



The efficacy of subacromial corticosteroid injections in impingement syndrome

Omuz sıkışma sendromunda subakromiyal kortikosteroid enjeksiyonlarının etkinliği

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Objectives: Subacromial steroid injections are frequently used in the treatment of impingement syndrome. Several studies have pointed out that the localization of the injection makes a significant difference in symptomatic improvement. This study was designed to test the importance of location of the corticosteroid injection in the treatment of impingement syndrome.

Patients and methods: The study included 30 patients (18 females, 12 males; mean age 52 years; range 23 to 67 years) who had shoulder pain for at least three months. Involvement was in the right shoulder in 19 cases, and in the left shoulder in 11 cases. The mean duration of symptoms was 11 months (range 3 to 48 months). On examination, all the patients exhibited a positive impingement sign, no instability, and an intact rotator cuff. Magnetic resonance imaging was performed in all the shoulders. The patients were randomized to three groups, equal in number, to receive a single injection of 40 mg methylprednisolone acetate into the subacromial space, deltoid muscle, and gluteal muscle, respectively. Functional and clinical assessments were made with the Constant score and a visual analog scale (VAS), respectively, before and three months after treatment.

Results: Subacromial and deltoid injections resulted in significant improvement in both Constant and VAS scores ($p<0.003$), whereas improvement obtained after gluteal injections was not significant ($p>0.05$). However, comparison between the three groups yielded no significant difference with respect to the location of injections.

Conclusion: Considering possible detrimental effects of repeated subacromial injections on rotator cuff tendons, intradeltoid muscle injections may have a chance in clinical application.

Key words: Glucocorticoids/therapeutic use; injections, intra-articular; shoulder impingement syndrome/drug therapy.

Amaç: Subakromiyal steroid enjeksiyonu omuz sıkışma sendromu tedavisinde sık kullanılan bir yöntemdir. Çeşitli çalışmalarda enjeksiyon yerinin semptom düzelmesinde anlamlı etkisi olduğu belirtilmiştir. Bu çalışmada, omuz sıkışma sendromu tedavisinde kortikosteroid enjeksiyonunun yapıldığı yerin tedavi sonuçları üzerindeki etkisi araştırıldı.

Hastalar ve yöntemler: Çalışmaya, en az üç aylık omuz ağrısı yakınmasıyla başvuran 30 hasta (18 kadın, 12 erkek; ort. yaş 52; dağılım 23-67) alındı. Yakınmalar 19 hastada sağ, 11 hastada sol omuzdaydı. Ortalama semptom süresi 11 ay (dağılım 3-48 ay) idi. Muayenede tüm hastalarda pozitif sıkışma bulgusu saptanırken, instabilite ve rotator kılıf hasarına rastlanmadı. Tüm omuzlar manyetik rezonans görüntüleme ile incelendi. Hastalar rastgele seçimle eşit sayıda üç gruba ayrılarak, tek doz 40 mg metilprednizolon asetat sırasıyla subakromiyal boşluğa, deltoid kası içine ve gluteal kas içine enjekte edildi. Tedavi öncesinde ve tedaviden üç ay sonra olmak üzere fonksiyonel değerlendirme Constant skoru, klinik değerlendirme görsel analog skala (GAS) ile yapıldı.

Bulgular: Tedavi öncesine göre, subakromiyal ve deltoid enjeksiyonlarıyla hem Constant hem de GAS skorlarında anlamlı düzelmeye sağlanırken ($p<0.003$), gluteal enjeksiyonla sağlanan düzelmeye anlamlı bulunmadı ($p>0.05$). Bununla birlikte, gruplar arası karşılaştırmada, enjeksiyon yerinin tedavi sonuçlarında anlamlı farklılık yaratmadığı görüldü.

Sonuç: Tekrarlayan subakromiyal steroid enjeksiyonlarının rotator kılıf tendonları üzerindeki olası zararlı etkileri göz önünde bulundurulduğunda, deltoid içi enjeksiyonlar da uygun bir seçim olabilir.

Anahtar sözcükler: Glukokortikoid/terapötik kullanım; enjeksiyon, eklemiçi; omuz sıkışma sendromu/ilaç tedavisi.

Impingement syndrome of the shoulder is the impingement of the rotator cuff tendons and the subacromial bursa between the greater tuberosity of the humerus and the coracoacromial arch. Patients typically complain of pain that originates from the coracoacromial arch and radiates along the deltoid muscle.^[1] On physical examination, coracoacromial tenderness and positive Neer and Hawkins impingement signs can be detected.^[1] To confirm the diagnosis impingement test is performed, which was described by Neer.^[2] A local anesthetic is injected into the subacromial space and relief of symptoms is considered a positive result. Subacromial corticosteroid injection is a frequently used treatment modality that results in short-term relief.^[3,4] Several studies have pointed out that the localization of the injection makes a significant difference in the results.^[5,6]

This study was designed to test the importance of needle placement and location of the corticosteroid injection in the treatment of impingement syndrome.

PATIENTS AND METHODS

The study included 30 patients (18 females, 12 males; mean age 52 years; range 23 to 67 years) who presented with a complaint of shoulder pain for at least three months, and, on examination, were found to have a positive impingement sign, no instability findings, and an intact rotator cuff.

The complaints involved the right shoulder in 19 cases, and the left shoulder in 11 cases. The mean duration of symptoms was 11 months (range 3 to 48 months). Six patients had a history of trauma. Nine patients previously received treatment including nonsteroid anti-inflammatory drugs and exercise. Limitation in passive internal rotation of the shoulder was severe in four patients, moderate in eight patients, and mild in seven patients. Other physical examination findings were as follows: tenderness

of the supraspinatus tendon (n=20), positive Speed test (n=17), and acromioclavicular tenderness (n=4). Magnetic resonance imaging was performed in all the shoulders.

The patients were randomized to three groups, equal in number and according to the order of their presentation, to receive a single injection of 40 mg methylprednisolone acetate into the subacromial space, deltoid muscle, and gluteal muscle, respectively. Functional and clinical assessments of the shoulders were made with the Constant score and a visual analog scale (VAS), respectively, before and three months after treatment. Statistical analyses were performed using the paired t-test and the repeated measures test.

RESULTS

Magnetic resonance imaging showed normal findings in two patients, and findings of supraspinatus tendinitis or partial rupture of the rotator cuff in 28 patients.

Pretreatment and posttreatment Constant and VAS scores of the three groups are summarized in Table I. Subacromial and deltoid injections resulted in significant improvement in both Constant and VAS scores ($p < 0.003$), whereas improvement obtained after gluteal injections was not significant ($p > 0.05$). However, comparison between the three groups using the repeated measures test yielded no significant difference with respect to the location of injections.

DISCUSSION

The pathomechanism of the impingement syndrome was first described by Neer^[2] in 1972 on his report on acromioplasty. Pain is believed to originate by the impingement of the supraspinatus tendon between the coracoacromial arc and the greater tubercle. Decrease in pain after injection of a local anesthetic into the subacromial bursa is called the impingement test and is considered diagnostic for the impingement

TABLE I

Pre- and posttreatment Constant and visual analog scale (VAS) scores

Injection groups	Pretreatment		Posttreatment	
	Constant	VAS	Constant	VAS
Group I (Subacromial)	44	84	61	29
Group II (Deltoid)	50	73	59	45
Group III (Gluteal)	42	73	50	50

syndrome. A study showed that 21% of the injections that were planned to be delivered to the subacromial space remained, in fact, inside the deltoid muscle.^[7] Interestingly, no difference was noted in the severity of pain even in cases in which no anesthetic agent reached the subacromial space.

There is controversy on the efficacy of subacromial corticosteroid injections. Some authors found subacromial corticosteroid injections efficacious,^[3,4] while some reported no advantage over nonsteroid anti-inflammatory medications.^[8]

The location of injections is another issue discussed in the literature. Clinical improvement was reported to be significantly less in injections failing to reach the subacromial location, as controlled by simultaneous injection of a radiopaque agent^[5] and ultrasonographic monitoring.^[6] However, our results are in contradiction with these observations, in that final comparisons between the three treatment groups showed no significant difference as to the effect of location of the injections. After a three-month follow-up, shoulders receiving subacromial and intradeltoid injections showed significant improvement in both pain and functional status. A meta-analysis concluded that further research is necessary on the effects of anatomic location, needle placement, frequency, and dosage of injections and the type of steroids injected.^[9]

Considering detrimental effects of repeated steroid injections on rotator cuff tendons,^[10] and our findings showing similar improvement by subacromial and intradeltoid injections, intradeltoid steroid delivery may be an appropriate alternative to avoid rotator cuff injury associated with repeated subacromial injections.

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