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Original Article

The Additive Value of Musculoskeletal Ultrasound in the Effect of Pes Anserine Injection Among Patients with Osteoarthritis over Clinical Examination

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Abstract:

Background: Osteoarthritis (OA) is the most frequent disease of the musculoskeletal (MSK) system. The knee is one of the most common joint involved in OA. In fact, symptomatic knee OA has been reported in 6-10% of the adult population, and more than 50% among patients over 65 years. Pes anserine bursitis (PAB), inflammation of the bursa beneath the conjoined insertion of the pes anserine muscle group tendons along the proximal medial portion of the tibia, can affect an individual's normal regular daily function as much as intra-articular pain.

Objectives: This study aimed to compare the effects of blind and ultrasound-guided corticosteroid injections on the pes anserine bursa.

Patients and methods: We collected 300 patients with PAB recruited from the outpatient clinic of Sohag University Hospitals. These patients were divided into two groups: Group 1 received MSUS guided PAB injection and group 2 received blind PAB injection depending on clinical landmark assessment.

Results: We found that the improvement was seen in both groups significantly from the first week. However, the improvement was much better among MSUS guided cases compared to the control group. On the other hand, this improvement was much sustained up to 3 months among the MSUS guided group compared to the bling group.

Conclusion: The use of MSUS guided PAB injection is associated with better and more prolonged outcome compared to blind injection depending only on the surface marking of anserine bursa.

Keywords: Pes Anserine; Osteoarthritis; Musculoskeletal Ultrasound.

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Introduction:

Osteoarthritis (OA) is the most frequent disease of the musculoskeletal (MSK) system. The knee is one of the most common joint involved in OA. In fact, symptomatic knee OA has been reported in 6-10% of the adult population, and more than 50% among patients over 65 years. [1, 2]

Pes anserine bursitis (PAB), inflammation of the bursa beneath the conjoined insertion of the pes anserine muscle group tendons along the proximal medial portion of the tibia, can affect an individual's normal regular daily function as much as intra-articular pain. [3]

The study of **Mortada et al.,** [4] showed that the presence of PAB among cases with knee OA were associated with older age, higher BMI, worse pain and functions of the knees, poorer quality of life scores and even more evident synovitis on MSUS examination.

Musculoskeletal ultrasonography (MSUS) can be a routine diagnostic tool for guiding PAB screening and treatment among KOA patients Because of the unique anatomic structures in the medial portion of the knee, it is generally difficult to identify PAB using clinical examination findings alone. Clinical studies have also demonstrated that conservative treatments, such as rest, physiotherapy, and/or steroid injections, can effectively treat PAB. [5]

As PAB appears to exist between the pes anserine tendons and the medial collateral ligament as well as among the tendons of the sartorius, gracilis, and semitendinosus, it is crucial to identify variations in its sonoanatomic position prior to treatment. [6]

Aim of the study:

The aim of this study was to compare the effect of ultrasound-guided versus blind corticosteroid injection in pes anserine bursa.

Methods:

In this study we collected 300 patients with PAB recruited from the outpatient clinic of Sohag University Hospitals.

These patients were divided into two groups: Group 1 (150 patients) received MSUS guided PAB injection and group 2 (150 patients) received blind PAB injection depending on clinical landmark assessment.

A detailed demographic data was collected and each patient was examined clinically. The American College of Rheumatology (ACR) classification criteria for knee osteoarthritis was used to diagnose knee osteoarthritis. [7-9]

All the patients were injected with Betamethasone 1 ml of 6 mg/ml and lidocaine 1% 1 ml. A knee injury and osteoarthritis outcome score (KOOS) and a visual analog scale (VAS) score were used to assess each trial participant. [10], pre-procedure and post-procedure at 1 week, 1 month, and 3 months, to assess pain and the functional improvement using paired t test for intra-group and unpaired t test for inter-group comparison.

The statistical Package of Social Sciences (SPSS) version 25 was used for statistical analysis of the study outcome data.

Inclusion criteria

1. Age more than 50 years
2. Knee OA associated with medial knee pain and tenderness clinically relating to PAB

Exclusion criteria

1. Other associated pathological conditions of knee
2. Uncontrolled DM or hypertention
3. Hypersensitivity to steroids
4. History of any knee surgeries, knee injections or knee physical therapy in the last 12 ws

Results:

The mean age of the current study population was 53.9±4.8 for MSUS guided PAB injection group (group 1) compared to 55.1±7.3 years for the blind PAB injection group (group 2) with non significant difference between the two groups. The majority of the included cases were females (around 74%), and this was matched between the two groups. Also, there were no significant differences between the two groups regarding the socio-economic and educational level distribution of the study groups (table 1).

Regarding the study's findings, we discovered that both groups' VAS scores improved noticeably after the first week. In contrast to the control group, MSUS guided cases showed a much greater improvement. However, compared to the bling group, where the VAS began to increase once more from the first month among the control group, this improvement was significantly maintained for three months among the MSUS led group (table 2).

Regarding the KOOS score, we found that the pain, symptoms and ADL subtotal scores improved significantly in both groups, but these improvements were non significant between the two groups in the first week, and then the improvement continued in the MSUS group with some regression in the blind group, making the difference between the two groups significant at 1 and 3 months. The quality of life subtotal score was similar between the two groups, with no significant difference except after 3 months, were the worsening of the QOL subtotal score among the blind group made this score significantly different compared to the MSUS guided score. Finally, the sport subtotal score and the total KOOS score showed significant differences in favor of the MSUS guided group compared to the bling group from as early as 1 week post PAB injection and this was maintained all over the study duration (table 3).

Table 1. Demographic data of the study groups

Item		**PAB injection**		**Chi square* T test ****	**P value**
		MSUS guided n= 150	**Blind n=150**		
Age		53.88±4.83	55.12±7.28	0.710**	0.481(NS)
Sex	Male	42(28%)	36(24%)	0.104*	0.747(NS)
	Female	108(72%)	114(76%)		
Socio-economic status	Low	48(32%)	54(36%)	0.402*	0.818(NS)
	Moderate	90(60%)	78(52%)		
	High	12(8%)	18 (12%)		
Education level	Illiterate	30(20%)	24(16%)	1.330*	0.722(NS)
	Primary	54(36%)	36(24%)		
	Secondary	36(24%)	48(32%)		
	University	30(20%)	42(28%)		

MSUS, musculoskeletal ultrasound; PAB, pes anserine bursitis; NS, non- significant

Table 2. Comparison between the two study groups

Item		PAB injection		P value
		MSUS the guided	Blind	
VAS	Pre-procedure (0)	6.76±0.78	6.96±0.74	0.355(NS)
	1 week post (1)	2.68±0.99	3.72±1.34	**0.003(S)**
	1 month post (2)	3.72±1.07	4.56±1.09	**0.008(S)**
	3 months post (3)	3.68±1.35	5.36±1.29	**<0.001(HS)**
	P value 0 vs 1	**<0.001(HS)**	**<0.001(HS)**	-
	P value 0 vs 2	**<0.001(HS)**	**<0.001(HS)**	-
	P value 0 vs 3	**<0.001(HS)**	**<0.001(HS)**	-
	P value 1 vs 2	**0.002(S)**	**0.011(S)**	-
	P value 1 vs 3	**0.012(S)**	**0.002(S)**	-
	P value 2 vs 3	0.846(NS)	**0.017(S)**	-
Pain subtotal KOOS score	Pre-procedure (0)	24.67±11.21	29.44±13.49	0.179(NS)
	1 week post (1)	46.11±13.00	39.56±14.48	0.099(NS)
	1 month post (2)	46.12±12.98	36.11±12.58	**0.008(S)**
	3 months post (3)	46.33±13.05	31.67±13.44	**<0.001(HS)**
	P value 0 vs 1	**<0.001(HS)**	**0.001(S)**	-
	P value 0 vs 2	**<0.001(HS)**	**0.002(S)**	-
	P value 0 vs 3	**<0.001(HS)**	0.258(NS)	-
	P value 1 vs 2	1.000(NS)	**0.033(S)**	-
	P value 1 vs 3	0.927(NS)	**0.005(S)**	-
	P value 2 vs 3	0.893(NS)	**0.011(S)**	-
Symptoms subtotal KOOS score	Pre-procedure (0)	30.29±14.22	31.00±14.35	0.860(NS)
	1 week post (1)	55.86±17.22	48.00±14.44	0.087(NS)
	1 month post (2)	51.57±13.83	42.71±15.31	**0.037(S)**
	3 months post (3)	53.71±12.48	38.00±16.43	**<0.001(HS)**
	P value 0 vs 1	**<0.001(HS)**	**<0.001(HS)**	-
	P value 0 vs 2	**<0.001(HS)**	**<0.001(HS)**	-
	P value 0 vs 3	**<0.001(HS)**	**<0.001(HS)**	-
	P value 1 vs 2	0.108(NS)	**<0.001(HS)**	-
	P value 1 vs 3	0.527(NS)	**<0.001(HS)**	-
	P value 2 vs 3	0.323(NS)	**0.017(S)**	-
ADL Function, daily living subtotal KOOS score	Pre-procedure (0)	21.41±6.95	23.12±8.89	0.453(NS)
	1 week post (1)	57.35±13.64	49.29±15.97	0.061(NS)
	1 month post (2)	53.88±12.97	40.65±13.01	**0.001(S)**
	3 months post (3)	52.29±13.04	35.41±12.62	**<0.001(HS)**
	P value 0 vs 1	**<0.001(HS)**	**<0.001(HS)**	-
	P value 0 vs 2	**<0.001(HS)**	**<0.001(HS)**	-
	P value 0 vs 3	**<0.001(HS)**	**<0.001(HS)**	-
	P value 1 vs 2	0.174(NS)	**0.004(S)**	-
	P value 1 vs 3	0.136(NS)	**0.001(S)**	-
	P value 2 vs 3	0.262(NS)	**0.025(S)**	-

VAS; visual analogue scale, KOOS; knee injury and osteoarthritis outcome score, ADL; activity of daily living, S; significant , HS; highly significant

Table 3. Comparison between the two study groups (continued)

Item		PAB injection		P value
		MSUS guided	Blind	
Sport subtotal KOOS score	Pre-procedure (0)	30.20±13.88	31.00±13.84	0.839(NS)
	1 week post (1)	73.20±11.35	58.00±18.20	**0.001(S)**
	1 month post (2)	69.40±13.41	53.20±18.36	**0.001(S)**
	3 months post (3)	65.80±14.84	47.20±20.47	**0.001(S)**
	P value 0 vs 1	**<0.001(HS)**	**<0.001(HS)**	-
	P value 0 vs 2	**<0.001(HS)**	**<0.001(HS)**	-
	P value 0 vs 3	**<0.001(HS)**	**<0.001(HS)**	-
	P value 1 vs 2	0.157(NS)	**0.020(S)**	-
	P value 1 vs 3	**0.025(S)**	**<0.001(HS)**	-
	P value 2 vs 3	0.053(NS)	**0.002(S)**	-
Quality of life subtotal KOOS score	Pre-procedure (0)	37.25±20.45	43.50±17.99	0.257(NS)
	1 week post (1)	72.75±11.25	70.25±11.59	0.442(NS)
	1 month post (2)	71.25±10.67	64.50±13.59	0.057(NS)
	3 months post (3)	67.00±15.04	57.00±15.45	**0.025(S)**
	P value 0 vs 1	**<0.001(HS)**	**<0.001(HS)**	-
	P value 0 vs 2	**<0.001(HS)**	**<0.001(HS)**	-
	P value 0 vs 3	**<0.001(HS)**	**<0.001(HS)**	-
	P value 1 vs 2	0.313(NS)	**0.023(S)**	-
	P value 1 vs 3	0.097(NS)	**<0.001(HS)**	-
	P value 2 vs 3	0.134(NS)	**0.001(S)**	-
Total KOOS score	Pre-procedure (0)	28.76±11.11	31.61±12.16	0.391(NS)
	1 week post (1)	61.05±10.91	53.02±13.17	**0.023(S)**
	1 month post (2)	58.44±8.83	47.44±12.10	**0.001(S)**
	3 months post (3)	57.03±9.11	41.86±12.67	**<0.001(HS)**
	P value 0 vs 1	**<0.001(HS)**	**<0.001(HS)**	-
	P value 0 vs 2	**<0.001(HS)**	**<0.001(HS)**	-
	P value 0 vs 3	**<0.001(HS)**	**<0.001(HS)**	-
	P value 1 vs 2	0.163(NS)	**0.002(S)**	-
	P value 1 vs 3	0.151(NS)	**<0.001(HS)**	-
	P value 2 vs 3	0.337(NS)	**0.001(S)**	-

S; significant , HS; highly significant, NS; non- significant

Discussion:

PAB" or "pes anserinus" (Latin for goose foot) is the word used to describe the shared insertional tendon of the sartorius, gracilis, and semitendinosus muscles on the anteromedial surface of the proximal tibia. These three tendons come together as they get closer to their insertion site to produce a conjoined tendon that resembles a goose's webbed foot anatomically. This tendon attaches along the anteromedial surface of the tibia 5–6 cm inferior to the knee .[11]

The PAB can often be the source of pain and discomfort in patients having knee problems, especially osteoarthritis. [12] According to **Yoon et al.** [13] 83.3% of patients with pes anserine bursitis or tendinitis had radiographic evidence of knee osteoarthritis (OA), and 46.8% of patients with OA had a clinical diagnosis of pes anserine bursitis. Also, **Mortada et al.,** [4] investigated the effects of pes anserine identified by MSUS on pain and function in patients with primary knee OA and came to the conclusion that pes anserine bursitis on ultrasonography is linked to higher knee OA pain and impairment.

The study of **Finnoff et al.,** [14] found that the accuracy of MSUS guided PAB injection reached up to 100%, compared to only an accuracy of 50%

if the injection done based on the clinical surface marking without MSUS guidance. Also, they found that the accuracy rate of US-guided pes anserine bursa injections was found as 92% in cadaveric specimens.

The aim of the current study was to compare the efficacy of ultrasound-guided local steroid injection of PAB compared to blin injection as regards the outcome and duration of improvement in both groups.

The current study included 50 cases, divided into two equal groups, with a mean age of 54-55 years in both of the MSUS guided PAB injection group and the blind PAB injection group with non significant difference between the two groups. The current case population was similar to that of the **Choudhary et al.** [11] study, where the mean age was 58 years for PAB group and 54 years for the blond group, with no significant difference. Our cases were younger than those of the **Lee et al.** [15] study, where the mean age of their cases was over 64 years.

The majority of the included cases were females (around 74%), and this was matched between the two groups. This female predominance was seen also in the study of **Choudhary et al.** [11] where 76% and 70% of the MSUS guided and blind cases were females; respectively. In the study of **Lee et al.** [15] female predominance was much more obvious, reaching up to 90% of their cases.

The current study showed that more than half of the cases were in the moderate socioeconomic level, and around 35% were in the low socioeconomic level, with only around 10% were high socioeconomically. Regarding the education level, more than half of the cases had at least secondary (28%) or university (24%) education level. Illiterate cases accounted for only 18% of the cases. There were no significant differences between the two groups regarding the socio-economic and educational level distribution of the study groups.

According to the current study findings, both groups' VAS scores improved noticeably after the first week. But when compared to the control group, the improvement was significantly greater in MSUS-guided instances. In contrast, the MSUS led group's recovery lasted for three months, while the bling group's VAS began to increase once more after the first month in the control group. The study of **Choudhary et al.** [11] found that the MSUS guided PAB injection group showed a significantly higher improvement of VAS compared to the blind injection group and this was maintained for up to 3 months after the intervention. In the study of **Lee et al.** [15], VAS improvement was much more evident among MSUS guided injection cases compared to the blind cases; however, they completed their follow up for only 4 weeks rather than 3 months.

In terms of the KOOS score, we discovered that both groups' pain, symptoms, and ADL subtotal scores significantly improved. However, these improvements were not statistically significant during the first week. After that, the MSUS group's improvement continued, with some regression in the blind group. At one and three months, the difference between the two groups was significant. The two groups' quality of life subtotal scores were comparable, with the exception of three months, when the blind group's declining QOL subtotal score caused this score to deviate significantly from the MSUS guided score. Lastly, from as early as one week after the PAB injection, the MSUS guided group outperformed the bling group in both the sport subtotal score and the total KOOS score, and this difference persisted throughout the study.

The study of **Choudhary et al.** [11] found that the MSUS guided PAB injection group showed a significantly higher improvement of KOOS score compared to the blind injection group and this was maintained for up to 3 months after the intervention.

Conclusion:

The current study showed that the use of MSUS guided PAB injection is associated with better and more prolonged outcome compared to blind injection depending only on the surface marking of anserine bursa

References:

1. **Felson DT, Zhang Y.An update on the epidemiology of knee and hip osteoarthritis with a view to prevention Arthritis Rheum 1998 .41(8):1343-55.**

2. **Naredo E, Cabero F, Palop MJ, Collado P, Cruz A, Crespo M.** Ultrasonographic findings in knee osteoarthritis: a comparative study with clinical and radiographic assessment Osteoarthritis Cartilage **2005** .13(7):568-74.

3. **Wood LR, Peat G, Thomas E, Duncan R.** The contribution of selected non-articular conditions to knee pain severity and associated disability in older adults Osteoarthritis Cartilage **2008** .16(6):647-53.

4. **Mortada M, Amer YA, Zaghlol RS.** Impact of ultrasonography-detected pes anserine bursitis on pain and function in patients with primary knee osteoarthritis Indian Journal of Rheumatology **2020** .15(2):73-8.

5. **Sarifakioglu B, Afsar SI, Yalbuzdag SA, Ustaomer K, Bayramoglu M.** Comparison of the efficacy of physical therapy and corticosteroid injection in the treatment of pes anserine tendino-bursitis J Phys Ther Sci **2016** .28(7):1993-7.

6. **Lee JH, Kim KJ, Jeong YG, Lee NS, Han SY, Lee CG, Kim KY, Han SH.** Pes anserinus and anserine bursa: anatomical study Anat Cell Biol **2014** .47(2):127-31.

7. **Salehi-Abari I.**2016 ACR revised criteria for early diagnosis of knee osteoarthritis Autoimmune Dis Ther Approaches **2016** .3(1):118.

8. **Peat G, Thomas E, Duncan R, Wood L, Hay E, Croft P.** Clinical classification criteria for knee osteoarthritis: performance in the general population and primary care Annals of the rheumatic diseases **2006** .65(10):1363-7.

9. **Altman R, Asch E, Bloch D, Bole G, Borenstein D, Brandt K, Christy W, Cooke TD, Greenwald R, Hochberg M.** Development of criteria for the classification and reporting of osteoarthritis: classification of osteoarthritis of the knee Arthritis & Rheumatism: Official Journal of the American College of Rheumatology **1986** .29(8):1039-49.

10. **Roos EM, Lohmander LS.** The Knee injury and Osteoarthritis Outcome Score (KOOS): from joint injury to osteoarthritis Health and quality of life outcomes **2003** .1(1):1-8.

11. **Choudhary M, Gupta S, Gaur AK.** Effect of ultrasound-guided pes anserine bursa injection on knee scores: A comparative study Journal of Orthopaedics and Spine **2022** .10(1):24.

12. **Clapp A, Trecek J, Joyce M, Sundaram M..** Pes anserine bursitis Orthopedics **2008** .31(4):306, 407-8.

13. **Yoon HS, Kim SE, Suh YR, Seo Y-I, Kim HA.** Correlation between ultrasonographic findings and the response to corticosteroid injection in pes anserinus tendinobursitis syndrome in knee osteoarthritis patients Journal of Korean medical science **2005** .20(1):109-12.

14. **Finnoff JT, Nutz DJ, Henning PT, Hollman JH, Smith J.** Accuracy of ultrasound-guided versus unguided pes anserinus bursa injections PM R**2010**. .2(8):732-9.

15. **Lee JH, Lee JU, Yoo SW.** Accuracy and efficacy of ultrasound-guided pes anserinus bursa injection J Clin Ultrasound. **2019** 47(2):77-82.