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Intra Articular Corticosteroid Injection in Rheumatoid Arthritis Patients

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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Original Research Article

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ABSTRACT

Objectives: This study was done to assess the effect of intra-articular injection of corticosteroid in persistent synovitis in rheumatoid arthritis (RA) patients.
Methods: Thirty RA patients with persistent synovitis in one joint were subjected to intra-articular injection of corticosteroid. All patients were examined for disease activity by disease activity score 28 (DAS28), functional assessment using the Modified Health Assessment Questionnaire (MHAQ), and laboratory investigations (erythrocyte sedimentation rate and C-reactive protein). Affected joints were evaluated for pain by visual analog scale (VAS) and tenderness score. Follow-up of the patients was done at 2 months after injection by clinical, functional and laboratory.
Results: There was a significant improvement in VAS, tenderness score, DAS 28, MHAQ after 2 months of injection.
Conclusion: Intra-articular injection of corticosteroid is a safe and effective treatment option in persistent synovitis in rheumatoid arthritis patients.

Keywords: Glucocorticoids; arthritis; rheumatoid; injections; intra-articular; synovitis.

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1. INTRODUCTION

"Rheumatoid arthritis (RA) is a chronic systemic inflammatory disorder which is characterized by synovial inflammation and joint destruction, as well as extraarticular manifestations" [1]. "Cytokines have a central role in the pathogenesis of this synovial inflammation. Tumor necrosis factor a (TNFa) is one of the dominant cytokines. Many studies have shown that TNFa is present in biologically significant amounts in RA synovial tissue and fluids, and the amount seems to parallel the extent of inflammation and bone erosion" [2,3]. "RA is the rheumatic condition that most severely affects the joints. *Pannus*, the hyper-trophic and hyperplasic synovial membrane formed, is an aggressive tissue that damages articular and periarticular structures, whether through the release of metalo-proteinases or its mechanical invasion of the surrounding joint space" [4-6]. "Even though RA treatment has evolved in recent decades with the advent of immunobiological therapy allied with disease-modifying antirheumatic drugs (DMARDs), [7] patients with mono or oligoarticular synovitis may persist". "In these cases, intra articular corticosteroid injection can be a useful therapeutic tool. It is known that triamcinolone acetonide (TH) is the drug of choice for intra-articular treatment of RA, given its synovial atrophying properties and slow absorption from the injection site" [8-14]. "On the other hand, if injected outside of the joint, it can cause serious adverse local effects" [15].

"Glucocorticoid therapy may be recommended due to its economic effectiveness; however, the option of glucocorticoid administration via intra-articular injection (IAI) is not recommended in the latest EULAR guidelines" [16]. "In the setting of real clinical practice, IAI of a glucocorticoid is often used, with clinical experience indicating that IAI provides comparable, or sometimes better, effectiveness than oral glucocorticoids. A considerable number of articles suggest that the addition of glucocorticoid via IAIs to RA treatment results in better clinical outcomes" [13,17-21].

2. PATIENTS AND METHOD

2.1 Enrollment of the Patients

This study was done on 30 RA patients collected from outpatient clinic of Tanta University Hospital diagnosed according to the latest diagnostic criteria of RA [22]. The patients included in this study complained of persistent activity in one joint despite their adherence to treatment. Written informed consent from all the patients was obtained and all our patients were subjected to IAI of 40 mg triamcinolone acetonide. Excluded from this study any patients with bleeding tendencies, systemic flare, received IAI of glucocorticoid in the same joint in the last 3 months.

2.2 Clinical Assessment

All the patients were subjected to thorough history taking, joint examination, assessment of disease activity using score of disease activity (DAS28), functional assessment by Modified Health Assessment Questionnaire (MHAQ), The degree of tenderness of the injected joint was assessed on a score (0–3). The degree of pain was evaluated by using the visual analog scale (VAS) for pain in the affected joints measured using a ten cm horizontal scale with 10 degrees.

2.3 Laboratory Tests

All the patients were assessed by complete blood count (CBC), erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP).

2.4 Intra Articular Injection

All the patients received one intra articular injection of 40 mg triamcinolone acetonide in the affected joint. Before injection the skin was washed by betadine, after injection the site of injection was covered with strip and patient was advised to complete bed rest for 24-48 after injection. Follow up of the patients was done at 2 months after injection by assessment clinically and by laboratory tests.

2.5 Statistical Analysis of the Data

Data were collected and analyzed using IBM SPSS software package version 20.0. (Armonk, NY: IBM Corp). Qualitative data were described using the number and percent. Quantitative data were described using the mean and standard error of the mean. The probability value (*p*-value) ≤ 0.05 was considered statistically significant.

3. RESULTS

Clinical characteristics of the patients were demonstrated in Table (1). There was female predominance in our patients as 29 patients out of 30 were females. The mean age of our patients was 42.33 years old. The mean duration of illness was 10.33 years.

Distribution of injected joints was demonstrated in Table (2) and the wrist joint was the most

injected one (18 out of 30 patients). Clinical assessment of injected joint was done in the form of VAS and tenderness score was illustrated in Table (3). The mean score of VAS was 6.57 while that of tenderness score was 2.57.

On comparing before and 2 months after injection, there was significant improvement in DAS28, VAS and tenderness score as shown in Table (4), there was also significant improvement in values of ESR and CRP. Table (4)

Table 1. Clinical and laboratory parameters of the patients before start of injection

Parameter	Patients (n=30)	
Age (years)		
Range	30-63	
Mean± SD	42.33± 10.08	
Sex	No.	%
Female	29	96.67
Male	1	3.33
Duration of illness (years)		
Range	3-25	
Mean ± SD	10.33±7.217	
Median	8	
Interquartile range	4	
MHAQ		
Range	0.25-1.25	
Mean ± SD	0.63±0.28	
DAS28		
Range	2.73-4.6	
Mean ± SD	3.6±0.62	
CRP (mg/l)		
Range	4-24	
Mean ± SD	9.53± 4.29	
ESR 1st h(mm/h)		
Range	10-38	
Mean ± SD	21.27±8.85	

MHAQ: Modified Health Assessment Questionnaire, DAS28: Disease Activity Score 28, CRP: C Reactive Protein, ESR: Erythrocyte Sedimentation Rate

Table 2. Distribution of injected joints

Joint	Patients (n=30)	
	No	**%**
Wrist	18	60
Ankle	5	16.67
Elbow	7	23.33

Table 3. Clinical characteristics of affected joints before injection

Parameter	Patients (n=30)
VAS	
Range	4 - 8
Mean ± SD	6.57±1.1
Tenderness score	
Range	2 - 3
Mean ± SD	2.57±0.504

VAS: Visual Analogue Scale

Table 4. Comparison between clinical, laboratory and clinical characteristics of affected joint before and 2 months after injection

	Before treatment	2 months
	Patients (n=30)	
VAS		
Range	4 – 8	2 - 5

	Before treatment	2 months
Mean± SD	6.57±1.1	3.1 ±0.885
P		<0.001*
Tenderness score		
Range	2 – 3	1-2
Mean± SD	2.77± 0.43	1.57±0.5
P		<0.001*
MHAQ		
Range	0.25-1.25	0.25-1
Mean± SD	0.63±0.28	0.550±0.234
P		0.007
DAS28		
Range	2.73-4.6	2.3-4.1
Mean± SD	3.6±0.62	3.065±0.495
P		<0.001*
ESR 1st h(mm/h)		
Range	10 – 38	8-30
Mean± SD	21.27±8.85	17.67±5.886
P		0.024*
CRP (mg/dl)		
Range	4 -24	3 – 12
Mean± SD	9.53± 4.29	6.97±2.512
P		0.004*

VAS: Visual Analogue Scale, MHAQ: Modified Health Assessment Questionnaire, DAS28: Disease Activity Score 28, CRP: C Reactive Protein, ESR: Erythrocyte Sedimentation Rate

4. DISCUSSION

IA injection with glucocorticoids aims to relieve RA-related pain due to its anti-inflammatory effects. In fact, this treatment is primarily used as a therapeutic strategy to anticipate the occurrence of severe joint swelling and pain during RA. Pain is reported to correlate with MHAQ scores [23], with elevated pain increasing MHAQ scores. According to a report describing the short-term effects of glucocorticoid IAI, there is a distinct decrease in synovial hyperplasia in groups with high reactivity at 12 weeks following glucocorticoid IAI [24], and a EULAR 'good response' for 2–6 weeks following IAI. In addition, some studies report a significant improvement in acute pain levels [17] and in pain at rest and during movement [25] within the first 24 weeks of IAI. From the aspect of cost effectiveness, glucocorticoid IAI provides an excellent outcome for pain relief of the rheumatoid knee [26].

Histologically, previous reports have supported the short-term anti-inflammatory effects, such as inhibition of synovial hyperplasia, reduction of intra synovial citrullinated protein, and inhibition of vascular endothelial growth factor (VEGF) proliferation, in responders to glucocorticoids IAIs. So, glucocorticoids can provide excellent short-term inflammatory control and analgesic effects and can thus provide significant aid in allowing patients to maintain their daily activities, while the literature presents mixed findings regarding the long-term effects of this intervention [27].

In our study, there was significant improvement in clinical and functional assessment of our patients through VAS, DAS 28 and MHAQ two months after IAI when compared with before injection and also significant improvement in values of ESR and CRP when compared before and 2 months after injection.This agreed with Cunnington et al who found Significant improvements in the patient's assessment of stiffness, pain, and function of the injected joint at 2 weeks and 6 weeks, as evidenced by the VAS scores, and improvements in the MHAQ score indicate that corticosteroid injection can positively affect overall health status [28].

Yoshii et al found DAS28-CRP at the initial injection exhibited the greatest correlation with changes in DAS28-CRP at 1 month and 1 year after the initial injection. It can be considered that the higher the disease activity, the higher the effect of the disease activity control by glucocorticoid IAI is expected, while, at the same time, pain control can also be affected over the short-term. Furthermore, it was also suggested that the greater the joint destruction, the greater

the effect in controlling short-term disease activity. This suggests that acute joint pain in RA patients with advanced joint deformities can be managed successfully with glucocorticoid IAI; however, these patients are more likely to experience a relapse of inflammation caused by excessive joint load. Therefore, GC IAI can be considered an effective treatment for RA patients with strong joint deformities [29]

Limitation of this study was the small number of patients, the short period of follow up and assessment of accuracy of injection.

5. CONCLUSION

IAI with TH controls disease activity and, at the same time, provides excellent pain control in RA patients. IAI administration of glucocorticoids may be more effective than oral administration in some cases.

CONSENT

As per international standard or university standard, patient(s) written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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