic, physical examinations clinical and radiological evaluation, to determine the predictors of response to IASI at 3 months. We found an association that could predict 50% reduction in pain at 3 months. These variables are age, sex, alcohol, medial collateral ligament laxity radiographic score and range of motion. Studies with large subjects have identified range of motion at the knee, local tenderness at the knee and radiographic score to predict 50% reduction in pain with IASI at 3 months.⁶ However after running a logistic regression, none of the variables identified could predict the response at 3 months. Most studies including large systemic reviews done in the western world have not found any factors that could predict response at 3 months^{10,12}

Traditionally, intra-articular injections have been performed using anatomical landmarks to identify the correct trajectory for needle placement. However, different anatomical-guided injection techniques have yielded inconsistent intra-articular needle positioning due, in large part, to the fact that the physician cannot directly visualize the area of interest, and variations in anatomy are common. Incorrect needle placement has been partially attributed

Table: 5 Association between Demographic and Outcome at the end of study Based on VAS

Characteristics	Outcome		Total	χ ²	P-value
	Poor n=21f (%)	Good n=27f (%)			
Age					0.029 ^{**}
<40	0(0.0)	2(100.0)	2(4.2)		
40-59	11(34.4)	21(65.6)	32(66.6)		
60-79	10(71.4)	4(28.6)	14(29.2)		
Sex					0.093 ^Y
Male	3(21.4)	11(78.6)	14(29.2)		
Female	18(52.9)	16(47.1)	34(70.8)		
Education					0.567 ^F
Primary	9(52.9)	8(47.1)	17(35.4)		
Secondary	9(42.9)	12(57.1)	21(43.8)		
Higher	3(30.0)	7(70.0)	10(20.4)		
Occupation					0.097 ^F
Business	0(0.0)	4(100.0)	4(8.3)		
Civil servant	6(40.0)	9(60.0)	15(31.3)		
housewife	10(66.7)	5(33.3)	15(31.3)		
Lecturing	0(0.0)	2(100.0)	2(4.2)		
Trading	5(41.7)	7(58.3)	12(25.0)		
BMI					0.921
Normal	2(33.3)	4(66.7)	6(12.5)		
Overweight	7(43.8)	9(56.3)	16(33.3)		
Obese	12(46.2)	14(53.8)	26(54.2)		
Systemic Hypertension					>0.999 ^Y
Yes	10(41.7)	14(58.3)	24(50.0)		
No	11(45.8)	13(54.2)	24(50.0)		
Alcohol					0.009 ^{Y*}
Yes	3(16.7)	15(83.3)	18(37.5)		
No	18(60.0)	12(40.0)	30(62.5)		
Smoking					0.322 ^Y
Yes	1(16.7)	5(83.3)	6(12.5)		
No	20(47.6)	22(52.4)	42(87.5)		

Table: 6 Association between Knee examination parameters and Outcome at end of study Based on VAS

Characteristics	Outcome		Total	χ ²	P-value
	poor n=25 f (%)	Good n=23 f (%)			
Joint line tenderness					0.065 ^Y
Present	17(38.6)	27(61.4)	44(91.7)		
Absent	4(100.0)	0(0.0)	4(8.3)		
Joint effusion				0.485	0.486
Present	13(48.1)	14(51.9)	27(56.3)		
Absent	8(38.1)	13(61.9)	21(43.7)		
Medial collateral ligament				2.721	0.099
Lax	12(57.1)	9(42.9)	21(43.8)		
Normal	9(33.9)	18(66.7)	27(56.3)		
Lateral collateral ligament					0.062 ^Y
Present	0(0.0)	6(100.0)	6(12.5)		
Absent	21(50.0)	21(50.0)	42(87.5)		
Radiology					<0.001 ^{P*}
Grade 1	0(0.0)	16(100.0)	16(33.3)		
Grade 2	9(69.2)	4(83.3)	13(32.4)		
Grade 3	0(0.0)	7(100.0)	7(14.6)		
Grade 4	12(100.0)	0(0.0)	12(25.0)		
Range of motion					0.001 [*]
30	7(100.0)	0(0.0)	7(14.6)		
35	0(0.0)	2(100.0)	2(4.2)		
40	5(71.4)	2(28.6)	7(14.6)		
45	4(66.7)	2(33.3)	6(12.5)		
50	5(38.5)	8(61.5)	13(27.1)		
55	0(0.0)	2(100.0)	2(4.2)		
60	0(0.0)	11(100.0)	11(22.9)		

Table: 7 Comparing WOMAC and VAS Score between study groups based on follow-up visit

Follow-up	Study group		U-Test	P-value
	Palpation Median (IQR)	Sonography Median (IQR)		
WOMAC				
Baseline	42.5(38.0-61.0)	40(38.0-60.0)	272.000	0.771
2 weeks	19(12.0-28.5)	18(12.0-28.0)	275.500	0.818
6 weeks	25.5(14.0-30.5)	18(14.0-28.0)	265.000	0.661
3 months	30.0(16.0-41.0)	21.0(16.0-34.0)	256.000	0.533
VAS				
Baseline	8(8-9)	8(8-9)	258.000	0.525
2 weeks	3(2-4)	3(1-3)	268.000	0.698
6 weeks	3(2-5)	3(2-4)	260.000	0.571
3 months	3(5-6)	3(3-5)	223.000	0.168

U= Mann Whitney U; IQR=Interquartile Range

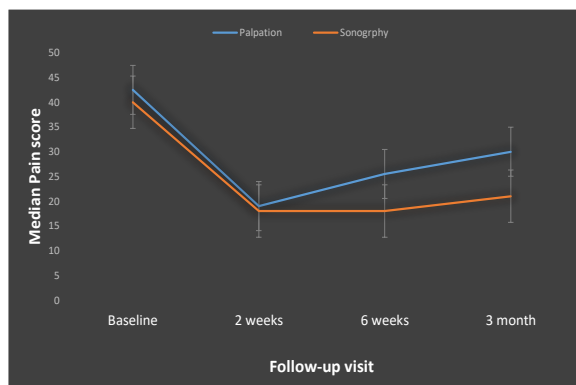


Figure:1 A line graph showing median WOMAC Score at each visit

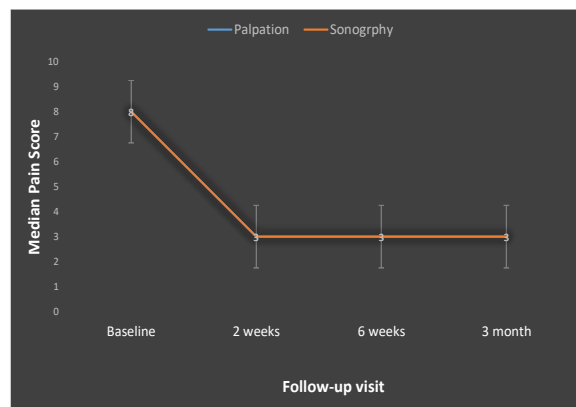


Figure:2A line graph showing median VAS Score at each visit

to variable clinical outcomes¹⁷⁻²⁰ Furthermore, inaccurate corticosteroid injections in the knee, for example, may result in post-injection pain, crystal synovitis, hemarthrosis, joint sepsis, and steroid articular cartilage atrophy, as well as systemic effects, such as fluid retention or exacerbation of hypertension or diabetes mellitus²¹ This study intended to remove the concern of steroid injected into the knee joint not getting into the joint space. The growing

Table: 8 Percent decrease in pain based on study group

%decrease in pain	Study group		U-Test	P-value
	Palpation Median (IQR)	Sonography Median (IQR)		
WOMAC				
2 weeks	59(52.0-67.0)	57(53.0-67.0)	276.000	0.836
6 weeks	53.0(42.0-60.0)	53(52.0-60.0)	279.000	0.884
3 months	46(20.0-52.0)	50.0(25.0-55.0)	241.000	0.351
VAS				
2 weeks	65(56-80)	63(63-86)	260.000	0.585
6 weeks	63(38-71)	63(56-71)	256.000	0.531
3 months	44(25-64)	57(38-67)	217.500	0.149

Table: 9 Comparing Median Percent decrease in pain based on follow-up visits in participants who received intra-articular steroid injections by Palpation

Follow-up visit	%decrease in pain		Wilcoxi n(Z)	P-value
	Median (IQR)	Median (IQR)		
WOMAC				
2 and 6 weeks	59(52.0-67.0)	53.0(42.0-60.0)	-2.890	0.004*
2weeks and 3months	59(52.0-67.0)	46(20.0-52.0)	-4.458	<0.001*
6weeks and 3months	53.0(42.0-60.0)	46(20.0-52.0)	-3.955	<0.001*
VAS				
2 and 6 weeks	65(56-80)	63(38-71)	-3.400	0.001*
2weeks and 3months	65(56-80)	44(25-64)	-4.319	<0.001*
6weeks and 3months	63(38-71)	44(25-64)	-3.376	0.001*

*=Significant

Table: 10 Comparing Median Percent decrease in pain based on follow-up visits in participants who received intra-articular steroid injections by Ultrasound guidance

Follow up Visit	%decrease in pain		Wilcoxi n(Z)	P-value
	Median (IQR)	Median (IQR)		
WOMAC				
2 weeks and 6 weeks	57(53.0-67.0)	53(52.0-60.0)	-2366	0.018*
2weeks and 3months	57(53.0-67.0)	50.0(25.0-55.0)	-2756	
6weeks and 3months	53(52.0-60.0)	50.0(25.0-55.0)	-2.193	
VAS				
2 and 6 weeks	63(63-86)	63(56-71)	-3.400	0.068
2weeks and 3months	63(63-86)	57(38-67)	-2.533	0.011*
6weeks and 3months	63(56-71)	57(38-67)	-1.947	

*=Significant

concern has always been that the large variability seen in the extent and duration is because steroid when injected blindly by palpation technique as normally done in the clinic would be injected into the structures around the synovium, if true, this should account for the variability seen. In this study a cohort group had injection blindly by clinical palpation method while the other group had injection under ultrasound guidance, we found no significant difference in the outcome measures between the two groups, even though WOMAC score in the group that had IASI under sonography had better pain reduction as seen in figure 1^{19,22,23}.

Table: 11 Outcome of intra-articular steroid injections based on study group

Outcome	Study group		Total	χ ²	P-value
	Palpation n=26 f (%)	Sonography n=22 f (%)			
WOMAC					
2 weeks					
Poor	6(23.1)	4(18.2)	10(21.6)	0.953 ^Y	
Good	20(76.9)	18(81.8)	38(78.4)		
6 weeks					
Poor	7(26.9)	4(18.2)	11(22.9)	0.709 ^Y	
Good	19(73.1)	18(81.8)	37(77.1)		
3 months					
Poor	15(57.5)	10(45.5)	25(52.1)	0.715	0.398
Good	11(42.3)	12(54.5)	23(47.9)		
VAS					
2weeks					
Poor	0(0.0)	0(0.0)	0(0.0)		
Good	26(100.0)	22(100.0)	48(100.0)		
6 weeks					
Poor	7(26.9)	2(9.1)	9(18.8)	0.151 ^Y	
Good	19(73.1)	20(90.9)	39(81.3)		
3 months					
Poor	13(50.0)	8(36.4)	21(43.8)	0.900	0.343
Good	13(50.0)	14(63.6)	20(56.3)		

^Y=Yates Correction

CONCLUSION

This study has added evidence to the efficacy of intra articular steroid use at this stage of management in the care of patients with osteoarthritis who are not responding to the use of NSAIDS, especially in our environment. It has also supported the duration of IASI lasting up to 3 months post intraarticular steroid injections. Nonetheless, the factors that would have tailored it's use only showed association with age, range of knee motion, stage of OA using Kellgren and Lawrence radiological grading, and medial collateral ligament laxity which were not significant when subjected to further statistical analysis. We recommend that Intraarticular steroid injection can conveniently be done via the palpation technique in the clinic. A large multicenter study may identify the factors predicting the response to intraarticular steroid use in osteoarthritis.

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