

Article

Comparison between Oral NSAIDs and Local Steroid Injection for Treatment of Frozen Shoulder in Diabetic Patients

Dr. Hayyan Fadhil Abbas¹, Dr. Ragi Mahssen Oada², Abbas AbdulWahhab Jumaah Al-Salihi³

- 1 M.B.Ch.B., D.A. & I.C.U. (Anesthesia and Intensive Care), Iraqi Ministry of Health, Thi-Qar Health Directorate, Al Hussein Hospital, Thi-Qar, Iraq.
- 2 M.B.Ch.B., D.O.S. \ (Orthopedic Surgeon), Iraqi Ministry of Health, Thi-Qar Health Directorate, Al Hussein Hospital, Thi-Qar, Iraq; rajialyassiri@gmail.com
- 3 Department of Applied Embryology, High Institute for Infertility Diagnosis and Assisted Reproductive Technologies, Nahrain University, Kadhimiya, Baghdad, Iraq; Abbasabdulwahab@ierit.nahrainuniv.edu.iq

* Correspondence: rajialyassiri@gmail.com

Abstract: Background: Frozen shoulder is a common musculoskeletal disease which develops during the soft tissues of the glenohumeral joint are affected, resulting in pain and restricted movement in the shoulder. **Objective:** This study was focused on conducting and analyzing clinical outcomes associated with the comparison between oral NSAIDs and local steroid injections for the treatment of frozen shoulder in diabetic patients. **Patients and methods:** We conducted a cross-sectional study of diabetic patients suffering from frozen shoulder, which included 80 patients who were collected from different hospitals in Iraq for a period from March 7, 2022, to October 17, 2023. We included two groups. Where the first group showed diabetes patients who had taken oral NSAIDs, represented by naproxen with 500 mg twice a day, while the second group showed diabetes patients who had taken steroids, represented by the drug triamcinolone, which included one injection of 40 mg. The clinical outcomes of the pain score were assessed by the VAS and SPADI scales. **Results:** In the group of patients subjected to nonsteroidal anti-inflammatory drugs (naproxen) during four months, it was recorded that the extent of flexion in the first month was mean (104.23) and SD (13.67), in the fourth month it was mean (165.52) and SD (17.84), and the extent of Abduction (degree) In the first month, the mean and SD were (21.86), in the fourth month, the mean and SD were (23.54), the average pain in the first month was 5.46 ± 2.63 and the fourth month was 2.01 ± 1.92 , while in the group of patients subjected to steroidal anti-inflammatory drugs (Naproxen) during four months, the extent of flexion in the first month was mean (105.46) and SD (20.03), in the fourth month it was mean (168.84) and SD (23.64), the extent of Abduction (degree) in the first month was mean (92.42) and SD (22.1), in the fourth month the mean (175.4) and SD (24.62), the average pain for patients (triamcinolone) in the first month was 5.87 ± 2.14 and in the fourth month it was 2.23 ± 1.93 . **Conclusion:** Both oral NSAIDs and local steroid injections are beneficial in relieving frozen shoulder mobility in diabetic individuals.

Citation: Abbas H. F., Oada R. M., Al-Salihi A. A. J. Comparison between Oral NSAIDs and Local Steroid Injection for Treatment of Frozen Shoulder in Diabetic Patients. Procedia of Engineering and Medical Sciences 2024, 9, 1-9.

Received: 7th Jan 2024
Revised: 9th Jan 2024
Accepted: 18th Jan 2024
Published: 20th Feb 2024



Copyright: © 2024 by the authors. Submitted for possible open access publication under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

Keywords: Patients with frozen shoulder; Naproxen; Triamcinolone; Risk factors; and Diabetic

1. Introduction

Frozen shoulder is considered as a frequently who see musculoskeletal condition in outpatient settings where it arises from soft tissue involvement in the glenohumeral joint [1]. It is particularly basic among men who are over the age of 40 where most widely clinical manifestations are pain and limited range of motion within both active and passive shoulder movements and functions. [2]

Shoulder joint pain and stiffness can occur through a period that ranges from a few months up to a year [3,4]. Frozen shoulder can be idiopathic or caused by different predisposing factors in terms of diabetes, inactivity, prior shoulder disorders, cervical spondylitis, coronary artery illnesses, pulmonary tuberculosis, persistent obstructive pulmonary disease (COPD), bronchial carcinoma, hyperthyroidism, hemiplegia, brain tumours, epilepsy, and Parkinson's disease. [5 – 8]

The diagnosis was determined through evaluation of the medical history with patients that, along with assessing the existence of discomfort and limited range of motion [9]. Besides to that, a physical test was found out to assess the patient's ability to move their joints actively and passively, noting any restrictions in movement in all directions [10]. A conclusive diagnosis is conducted through arthrography, a procedure in which a radiopaque fluid of less than 15 mL is injected into the joint [11]. The symptoms can enhance spontaneously in the majority of patients after a period of 1-3 years [12]. However, there might still be some degree of limitation in joint mobility. [13]

In the general population, a frozen shoulder is seen in around 2% of individuals. However, in diabetes patients, the frequency rises significantly to 10–20% [14]. The prevalence is directly correlated with the length of time a person has had diabetes [15]. In diabetic individuals, the average age of capsulitis is lower compared to the general population [16]. Additionally, the duration of the condition tends to be longer. Therefore, the response to therapy is less effective. Diabetics are more likely to have participation on both sides. [17]

Frozen shoulder often occurs in individuals aged 40 to 60 years. The sickness will start inconspicuously and progress through three distinct phases: The first stage is referred to as the 'Painful Phase' and is characterised by discomfort and limited mobility. The duration of this period is between 2 to 9 months [18]. The second stage is referred to as the 'Freezing (Adhesive) Phase' and typically spans a duration of 3–9 months. In the second phase, fibrosis develops, and discomfort diminishes, but the range of motion further decreases [19]. The third phase is referred to as the 'Throwing (Resolution) Phase,' during which the discomfort diminishes, and the lost range of motion is restored. The duration of this period is around 12 to 18 months. [20, 21, 22]

2. Patients and Methods

We conducted a cross-sectional study of diabetic patients suffering from frozen shoulder, which included 80 patients who were collected from different hospitals in Iraq for a period from March 7, 2022, to October 17, 2023. Clinical data, including age, sex, body mass index, comorbidities, ASA, smoking status, biochemical rates, education status, education level, employment status, and income level, were recorded for patients

participating in this study. This study excluded patients who suffer from severe concomitant diseases, suffer from more than five months of illness, have chronic diseases such as stroke, or have digestive system problems.

Our data recorded the results of examinations or diagnoses for both groups, one of which was oral NSAIDs, represented by naproxen as an anti-inflammatory drug, by which 500 mg of naproxen was given twice a day, which was used for patients, while the second group included diabetic patients who were given the anti-inflammatory drug who given steroids, represented by the drug triamcinolone, which included one injection of 40 mg. According to the results of pain scores by VAS, pain scores were measured by VAS, which ranged from 0 to 10, between no pain and severe pain.

The range of motion and function of the shoulder was evaluated during the three sessions, which included all flexion, abduction, and external rotation, using a goniometer by determining the ability of the patient to move their hands backwards, starting from the highest point until reaching the bottom of their shoulder with a range between (0 - 4) to a maximum range of 180 degrees in abduction and flexion.

3. Results

Characteristics	Number of patients [80]	Percentage [%]
Age (years)		
40 – 44.5	12	15%
45 – 49.5	16	20%
50 – 55.5	24	30%
56 – 60	28	35%
Sex		
Male	60	75%
Female	20	25%
BMI, [kg/m²]		
30.5 – 33.0	12	15.0%
33.5 - 36	20	25.0%
> 36	48	60.0%
Comorbidities		
Hypertension		
Yes	64	80%
No	16	20%
Nephropathy		
Yes	60	75%
No	20	25%
Obesity		
Yes	56	70%

No	24	30%
ASA, (%)		
I	10	12.50%
II	28	35.0%
III	20	25.0%
IV	22	27.50%
Smoking status		
Yes	48	60.0%
No	32	40.0%
FBG (mg/dL)		189.68 ± 27.80
PPBG mg/dL		284.89 ± 34.22
HbA1c %		8.67 ± 1.24
Education status		
Elementary	12	15.0%
Secondary	23	28.75%
College/University	45	56.25%
Employment status		
Employed	34	42.5%
Non – employeds	46	57.5%
Income status\$		
600 – 800	51	63.75%
801 – 1000	20	25.0%
> 1000	9	11.25%

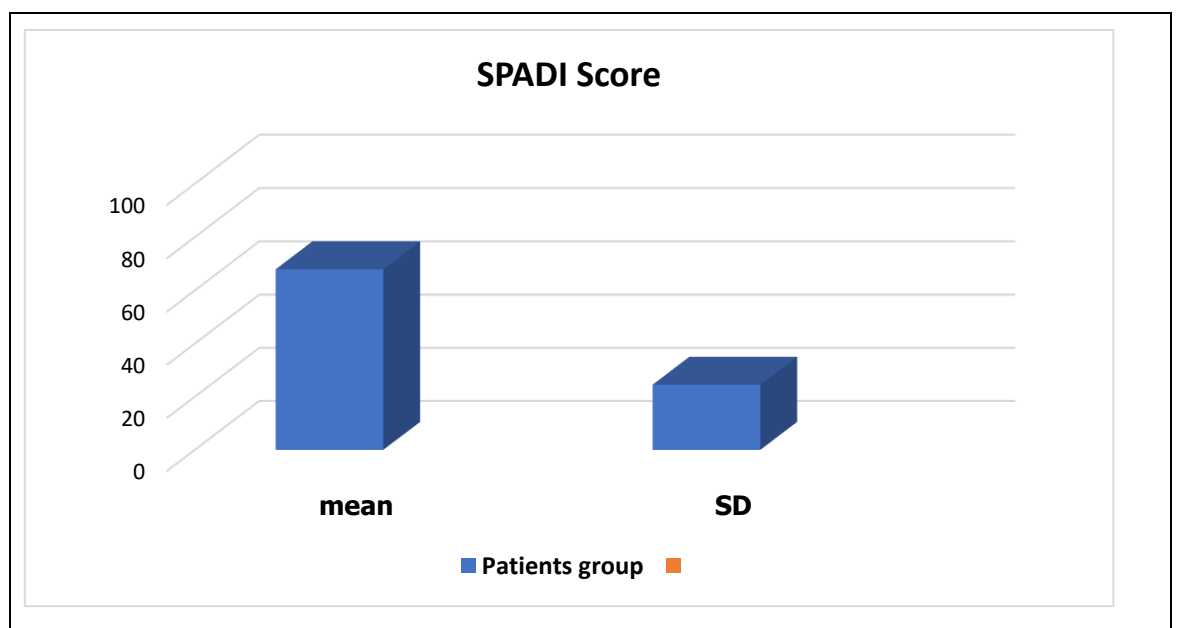


Figure 1. Determine shoulder pain and disability by SPADI Scores.

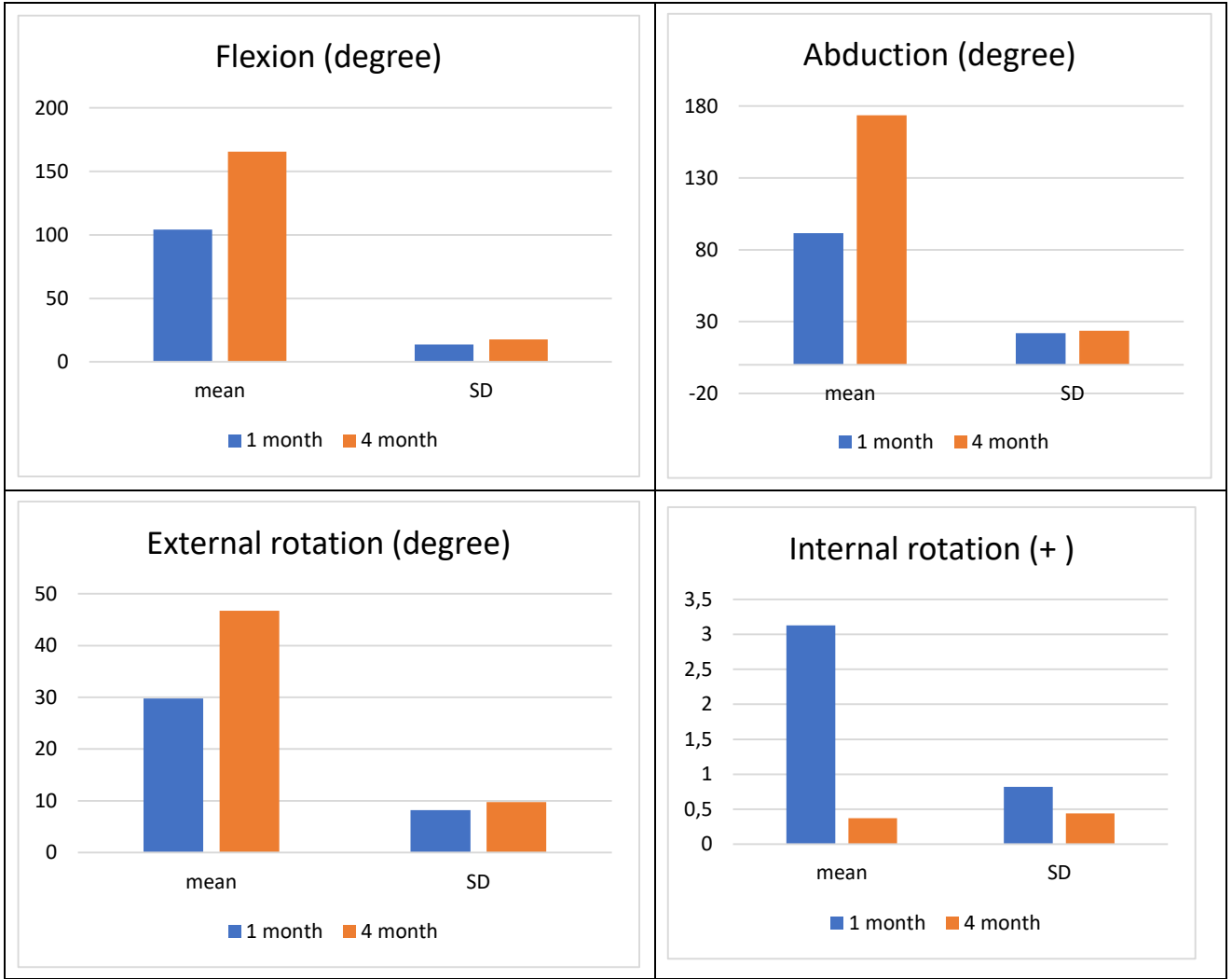
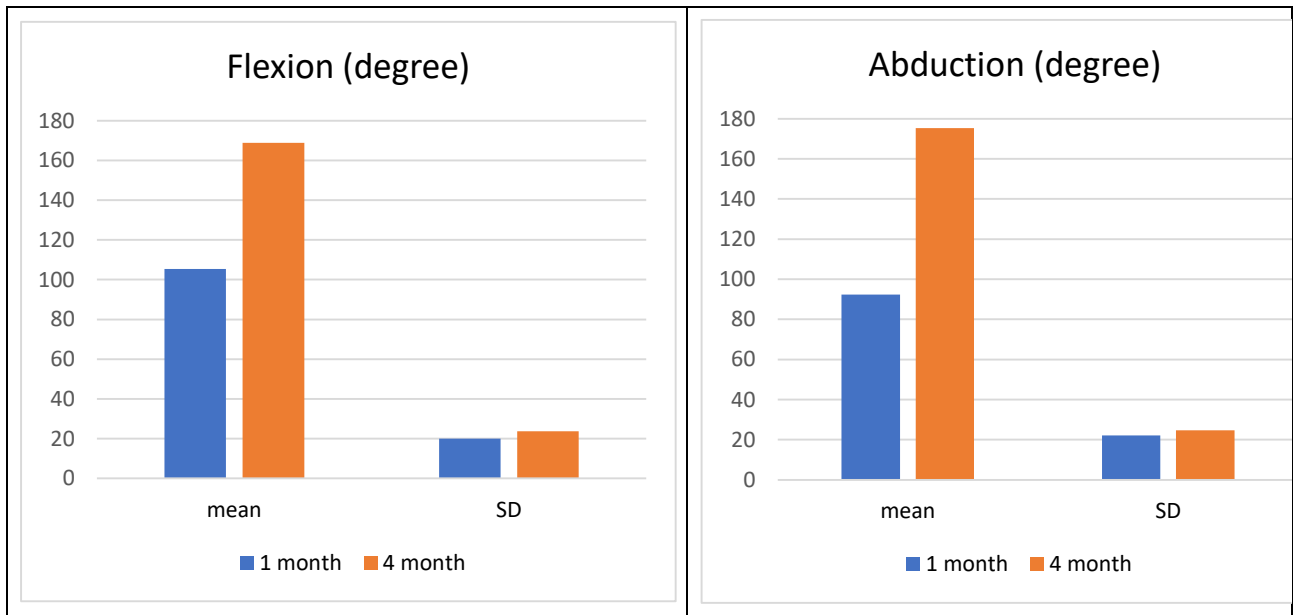


Figure 2. Determine secondary outcomes of diabetes patients who underwent to naproxen.



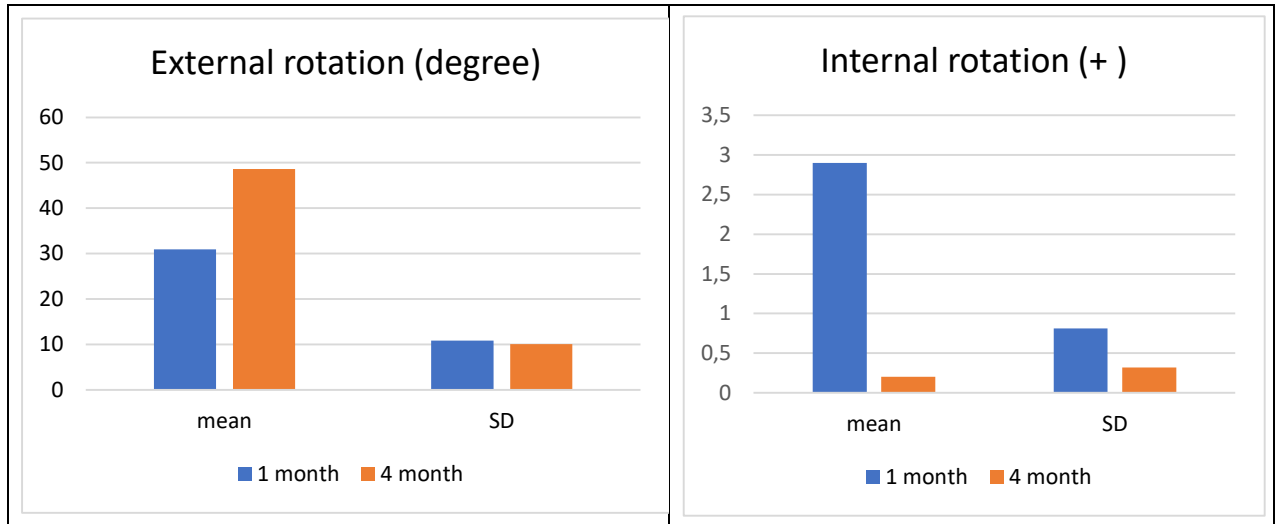


Figure 3. Determine secondary outcomes of diabetes patients who underwent to triamcinolone

Table 2. Assessment pain scores for one month and four months.

Groups	One month	Four months	P -value
Naproxen group	5.46 ± 2.63	2.01 ± 1.92	< 0.001
triamcinolone group	5.87 ± 2.14	2.23 ± 1.93	< 0.001

Risk factors	[OR 95% CI]	P - value
Age	2.79 [0.5 – 4.82]	0.0357
Male	5.67 [1.194 – 6.732]	0.0228
Female	3.85 [1.64 – 6.54]	0.0318
Smokers	2.874 [0.673 – 4.890]	0.0251
FBG (mg/dL)	1.864 [0.420 – 5.430]	0.00350
PPBG mg/dL	2.86 [0.26 – 8.89]	0.00459
HbA1c %	3.457 [1.054 – 7.754]	0.00156
Flexion	2.02 [0.8 – 4.68]	0.0472
Abduction	3.015 [1.203 – 5.701]	0.0424
Hypertension	3.207 [0.896 – 6.870]	0.0025
Nephropathy	2.806 [0.921 – 4.648]	0.0356
Obesity	3.011 [2.865 – 6.896]	0.0417

4. Discussion

Our clinical results were recorded on diabetic patients suffering from frozen shoulder, which included 80 patients who underwent treatment with steroidal and non-steroidal anti-inflammatory drugs. Our results showed in patients in the age group (56 - 60) years, which included 28 patients, (50 - 55.5) years, which included 24 patients, (45 - 49.5) years, which included 16 patients, and (40 - 44.5) years, which included 12 patients. Males were 60, and females were 20 patients. Body mass index rates were recorded, which included (30.5 - 33.0), which included 12 patients (33.5 - 36), which included 20 patients; > 36, which included 48 patients. The most prominent comorbidities were also recorded, which included all of high blood pressure, which were 64. Case, nephropathy was 60 cases, obesity was 56 cases, ASA II was 28 patients, smoking patients were 48 cases and non-smokers were 32 cases, and biochemical results included FBG (mg/dL) was 189.68 ± 27.80 , PPBG mg/dL was 284.89 ± 34.22 , and HbA1c% was 8.67 ± 1.24 , as 56.25% of the patients were from the university or college, as well as the percentage of employed patients was 42.5%, and non-employed patients was 57.5%, the highest income level was (600 - 800) \$.

In the group of patients subjected to nonsteroidal anti-inflammatory drugs (naproxen) during four months, it was recorded that the extent of flexion in the first month was mean (104.23) and SD (13.67), in the fourth month, it was mean (165.52) and SD (17.84), and the extent of Abduction (degree) in the first month it was mean (91.46) and SD (21.86), in the fourth month it was mean (173.65) and SD (23.54), external rotation (degrees) in the first month was mean (29.78) and SD (8.2), in the fourth month the external rotation was recorded (score) were mean (46.73) and SD (9.76).

In the group of patients subjected to steroidal anti-inflammatory drugs (triamcinolone) during four months, it was recorded that the extent of flexion in the first month was mean (105.46) and SD (20.03), in the fourth month, it was mean (168.84) and SD (23.64), and the extent of Abduction (degree) In the first month it was mean (92.42) and SD (22.1), in the fourth month it was mean (175.4) and SD (24.62), external rotation (degrees) in the first month was mean (30.92) and SD (10.85), in the fourth month the external rotation were mean (48.65) and SD (10.08).

Pain rates were recorded for patients for both groups. It was found that the pain rate for patients on non-steroidal anti-inflammatory drugs (naproxen) in the first month was 5.46 ± 2.63 , and in the fourth month, it was 2.01 ± 1.92 , while the pain rate for patients on non-steroidal anti-inflammatory drugs (triamcinolone) in the first month was 5.87 ± 2.14 . and the fourth month, it was 2.23 ± 1.93 .

5. Conclusion

Although both techniques, oral NSAIDs and local steroid injections, are effective treatments in improving frozen shoulder mobility in diabetic patients. However, our results indicated the strong effectiveness of triamcinolone in reducing the rate of frozen shoulder pain compared to naproxen as a non-steroidal anti-inflammatory drug after four months, which enhances the improvement of range of motion and shoulder function as well as the level of disability in patients with diabetes.

References

1. Pai, L.-W.; Li, S.-F.; Chen, L.-L.; Liu, H.-L.; Hung, C.-T.; Chung, Y.-C. Musculoskeletal pain in people with and without type 2 diabetes in Taiwan: A population-based, retrospective cohort study. *BMC Musculoskelet. Discord.* 2015, 16, 364.
2. Laslett, L.L.; Burnet, S.P.; Jones, J.; Redmond, C.L.; McNeil, J.D. Musculoskeletal morbidity: The growing burden of shoulder pain and disability and poor quality of life in diabetic outpatients. *Clin. Exp. Rheumatol.* 2007, 25, 422–429
3. Le, H.V.; Lee, S.J.; Nazarian, A.; Rodriguez, E.K. Adhesive capsulitis of the shoulder: Review of pathophysiology and current clinical treatments. *Shoulder Elb.* 2017, 9, 75–84.
4. Kumar, N.; Baliwan, V.; Sen, S.; Badoni, N.; Khatri, N. Prevalence and management of the diabetic frozen shoulder. *Int. J. Adv. Res.* 2020, 8, 944–954.
5. Hsiao, C.-C.; Huang, W.-H.; Cheng, K.-H.; Lee, C.-T. Low-Energy Extracorporeal Shock Wave Therapy Ameliorates Kidney Function in Diabetic Nephropathy. *Oxid. Med. Cell. Longev.* 2019, 2019, 1–12.
6. Ryans I, Montgomery A, Galway R, et al. Randomized Controlled Trial of Intra-Articular Triamcinolone and/or Physiotherapy in Shoulder Capsulitis. *Rheumatology (OXFORD)* 2005; 44: 522 – 535
7. Sharma S. Management of frozen shoulder – conservative vs surgical? *Ann R Coll Surg Engl* Jul 2011; 93: 343 – 344 discussion 345–346
8. Arslan S, Celiker R. Comparison of the Efficiency of Local Corticosteroid Injection and Physical Therapy for the Treatment of Adhesive Capsulitis. *Rheumatol Int* 2001; 21: 20 – 23
9. Buchbinder R, Hoving JL, Green S et al. Short course prednisolone for adhesive capsulitis (frozen shoulder or stiff, painful shoulder): a randomised, double-blind, placebo-controlled trial. *Ann Rheum Dis* 2004; 63: 1460 – 1469
10. Russell J. Shoulder Adhesive Capsulitis: Systematic Review of Randomized Trials Using Multiple Corticosteroid Injections. *British Journal of General Practice* 2007; 57: 662 – 667
11. Isar Ahmad, Zahid Askar. Intra-articular injection of Methylprednisolone for Idiopathic frozen shoulder. *J Med Sci (Pishawar print)* 2009; 17: 16 – 18
12. Roh YH, Yi SR, Noh JH et al. Intra-articular corticosteroid injection in diabetic patients with adhesive capsulitis: a randomized controlled trial. *Knee Surg Sports Traumatol Arthrosc* Nov 24, 2011.
13. Smith F. American College of Rheumatology Intra-Articular Corticosteroids, Supervised Physiotherapy, Adhesive Capsulitis of the Shoulder. *Arthritis & Rheumatism* 2005; 48: 829 – 838
14. Widiastuti-Samekto M, Sianturi GP. Comparison of oral Route corticosteroid and intra-articular corticosteroid injection. *Med J Malaysia* 2004; 59: 312 – 316
15. Sakeni RA, Al-Nimer MS. Comparison between intraarticular triamcinolone acetonide and methylprednisolone acetate injections in the treatment of the frozen shoulder. *Saudi Med J* 2007; 28: 707 – 712
16. Arroll B, Goodyear-Smith F. Corticosteroid Injections of Painful Shoulder: A Meta-Analysis. *Br J Gen Pract* 2005; 55: 224 – 228
17. Maund E, Craig D, Suekarran S et al. Management of frozen shoulder: a systematic review and cost-effectiveness analysis. *Health Technol Assess* 2012; 16: 1 – 264
18. Laslett, L.L.; Burnet, S.P.; Jones, J.; Redmond, C.L.; McNeil, J.D. Musculoskeletal morbidity: The growing burden of shoulder pain and disability and poor quality of life in diabetic outpatients. *Clin. Exp. Rheumatol.* 2007, 25, 422–429.

19. Lorbach, O.; Anagnostakos, K.; Scherf, C.; Seil, R.; Kohn, D.; Pape, D. Nonoperative management of adhesive capsulitis of the shoulder: Oral cortisone application versus intra-articular cortisone injections. *J. Shoulder Elb. Surg.* 2010, 19, 172–179.
20. Jainandn, K.; Sharma, K. The effectiveness of physiotherapeutic interventions in the treatment of frozen shoulder/adhesive capsulitis: A systematic review. *J. Back Musculoskelet. Rehabil.* 2014, 27, 247–273.
21. Ismael, K. I., Al-Salihi, A. A. J., AL-Saadi, R. R., & Saeed, B. T. Isolation of Hemolysin-Producing Bacteria That Cause Infection in Patients with Urinary Tract Infections by Molecular Detection. *Journal of Pharmaceutical Negative Results.* 2022, 13 (3), pp.
22. Alfalluji, W. L., Radhi, A. K., Al-Salihi, A. A. J. Evaluation of the clinical conditions of patients with therapeutic cardiac angiography and In-stent restenosis risk factors for in cancer patients. *Onkologia i Radioterapia.* 2023, 17 (10), pp. 1–6.