Randomized Controlled Trial Local Injection for Treatment of Lateral Epicondylitis, 5 and 10 Mg Triamcinolone Compared

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Objective: *To compare the efficacy and adverse effects between 5 and 10 mg triamcinolone local injection for treatment of the lateral epicondylitis. The primary outcome was the improvement of pain after 12 weeks of treatment. The secondary outcome was the adverse effects rate.*

Material and Method: *One hundred and four patients with lateral epicondylitis were randomly allocated into 2 groups. Group A were injected with 5 mg triamcinolone and group B were injected with 10 mg triamcinolone at the maximum tenderness point at the lateral aspect of the elbow. All the patients were followed-up to 12 weeks. Patient satisfaction, pain score (VAS), degree of tenderness, pain on wrist extension against resistance, grip strength and adverse effects were recorded at 12 weeks after the injection.*

Results: *Group A (n = 51) had excellent result 80.39%, good 11.76%, slightly improved 1.96% and not improved 5.88%. Group B (n = 53) had excellent result 73.58%, good 16.98%, slightly improved 3.77% and not improved 5.66%. The adverse effects rate were 9.8% in group A and 13.2% in group B. There were no statistically significant in terms of patient satisfaction, pain score, tenderness at lateral epicondyle, grip strength and adverse effect rate.*

Conclusion: *The use of 5 mg triamcinolone was comparable to 10 mg triamcinolone injected locally to treatment of lateral epicondylitis.*

Keywords: *Lateral epicondylitis, Triamcinolone, Local injection*

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Lateral epicondylitis (tennis elbow) is a common problem in orthopedics clinic with the incidence of 4 adult per 1,000 annually[1]. The disease is an overuse injury occurring in the wrist extensor muscle group at lateral side of the elbow. The most commonly affected part is the origin of the extensor carpi radialis brevis (ECRB)[2]. Many treatments have been proposed for treatment lateral epicondylitis[3-6] and local injection with steroid is often used[7-11]. The efficacy of the local injection with triamcinolone was about 92-95%[7,8]. However, adverse effects of this treatment method such as subcutaneous fat atrophy and local skin depigmentation could occur[4]. Recommended dose of triamcinolone range from 10-40 mg[5,7,12,13]. Price et al[12] compared between 10 and 20 mg triamcinolone for treatment lateral epicondylitis and concluded that they had the same efficacy, skin atrophy in 20 mg group was more than 10 mg group but the statistically not difference. In the present study, the author compared 5 and 10 mg triamcinolone local injection to treat lateral epicondylitis.

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Material and Method

During January 2008 to December 2009, patients at the Naresuan university hospital who had met the inclusion criteria (pain on the lateral side of the elbow, tenderness over the forearm extensor origin at the elbow and pain at the lateral epicondyle during resisted dorsiflexion of the wrist with the elbow in full extension) were asked to participate in the present study. The exclusion criteria were the patients that have been injected for treatment of lateral epicondylitis in the last three months or have been injected three or more times to treat lateral epicondylitis, the patients that have major injury or surgery around the affected elbow. The pain score (visual analog scale 1-100 mm-VAS), degree of tenderness grip strength (kilograms)

were recorded.

The patients were randomized to received 5 mg or 10 mg triamcinolone local injection at the maximum tenderness point at the lateral aspect of the affected elbow. The regimens were prepared by nursing staffs at the orthopaedics out patient clinic who didn't participate in the present study. For group A, triamcinolone (10 mg/ml) 0.5 ml was combined with 1% lignocaine 0.7 ml. For group B, triamcinolone (10 mg/ml) 1.0 ml was combined with 1% lignocaine 0.2 ml. The total volume of the injected fluid for each patient in both groups was 1.2 ml. The injections were performed by only one of the authors (Weerakul S). The patients were allowed to take only acetaminophen for pain control after the injections. No restriction of activity was advised. The patients were scheduled for follow-up at 12 weeks after the injection. At follow-up, patients were asked for satisfaction and pain score. The affected elbows were examined for tenderness, pain at lateral epicondyle on resisted wrist extension, grip strength and adverse effects.

The protocol was approved by the Naresuan ethics committee for the human experiments and a written informed consent was obtained from each subject.

Statistical analysis was done with Chi-square for patient satisfaction, tenderness, pain on resisted wrist extension, complications and independent t-test for pain score (VAS) and grip strength. SPSS (version 17.0) was used for statistical analysis. A p-value of < 0.05 was used to determined statistical significance.

Results

One hundred and twelve patients were initially recruited into the present study. Eight patients dropouts due to loss to follow-up, resulting in 104 patients (group A n = 51, group B n = 53) that complete the present study (Fig. 1).

There were fourteen males in group A and sixteen males in group B, which were not statistically significant. The group A had a mean age of 48.35 $\pm$ 10.42 years, right handed 90.20%, mean duration of symptoms 10.5 $\pm$ 20.30 weeks. The group B had a mean age of 46.7 $\pm$ 9.07 years, right handed 88.68%, mean duration of symptoms 14.51 $\pm$ 26.62 weeks. None of these data were significantly different (Table 1).

Mean pain score of group A and group B before treatment was 63.45 and 58.69 respectively. Mean grip strength of the affected limb of group A and group B before treatment was 14.43 kilograms and 16.67 kilograms respectively. The mean pain score and grip strength before treatment were not different between the two groups (Table 1).

At twelve weeks, mean pain score decreased from 63.45 to 8.92 in group A and from 58.69 to 12.03 in group B. There were significantly decrease pain score after the triamcinolone injection in both groups. The mean grip strength increased from 14.43 to 27.42 kilograms in group A and 16.67 to 27.44 kilograms in group B. There was significantly increased grip strength after treatment in both groups. There were no significantly different pain score and grip strength after treatment between the two groups (Table 2).

All the patients had tenderness and pain on resisted wrist extension at lateral epicondyle before the treatment. After twelve weeks the patients remained tenderness 41.17% in group A and 41.50% in group B. Pain at lateral epicondyle on resisted wrist extension had positive results in 39.22% of group A and 56.60% in group B. There were no significantly different between the two groups in terms of tenderness and pain at lateral epicondyle on resisted wrist extension after treatment (Table 2).

For patients satisfaction, group A had excellent 80.39%, good 11.76%, slightly improved 1.96%, not improved 5.88% and group B had excellent 73.58%, good 16.98%, slightly improved 3.77%, not improved 5.66%.There was no statistically different in satisfaction rate between the two groups (Table 3).

There were 12 patients that had adverse effects. Group A had subcutaneous fat atrophy in 2

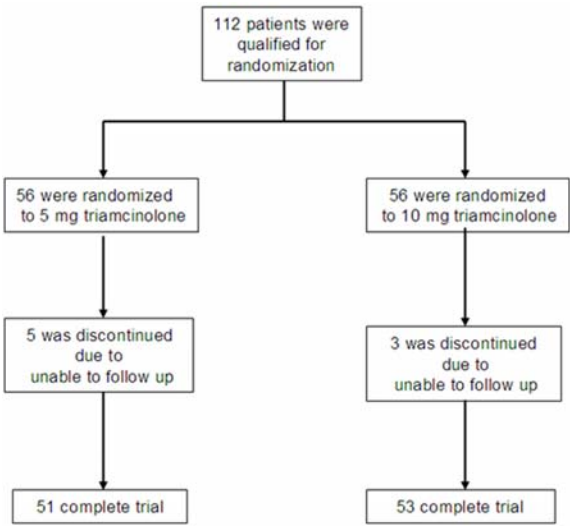

Fig. 1 Patients with lateral epicondylitis enrolled in 12 weeks clinical trial of 5 vs. 10 mg triamcinolone local injection

patients, local skin depigmentation in 3 patients. Group B had subcutaneous fat atrophy in 4 patients, local skin depigmentation in 2 patients and combined subcutaneous fat atrophy and local skin depigmentation in one patient. There were no significantly different in adverse effects rate between the two groups (Table 4).

Discussion

There were many treatment methods for treatment lateral epicondylitis. Verhaar et al[6] compared between local injection with triamcinolone and Cyriax physiotherapy and concluded that local corticosteroid injection was more effective. Price et al[12] compared between local injection with 10 mg triamcinolone, 25 mg hydrocortisone and 1% lignocaine alone and concluded that at eight weeks, pain relief was greater for triamcinolone than hydrocortisone and both triamcinolone and hydrocortisone were significantly better than 1% lignocaine alone at eight weeks. In a

Table 1. Baseline characteristics of subjects in each group

Demographic details	Group A (5 mg) (n = 51)	Group B (10 mg) (n = 53)	p-value
Sex			
Male	14	16	0.927*
Female	37	37	
Mean age (SD)	48.35 (10.42)	46.75 (9.07)	0.52**
Dominance side			
Right	46	47	0.801*
Left	5	6	
Affected side			
Right	39	32	0.120*
Left	12	21	
Duration of symptoms (SD) (weeks)	10.59 (20.30)	14.51 (26.62)	0.34**
Pain score (SD)(VAS 1-100 mm)	63.45 (14.40)	58.69 (17.13)	0.176**
Grip strength (SD) (kilograms)	14.43 (7.59)	16.67 (9.22)	0.179**

* Chi-square test, ** t-test

Table 2. Pain score and grip strength at twelve weeks

	Group A (5 mg)	Group B (10 mg)	p-value (t-test)
Pain score (SD) (VAS 1-100)	8.92	12.03	0.384**
Grip strength (SD) (kilograms)	27.42	27.44	0.993**
Tenderness	21 (41.17%)	22 (41.50%)	0.972*
Pain at lateral epicondyleon resisted wrist extension	20 (39.22%)	30 (56.60%)	0.114*

* Chi-square test, ** t-test

Table 3. Patient satisfaction after treatment

	Group A (5 mg)	Group B (10 mg)	p-value (Chi-square test)
Excellent	41 (80.39%)	39 (73.58%)	0.814
Good	6 (11.76%)	9 (16.98%)	
Slightly improved	1 (1.96%)	2 (3.77%)	
Not improved	3 (5.88%)	3 (5.66%)	

Table 4. Adverse effects

	Group A (5 mg)	Group B (10 mg)	p-value (Chi-square test)
Adverse effects	5	7	0.587
Subcutaneous fat atrophy	2	4	
Skin depigmentation	3	2	
Combined	-	1	

prospective randomized study, Crowther, Bannister and Rooker[5] concluded that in the medium term local injection of steroid is more successful and 100 times less expensive than extracorporeal shock-wave therapy in the treatment of tennis elbow.

The recommended dose of triamcinolone for treatment of lateral epicondylitis was range from 10-40 mg. Price et al[12] compared 20 and 10 mg triamcinolone local injection to treat lateral epicondylitis and concluded that they were similar. The present study demonstrated that 5 mg triamcinolone had the same efficacy as 10 mg triamcinolone.

The adverse effects of local injection with triamcinolone were subcutaneous fat atrophy and depigmentation at the site of injection[4,12]. Jawed and Allard[14] reported a case of osteomyelitis of the humerus following steroid injections for tennis elbow. In the present study, the overall adverse effects were 11.53% (skin atrophy 5.77%, depigmentation 4.81% and combine 0.96 %). No one developed osteomyelitis of the humerus. There were no different in adverse effects rate between the two groups.

The present study had no lignocaine alone group because in short to medium term, injection with steroid was better than lignocaine alone[12].

The present study demonstrated that 5 mg triamcinolone local injection for treatment lateral epicondylitis had the same efficacy as 10 mg triamcinolone. The majority of patients in both groups had improved pain score, increased grip strength, decrease tenderness, high satisfaction rate and low complications.

Conclusion

The present study demonstrated that 5 mg and 10 mg triamcinolone local injection for treatment lateral epicondylitis were comparable in terms of efficacy and adverse effects rate.

Potential conflicts of interest

None.

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การศึกษาแบบสุ่มเปรียบเทียบการรักษา Lateral epicondylitis ระหว่างการฉีดเฉพาะที่ด้วยยาไตรแอมซิโนโลน 5 และ 10 มิลลิกรัม

สันติ วีรกุล, มณฑล กาฬสีห์

วัตถุประสงค์*: เปรียบเทียบประสิทธิภาพและผลข้างเคียงของการรักษาภาวะ lateral epicondylitis ด้วยยาไตรแอมซิโนโลน 5 และ 10 มิลลิกรัมฉีดเฉพาะที่*

วัสดุและวิธีการ*: ผู้ป่วยlateral epicondylitis จำนวน 104 ราย ถูกสุ่มออกเป็น 2 กลุ่ม กลุ่ม A ได้รับการฉีดยาเฉพาะที่บริเวณข้อศอกที่มีอาการด้วยยาไตรแอมซิโนโลน 5 มิลลิกรัม กลุ่ม B ได้รับการฉีดยาเฉพาะที่บริเวณข้อศอกที่มีอาการด้วยยาไตรแอมซิโนโลน 10 มิลลิกรัม ผู้ป่วยจะได้รับการนัดตรวจหลังฉีดยา12 สัปดาห์ โดยจะเก็บข้อมูลความพึงพอใจของผู้ป่วย, คะแนนความเจ็บปวด, อาการกดเจ็บบริเวณข้อศอก, อาการเจ็บเมื่อกระดกข้อมือต้านแรง, แรงบีบมือ และผลข้างเคียงที่เกิดขึ้นจาการรักษา*

ผลการศึกษา*: กลุ่ม A (จำนวน 51 ราย) อาการดีขึ้นมาก 80.39 เปอร์เซ็นต์ อาการดีขึ้น 11.76 เปอร์เซ็นต์ ดีขึ้นเล็กน้อย 1.96 เปอร์เซ็นต์ ไม่ดีขึ้น 5.88 เปอร์เซ็นต์ กลุ่ม B (จำนวน 53 ราย) อาการดีขึ้นมาก 73.58 เปอร์เซ็นต์ อาการดีขึ้น 16.98 เปอร์เซ็นต์ ดีขึ้นเล็กน้อย 3.77 เปอร์เซ็นต์ ไม่ดีขึ้น 5.66 เปอร์เซ็นต์ มีผลข้างเคียงในกลุ่มA 9.8 เปอร์เซ็นต์ และในกลุ่มB 13.2เปอร์เซ็นต์ ไม่มีความแตกต่างอย่างมีนัยสำคัญทางสถิติในด้านความพึงพอใจของผู้ป่วย, คะแนนความเจ็บปวด, การกดเจ็บบริเวณข้อศอก, อาการเจ็บเมื่อกระดกข้อมือต้านแรง, แรงบีบมือ และผลข้างเคียงที่เกิดขึ้นจาการรักษา*

สรุป*: ยาไตรแอมซิโนโลน 5 มิลลิกรัมฉีดเฉพาะที่ให้ผลการรักษาภาวะ lateral epicondylitis ไม่แตกต่างกับยาไตรแอมซิโนโลน 10 มิลลิกรัม ฉีดเฉพาะที่ และมีผลข้างเคียงจากการรักษาไม่แตกต่างกัน*