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Treatment of shoulder impingement syndrome after coronary artery bypass surgery

Koroner arter baypas ameliyatı sonrası oluşan omuz sıkışma sendromunun tedavisi

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Amaç: Major göğüs cerrahisi uygulanan hastalarda gelişen omuz sıkışma sendromuna yönelik bir tedavi protokolü oluşturuldu ve bu protokolün sonuçları kontrol grubuyla karşılaştırıldı.

Çalışma planı: Koroner arter baypas ameliyatı sonrası omuz sıkışma sendromu gelişen 17 hastaya (15 erkek, 2 kadın; ort. yaş 62; dağılım 52-68) ve kontrol grubu olarak göğüs cerrahisi geçirmemiş, omuz sıkışma sendromu bulunan 17 hastaya (6 erkek, 11 kadın; ort. yaş 56; dağılım 43-67) steroid ve lokal anestezik tedavisi uygulandı. Enjeksiyon uygulaması subakromiyal, biseps tendonu çevresi, eklemiçi ve posterior perikapsüler alana yapıldı. Hastalara enjeksiyon sonrası en az altı hafta boyunca, Jackins fizik tedavi programını da kapsayan konservatif tedavi protokolü uygulandı. Hastalar tedaviden önce ve tedaviden sonra 3, 6, 9 ve 12. aylarda UCLA (University of California at Los Angeles) skorlamasıyla değerlendirildi.

Sonuçlar: Tedaviden önce her iki gruptaki hastaların tamamı UCLA skorlamasına göre kötü olarak değerlendirildi. Tedavi sonrası birinci yılda göğüs cerrahisi geçiren hastaların 12'si (%70.6) mükemmel, beşi (%29.4) iyi; kontrol grubunda ise beş hasta (%29.4) mükemmel, sekiz hasta (%47.1) iyi ve dört hasta (%23.5) kötü olarak değerlendirildi.

Çıkarımlar: Major göğüs cerrahisi geçiren hastalarda oluşan omuz sıkışma sendromu, steroid-lokal anestezik enjeksiyonu ve kısa süreli konservatif tedaviye, toraks cerrahisi geçirmemiş kontrol grubuna göre çok daha iyi yanıt vermektedir. Hastaların ağrılarının kısa sürede azaldığı ve omuz hareketlerinin oldukça hızlı bir şekilde düzeldiği görüldü.

Anahtar sözcükler: Koroner arter baypas/rehabilitasyon; egzersiz tedavisi; omuz sıkışma sendromu/etyoloji/tedavi; omuz eklemi.

Objectives: A treatment protocol was developed for shoulder impingement syndrome in patients undergoing a major thoracic surgery and the results were compared with those of a control group.

Methods: Treatment with steroids and local anesthetics was administered to 17 patients (15 males, 2 females; mean age 62 years; range 52 to 68 years) who developed impingement syndrome after coronary artery bypass surgery, and to 17 control patients (6 males, 11 females; mean age 56 years; range 43 to 67 years) who did not have thoracic surgery but had impingement syndrome. Injections were made subacromially, around the biceps tendon, intraarticulary, and in the posterior pericapsular area. After the injections, conservative therapy was given, which also included at least six weeks of the Jackins physical therapy program. The patients were assessed before and 3, 6, 9 and 12 months after the treatment with the use of the UCLA (University of California at Los Angeles) scoring system.

Results: Before the treatment, the UCLA scores were poor in all the patients in both groups. The results of the treatment in the thoracic surgery group at the end of a year were excellent in 12 patients (70.6%) and good in five patients (29.4%). In the control group, five patients (29.4%) were rated as excellent, eight patients as good (47.1%), and four patients as poor (23.5%).

Conclusion: Compared to controls, patients that develop shoulder impingement syndrome following major thoracic surgery benefit from steroid-local anesthetic injections and short-term conservative therapy with a far better response characterized by early relief of pain and rapid improvement in the shoulder range of motion.

Key words: Coronary artery bypass/rehabilitation; exercise therapy; shoulder impingement syndrome/etiology/therapy; shoulder joint.

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It is well known that shoulder pain is frequently seen in patients who have undergone a major thoracic surgery.[1] These patients constitute the major part of people who seek medical care with the complaint of shoulder pain.

Frozen shoulder after major thoracic surgery has been described in the literature; but many of these patients are diagnosed as impingement syndrome in the light of their symptoms and clinical findings. We have noticed that response of these patients to treatment was somewhat different from other impingement syndromes and isolated frozen shoulder cases which are seen after thoracic surgery.

Difference of the prognosis of these patients who had major thoracic surgery has led us to develop a specific treatment program for this group of patients. In our study we aimed to evaluate the results of the specific treatment program and to determine response rate in these patients.

Patients and method

Our study was designed as randomized, prospective clinical experimental trial with a control group. The first 17 patients (15 males and 2 females, mean age 62 years, range from 52 to 68) which were diagnosed as impingement syndrome out of a total of 82 patients who had the complaint of shoulder pain after coronary bypass grafting between 2002 and 2003 was selected as study group. Control group included 17 patients (6 males, 11 females, mean age 56, and range from 43 to 67) without history of a previous thoracic surgery but had impingement syndrome in the same period. None of the patients had any rehabilitation for their shoulder after thoracic surgery.[2] Patients had no symptoms and no trauma history pertaining to shoulder region, thorax or neck before the surgery. In the thoracic surgery group 11 of the patients had impingement in the right shoulder and 6 in the left shoulder. Symptoms appeared after an average of 9.5 months postoperatively (range 6 to 15 months). Left shoulder patients developed complaints at 11.5 months and right shoulder patients developed at a mean 4.5 of months. In the control group 8 of 17 cases had impingement at the right shoulder and remaining 9 cases at the left shoulder.

Impingement sign and tests described by Neer and Welsh were used for the diagnosis of shoulder impingement. Welsh impingement sign was accepted as the presence of pain in the critical zone of supraspinatus muscle during shoulder abduction against resistance. Neer's impingement test was accepted as positive when pain resolved after subacromial lidocaine injection.[3] All the patients were evaluated by magnetic resonance imaging (MRI) and patients with rotator cuff tears and with type 3 acromion were excluded from the study as their response to conservative treatment is very limited. [4]

Diagnosis of frozen shoulder which is common after bypass surgery based on the criteria described by Kessel.[1] These criteria were: I) limitation in the range of shoulder motion without any major injury or reconstructive surgery; II) global limitation in the range of shoulder motion in all directions; III) normal cartilage view and absence of any pathology around the shoulder in the plain radiographs. [3,5]

Patients were evaluated by UCLA (University of California at Los Angeles) scoring system. Scores between 2 and 29 are regarded as poor in this scoring system. Before injection mean UCLA score was measured as 14 for the study group and 16 for the control group.

Posterior capsule tension and biceps tendinitis may accompany a shoulder impingement syndrome. Posterior capsule tension was determined by stiffness in the internal rotation at passive adduction and thumb up test.[5] Test is accepted as positive, if the patient is unable to touch to the spinous process of 7th or 8th thoracic vertebra by maximal internal rotation or cannot reach to the same level that the intact shoulder does. Biceps tendinitis was diagnosed by Yergason test, Speed test or when tenderness on the biceps groove or any history of pain radiating to the upper arm was elicited by direct compression on the biceps groove.[3]

Procedures were thoroughly explained to cardiovascular surgeons or cardiologists who were in charge of the patient and injections were performed after their consents were obtained. Multidirectional injection technique was applied for injection.[6] Injection solution consisted of saline (20 ml), bupivacaine HCL (20 ml) and triamsinalon (1 ml). A volume of 15 ml of this solution was introduced into subacromial space. An additional 10 ml. of solution was injected around the long head of biceps from anterior surface if the patient had biceps tendinitis.

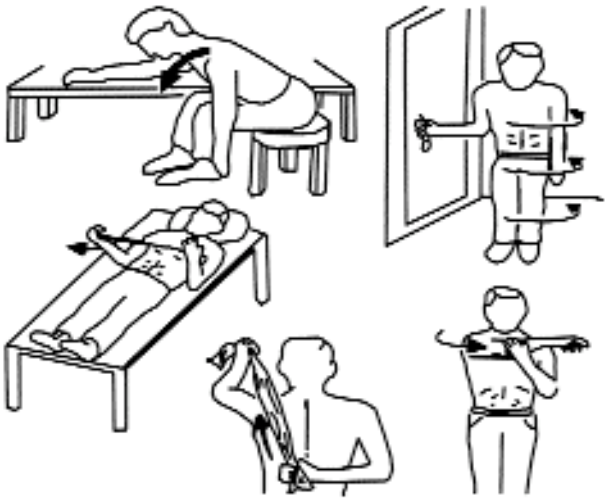

Figure 1. Second stage of Jackins shoulder physical therapy exercises

In patients with posterior capsule tension, 16 ml. of the solution was injected into the joint and to the pericapsular region. If the patient did not have biceps tendinitis or posterior capsule tension, no injection was performed to these areas and the remaining solution was discarded. In the study group, 12 patients had subacromial, anterior and posterior; 2 patients had subacromial and posterior; 2 patients had subacromial and anterior; and 1 had only subacromial injection. In the control group 14 patients had subacromial, anterior and posterior; 1 patient had subacromial and posterior; and 2 patients had subacromial and anterior injection.

Second stage of Jackins physical therapy protocol was started immediately after injection. (Figure 1). Patients were informed to perform each exercise 10 times twice a day for at least 6 weeks. Patients were monitored for an hour after injection for the risk of complication and to determine their compliance to exercises.

Follow-up examinations were done at 2nd day, 1st and 2nd weeks and 1st, 2nd, 3rd, 6th, 9th and 12th months after injection. UCLA score was measured before injection and 3, 6, 9 and 12 months after injection. UCLA scores of the patients at follow-up period in terms of time were plotted in the graphics to analyze the response rate to treatment.

Results

All patients in both groups had poor UCLA scores before the treatment. In the thoracic surgery group 12 patients had (%70.6) perfect, 5 patients had (%29.4) good and in the control group 5 patients had (%29.4) perfect, 8 patients had (%47.1) good and 4 patients had (%23.5) poor UCLA scores at the end of the first year. Changes in the UCLA scores of the thoracic surgery group throughout the first year of the treatment are shown in Figure 2.

Discussion

Studies on pathophysiology of frozen shoulder after coronary bypass graft surgery is limited in the literature. Careful examination is essential to recognize these patients. They should be differentiated especially from isolated frozen shoulder cases. Absence of global stiffness which is typical of frozen shoulder and positive impingement sign and impingement tests described by Neer and Welsh, necessitates these patients to be evaluated for

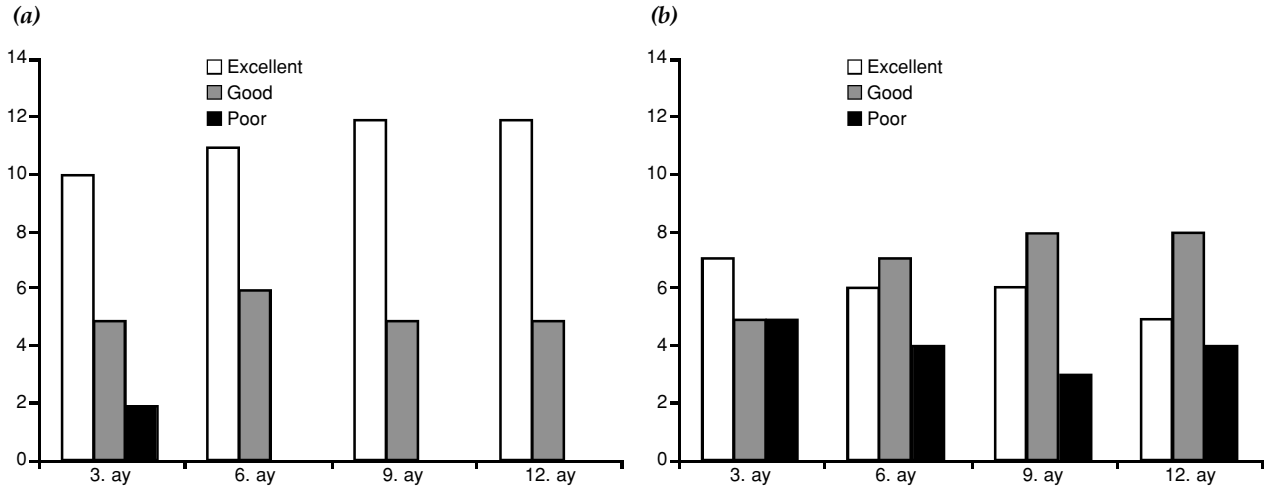

Figure 2. UCLA scores of the patients with **(a)** and without **(b)** previous thoracic surgery in terms of months.

impingement syndrome.[3,7,8] It is also important to discriminate posterior capsule stiffness which may accompany an impingement syndrome. In these patients subacromial injection test typically relieves the pain and permits all the movements to be done except internal rotation which stresses posterior capsule.

Patients with impingement syndrome after a coronary artery bypass surgery may not respond to conservative treatment without injection. When symptoms develop after bypass surgery or impingement syndrome is diagnosed, it may be unsafe to perform painful exercises in this group of patients for a long time as these may increase the cardiac stress. These patients have undergone a bypass surgery and their referral time (mean 9.5 months) coincides with the period where prognosis of their bypass surgery is unknown. This may cause patients to refrain from painful rehabilitation programs and decrease the success of conservative treatment. It is useful to perform steroid and local anesthetic injection at the time of diagnosis to accomplish a painless and comfortable physical therapy.

Our literature search revealed no information about the etiology of impingement syndrome after thoracic surgery. It is obvious that major surgery causes inflammation in the adjacent tissues, but there is no information on what degree the shoulder is affected by this mechanism.

In our study, the period between the surgery and shoulder symptoms was as long as 9.5 months. Very late onset of symptoms on the left shoulder is noticeable. Cardiovascular surgeons responsible for the follow-up of these patients assign these left sided postoperative shoulder pains to coronary artery problems. Thus, it takes time to confirm shoulder as the source of pain in the patients with impingement syndrome on the left shoulder. This may be the reason for the prolonged mean period in these patients.

Although ratio of the both genders is not similar in the two groups, sex is not considered as a factor for the different results in the impingement syndrome.

In the thoracic surgery group, successful treatment results achieved at third month has been found out to increase progressively throughout the remaining 12 months of treatment period. Our results show that similar cases without the history of a previous thoracic surgery have a longer recovery period with reduced successful rates.

Patients with impingement syndrome, which has developed after coronary bypass surgery excluding rotator cuff tears or type 3 acromion, have better responded to our treatment protocol which involved injection of a steroid-local anesthetic-saline solution and tensioning type physical therapy exercises, compared to the control group. In the follow-up, pain has promptly relieved and shoulder movements has rapidly improved.

References

1. Öztuna V, Gölpınar A, Aytaçoğlu B, Kuyurtar F. Koroner arter bypass ameliyatı sonrası oluşan donuk omuz olgularında risk faktörlerinin araştırılması. In: 2. Türk Omuz ve Dirsek Cerrahisi Kongresi; 6-9 Mart 2002; Çeşme, İzmir, Türkiye. İzmir: United Expo Tempatur Turizm Ticaret AŞ; 2002. s. 30.
2. Shaw DK, Deutsch DT, Bowling RJ. Efficacy of shoulder range of motion exercise in hospitalized patients after coronary artery bypass graft surgery. Heart Lung 1989;18:364-9.
3. Hawkins RJ, Bokor DJ. Clinical evaluation of the shoulder problems. In: Rockwood CA, Matsen FA 3rd, editors. The shoulder. 2nd ed. Philadelphia: W. B. Saunders; 1998. p. 164-97.
4. Bigliani LU, Levine WN. Subacromial impingement syndrome. J Bone Joint Surg [Am] 1997;79:1854-68.
5. Fongemie AE, Buss DD, Rolnick SJ. Management of shoulder impingement syndrome and rotator cuff tears. Am Fam Physician 1998;57:667-74, 680-2.
6. Ünay K, Poyanlı O, Akan K, Çağlar S. Donuk omuz komplikasyonu gelişmiş omuz sıkışma sendromu olgularında 4 yönlü omuz enjeksiyonu. In: 2. Türk Omuz ve Dirsek Cerrahisi Kongresi; 6-9 Mart 2002; Çeşme, İzmir, Türkiye. İzmir: United Expo Tempatur Turizm Ticaret AŞ; 2002. s. 29.
7. Harryman DT, Lazarus MD, Rozencwaig R. The stiff shoulder. In: Rockwood CA Jr, Matsen FA III, editors. The shoulder. Vol. 2, Philadelphia: W. B. Saunders; 1998. p. 1064-106.
8. Reeves B. The natural history of the frozen shoulder syndrome. Scand J Rheumatol 1975;4:193-6.