Comparing the Effectiveness of Thiocolchicoside and Triamcinolone in Piriformis Syndrome Treatment

Piriformis Sendromu Tedavisinde Triamsinolon ve Tiyokolşikosidin Etkinliğinin Karşılaştırılması

Kamer DERE, MD,[a]
Mert AKBAŞ, MD,[b]
Hüseyin ŞEN, MD,[a]
Ertan TEKSÖZ, MD,[a]
Arif YEĞİN, MD,[b]
Sezai ÖZKAN, MD,[a]
Güner DAĞLI, MD[a]

[a]Department of Anesthesiology, GATA Haydarpaşa Training Hospital, İstanbul
[b]Department of Anesthesiology, Division of Algology, Akdeniz Universitesi, Antalya

Geliş Tarihi/*Received:* 16.07.2008
Kabul Tarihi/*Accepted:* 24.12.2008

Yazışma Adresi/*Correspondence:*
Kamer DERE, MD
GATA Haydarpaşa Training Hospital, Department of Anesthesiology, İstanbul, TÜRKİYE/TURKEY
kamerdere@hotmail.com

ABSTRACT Objective: We aimed to investigate the effect of thiocolchicoside, a drug never used in piriformis syndrome (PS) treatment before and to compare these effects with triamcinolone, that has been used in the routine treatment for PS. **Material and Methods:** Our study was designed as a randomized and multicentral study in 60 patients where group I (n= 30) received triamsinolon and group II (n= 30) received thiocolchicoside. The pressure values of the trigger points were measured with an algometer at baseline, and at 1 month and 3 months after the procedure. The subjective complaints of the patients were evaluated with visual analog scale (VAS). **Results:** The demographical data and their evaluations at baseline were similar. In all groups, the trigger point pressure values were significantly higher (p= 0.019) and VAS values were significantly lower (p= 0.001) when compared to baseline values. While this significant decrease in VAS values continued in group I at 3 months, no such difference was observed in group II. **Conclusion:** In conclusion, triamcinolone has a similar effect compared to thiocolchicoside at one month following the administration, but the effect of triamsinolon continues at 3 months also. Thus, triamcinolone is more effective than thiocolchicoside in one-dose-shot-treatments in PS patients. Nevertheless, thiocolchicoside is still an alternative for the treatment in PS patients where triamcinolone cannot be used.

Key Words: Thiocolchicoside; triamcinolone

ÖZET Amaç: Çalışmamızda piriformis sendromu (PS) tedavisinde rutinde kullanılan triamsinolon ile daha önce hiç kullanılmamış olan tiyokolşikosidin etkinliğini karşılaştırmayı amaçladık. **Gereç ve Yöntemler:** Çalışmamız PS'li 60 hastada çok merkezli, randomize ve prospektif olarak yapıldı. Grup I'e (n= 30) triamsinolon ve grup II'ye (n= 30) tiyokolşikosid uygulandı. Uygulama öncesinde, uygulamadan 1 ve 3 ay sonra, tetik noktaların basınç değerleri ve hastaların subjektif şikâyetleri değerlendirildi. Tetik noktaların basınç değerleri bir algometre ile ölçülürken, subjektif şikâyetlerin değerlendirilmesi için 0 ile 10 arasında görsel analog ölçeği (GAÖ) kullanıldı. **Bulgular:** Grupların demografik verileri ve girişim öncesi ölçüm ve değerlendirmeleri benzerdi. Her iki grupta da tetik nokta basınç değerleri, girişim öncesi değerlere göre istatistiksel olarak anlamlı bir artış gösterdi (p= 0.019). Yine her iki grupta da GAÖ değerleri, girişim öncesi değerlere göre istatistiksel olarak anlamlı bir azalma sergiledi (p= 0.001). Grup I'de 3. ayda GAÖ değerlerinde istatistiksel olarak anlamlı bir azalma devam ederken, grup II'de bu azalma saptanmadı. **Sonuç:** Çalışmamızın sonucunda, PS'nin tek doz tedavisinde, 1. ay sonunda triamsinolonun tiyokolşikosid ile aynı etkinliğe sahip olmasına karşın, 3. ayda bu etkinliğin triamsinolonda artarak devam ettiğini tespit ettik. Bu nedenle triamsinolonun PS tedavisinde daha etkili olduğu kanaatindeyiz. Bununla birlikte, PS tedavisinde triamsinolonun kullanılamadığı durumlarda yine de tiyokolşikosidinin tedavide bir alternatif olarak düşünülebileceği kanısındayız.

Anahtar Kelimeler: Tiyokolşikosid; triamsinolon

Turkiye Klinikleri J Med Sci 2009;29(5):1267-72

Piriformis syndrome (PS) is one of the uncommon causes of hip and leg pain and it can be easily passed over.[1] Initially it was defined by Robinson in 1947 as the irritation of the sciatic nerve.[2] Etiology consists of myofascial pain, anatomical variations, the shortness of the leg on the same side, heavy exercise, trauma and myositis ossificans.[3-6] It has been held responsible for 6-8% of the 80 millions of back pain and siatalgia cases in the United States.[7] Hence, a higher interest is observed in the last 10 years on the diagnosis and treatment of the syndrome.

Purpose of the treatment of PS is to treat trigger points in the piriformis muscle and to prevent the stiffness of the muscle. In molecular studies by Shah et al on trigger points, they took samples of trigger points and observed that levels of bradykinin, calcitonin gene-related peptide (CGRP), substance-P, tumor necrosis factor (TNF)-α, interleukin (IL)-1β, serotonin and norepinephrine were higher than in regular muscle samples.[8] In another study, Schafers et al injected TNF-α into muscle of rats and a day later observed increased levels of CGRP, nerve growth factor (NGF) and prostaglandin $(PGE)_2$ in tissue samples.[9] Thus, TNF-α and other pro-inflammatory cytokines (especially IL-1β) take effective role in muscle hyperalgesia. Reports suggest that in remote future these cytokines are likely to take an effective role in the treatment of myofascial pain.[9] In all those studies, pro-inflammatory cytokines had significant effects in both trigger points and myofascial pain caused by trigger points, and these effects were mostly attributed to TNF-α.

Another study by Kelley et al determined that gamma-aminobutyric acid (GABA) had inhibitory effects on pro-inflammatory cytokines, especially production of TNF-α at the periphery.[10] In another study, Spangelo et al determined that GABA restricted the production of pro-inflammatory cytokines by sending signals, which have inhibitor effects on the spinal cord.[11] Based on these studies we suggest that GABA has a very effective role in controlling the pro-inflammatory cytokines.

Thiocolchicoside is half-synthetic derivated sulphur made of colchicoside, which is a natural glucocid of Colchicum Autumnale that originated in Anatolia. This very natural glucocid myorelaxant has anti-inflammatory and analgesic effects. Thiocolchicoside, acts as a myorelaxant by activating GABA and glycine receptors at the spinal level.[12,13]

Based on its myorelaxant effect by activating GABA, we aimed to compare the effect of thiocolchicoside, which has never been used in PS treatment, with triamcinolone that is the choice of treatment for PS.

MATERIAL AND METHODS

After approval by the GATA Ethical Committee, this multicenter, randomized and prospective study was run at the GATA Haydarpaşa Training and Research Hospital Anesthesiology and Reanimation Department and the Akdeniz University Anesthesiology and Reanimation Department Algology Service between 2007 and 2008.

Sixty patients aged 20-50 years were enrolled in the study after the diagnosis of PS with palpation of the piriformis muscle, pain in the sciatic notch by prolonged sitting and walking, and positive results in the FAIR (Flexion Adduction Internal Rotation), Lasègue and Freiberg tests.

Exclusion criteria were cardiovascular and respiratory system difficulties, history of allergic reactions, history of previous shots for PS within the last year, receiving medication inhibiting neuromuscular transmission (ex. aminoglucocid), being assessed as not eligible, history of bleeding diathesis and being pregnant.

The patients were randomly divided into two groups for injection treatment. Triamcinolone asetonid (Kenacort-a retard amp., Bristol-Myers Squibb) was applied to group I and thiocolchicoside (Muscoril amp., Sanofi-Aventis) was applied to group II. The study drugs were supplied by the authors.

Group I received 40 mg triamcinolone + 9 cc. isotonic solution (a total of 10 cc) (n= 30)

Group II received 4 mg thiocolchicoside + 8 cc. isotonic solution (a total of 10 cc) (n= 30).

At baseline, and at 1 month and 3 months after the process, pressure values of the trigger points were measured with an algometer (The Wagner Pain Test™ Model FPK20). Plastic edge of the algometer was placed on the trigger point and was pressed with a pressure 1 $kg.sec.^{-1}$ until pain developed. The pressure value that generated pain was recorded.

To evaluate subjective complaints at baseline and at 1 and 3 months VAS rating between 0 and 10 was used.

After signed consents were taken, the patients scheduled to piriformis injection were taken to the operation room without any premedication. They were positioned in prone position on the operation table. All were monitored and an IV access in the brachial vein was provided. The PS diagnosed side of the hip was cleaned with povidon iodine and was covered up in sterile conditions. Antero-posterior images of the hemi-pelvic and acetabular areas were viewed by fluoroscopy. Lower edge of the sacroiliac joint and upper external region of the acetabulum was determined. Then, the upper lateral one third of this line, which connected these two points, was determined as the entrance point.

From this point a 10 cm, isolated 22G needle was inserted vertical to the skin. While the needle was advanced deeper, the patient was asked whether she or he felt any familiar pain or any sort of hip pain. When the patient described the original pain, the advancement of the needle was stopped and 2 ml Iohexol (Omnipaque™ 300, Opakim, Istanbul, Turkey) solution was injected. When piriformis muscle stained on fluoroscopy, half of the medication was applied according to the group the patients were randomized. At least two injections were applied to the piriformis muscle. To achieve this, following the first injection the needle was withdrawn to the subcutaneous tissue and was directed 0.5 cm caudal to the first injection area. After the muscle was visible on fluoroscopy, the other half of the planned medication was injected to the second point (Figure 1). After the process was over, patients were taken into the recovery room, were monitored for one hour and were discharged if no complications were observed.

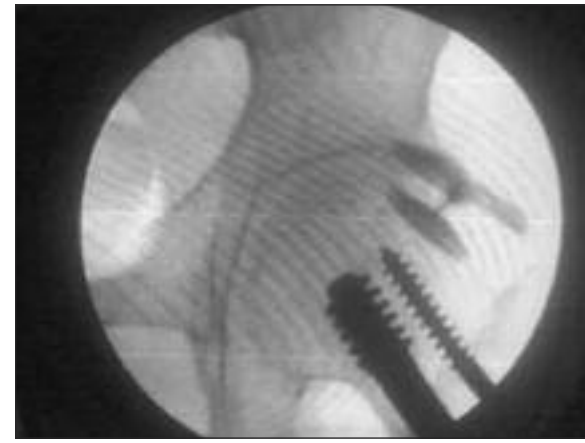

FIGURE 1: Piriformis injections seen on fluoroscopy. The black arrows indicate the piriformis muscle.

"Statistical Package for Social Sciences for Windows 13.0" (SPSS) and NCSS program were used for statistical analyses. Mean, standard deviation, minimum and maximum values were computed as defined data. The quantities in groups were compared with non-parametric Mann-Whitney U test because of not meeting the characteristic of normal distribution. Wilxocon–t test was used for dependent non-parametric groups. On the other hand, when comparing the quantities in non-dependent groups, the Chi-square test was used. For all analyses, a p value 0.05 was considered statistically significant, 0.01 more significant, and 0.001 the most significant.

RESULTS

Demographic characteristics of both groups were similar (Table 1).

TABLE 1a: Demographic characteristics of groups.

	Age (year)	Body Mass Index	Sex (M/F)
Group I	38.40 ± 8.34	26.56 ± 3.10	17/13
Group II	37.30 ± 8.27	25.34 ± 2.96	16/14
P values	> 0.05	> 0.05	

M, male; F, female.

TABLE 1b: Demographic values of groups.

Groups		Frequency	Percentage	p
Group I	Male	17	56.7	0.465
	Female	13	43.3	
	Total	30	100	
Group II	Male	16	53.3	0.715
	Female	14	46.7	
	Total	30	100	

The first parameter measured was the pressure value (PV) of the trigger point to evaluate trigger point activity in PS. Pressure values of trigger points were similar at baseline in both groups and PV values in group I at baseline, and at 1 and 3 months were 3.28 (3.0), 3.83 (3.7), and 4.30 (4.0) respectively. PV values in group II at baseline, and at 1 and 3 months were 3.21 (3.0), 3.56 (3.5), 3.76 (3.5) respectively. We observed a significant increase for PV at 1 and 3 months (p= 0.019) when compared to baseline (Figure 2). The greatest increase for PV occurred at 3 months (baseline < 1 month < 3 months). PV values at 1 month and 3 months in group I were significantly higher than the values in group II.

To evaluate the subjective complaints of patients with PS, VAS was used. VAS values of the patients were similar at baseline in both groups and VAS values in group I at baseline, and at 1 and 3 months were 7.06 (7.0), 4.66 (5.0), and 2.16 (2.0), respectively. VAS values in froup II at baseline, and at 1 and 3 months were 6.70 (6.5), 4.73 (5.0), and 4.00 (4.0) respectively. We observed a significant decrease in VAS values in both groups from 1 month to 3 months (p= 0.001) when compared with baseline (Figure 3). The decrease was smaller at 3 months (baseline < 1 month < 3 months). VAS values of froup I at 3 months were significantly lower than the VAS values of group II.

DISCUSSION

The approach for the treatment of PS is gradual and conservative treatment is usually successful. Initially, non-steroid anti-inflammatory medications, analgesics and myorelaxants may control the inflammation, pain, and spasm.[14,15] Physical therapy is considered in patients who do not respond to initial treatment. If physical therapy does not provide adequate cure, local anesthetics (lidocaine), steroids (triamcinolone or methylprednisolone) and bot-

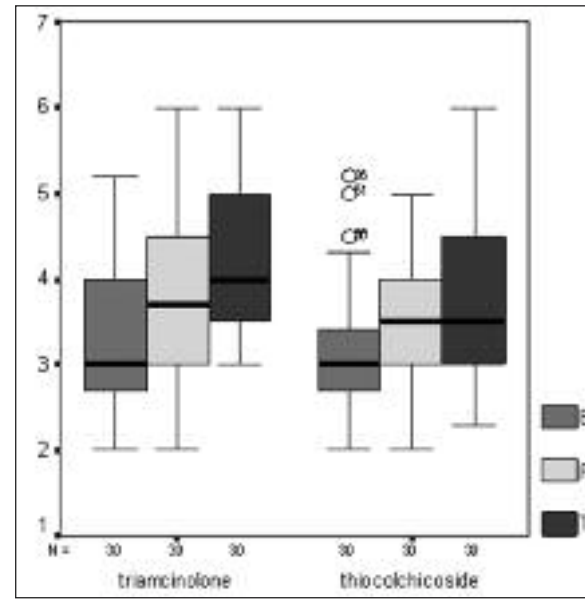

FIGURE 2: Pressure values of the groups. The greatest increase was at 3 months. PV values of group I (triamcinolone) at 1 and 3 months were significantly higher than those for group II (thiocolchicoside).
B: Baseline F: First Month T: Third Month

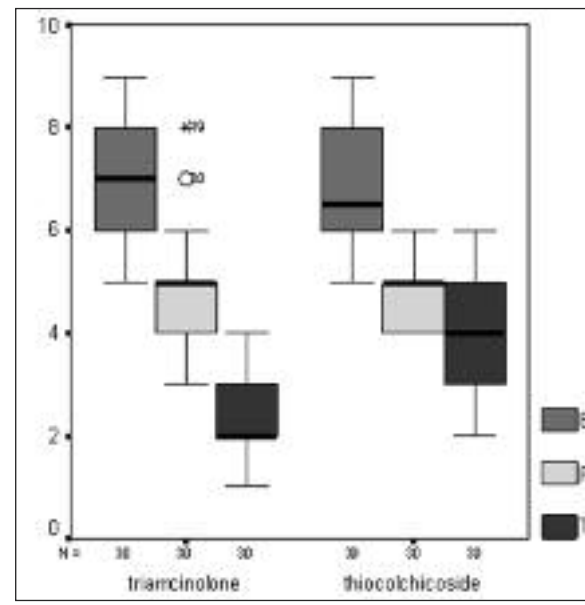

FIGURE 3: VAS values of the groups. VAS values of group I (triamcinolone) at 3 months were significantly lower than that in group II (thiocolchicoside).
B: Baseline F: First Month T: Third Month.

ulinum toxin-A and B injections into the piriformis muscle are alternative treatment approaches.[14-18] Symptoms are alleviated in most patients and may completely disappear in some cases.

We observed significant positive differences in pressure and VAS values of both groups at one month after the process compared to baseline. At the second visit at three months, this positive effect had almost diminished in the thiocolchicoside group and there was no significant difference compared to the first visit. However, in the triamcinolone group, the positive effect persisted and was still significant.

There is no prospective study in the literature comparing thiocolchicoside with triamcinolone for the treatment of PS. Only in a few studies with steroids a positive effect on PS treatment was detected. Hanania et al in their study, reported a significant decrease after steroid injection in six patients who did not respond to conventional methods.[19] In our study, the pain scores significantly decreased in the triamsinolon group similar to the the findings of Hanania et al. Porta, compared methylprednisolone with botulinum toxin type A injection in 40 PS patients and at one month observed a decrease in the pain scores. However, the botulinum toxin type A group had a higher decrease in pain scores than the methylprednisolone group at two months.[4] In our study, we evaluated pain scores at one and three months and saw that the decrease in pain scores at the end of three months in the steroid group was greater than that at one month. Based on our results, we concluded that the anti-inflammatory and analgesic effects of steroids lasted longer and was stronger than the effect of thiocolchicoside.

On the other hand, the data from the thiocolchicoside group suggested that the effectiveness of this molecule decreased at three months. This is similar to the effect of botulinum toxin which is another agent used in the PS treatment. Botulinum toxin is applied as repetitive injections. Fishman et al. examined botulinum toxin type B injection in PS patients by repeating the piriformis injection at 12 weeks and reported that the decrease in pain scores was greater after repeat injections than with the first injection.[18] Similarly, we believe that preserving the inhibitor effect of GABA by repetitive thiocolchicoside injections may exert a positive effect on trigger points like botulinum toxin. Yet further prospective studies are needed to support our idea.

In conclusion, triamcinolone has a similar effect compared to thiocolchicoside at one month following the administration but the effect of triamsinolon persists at 3 months. We suggest that triamcinolone is more effective than thiocolchicoside in one-dose-shot-treatments for PS patients. Nevertheless, thiocolchicoside is still an alternative treatment in PS patients where triamcinolone can not be used.

Acknowledgment

We would like to thank Assistant Professor Emel Lüleci for her help in the statistical analysis and M.D. Ş. Emre Erbabacan for English review.

REFERENCES

1. Benzon HT, Katz JA, Benzon HA, Iqbal MS. Piriformis syndrome: anatomic considerations, a new injection technique, and a review of the literature. Anesthesiology 2003;98(6):1442-8.
2. Robinson DR. Piriformis syndrome in relation to sciatic pain. Am J Surg 1947;73:355-8.
3. Parziale JR, Hudgins TH, Fishman LM. The piriformis syndrome. Am J Orthop 1996; 25(12):819-23.
4. Porta M. A comparative trial of botulinum toxin type A and methylprednisolone for the treatment of myofascial pain syndrome and pain from chronic muscle spasm. Pain 2000;85(1-2):101-5.
5. Thiele GH. Coccygodynıa and pain in the superior gluteal region: and down the back of the thigh: causation by tonic spasm of the levator ani, coccygeus and piriformis muscles and relief by massage of these muscles. J Am Med Asso 1937;109(16):1271-5.
6. Beauchesne RP, Schutzer SF. Myositis ossificans of the piriformis muscle: an unusual cause of piriformis syndrome. A case report. J Bone Joint Surg Am 1997;79(6): 906-10.
7. Agency for Health Care Policy and Research. Acute Low Back Problems in Adults. Clinical Practice Guidelines 14. AHCPR Publication No:95-0642, 1994.
8. Shah JP, Phillips TM, Danoff JV, Gerber LH. An in vivo microanalytical technique for measuring the local biochemical milieu of human skeletal muscle. J Appl Physiol 2005;99(5): 1977-84.

9. Schäfers M, Sorkin LS, Sommer C. Intramuscular injection of tumor necrosis factor-alpha induces muscle hyperalgesia in rats. Pain 2003;104(3):579-88.
10. Kelley JM, Hughes LB, Bridges SL Jr. Does gamma-aminobutyric acid (GABA) influence the development of chronic inflammation in rheumatoid arthritis? J Neuroinflammation 2008;5:1.
11. Spangelo BL, Horrell S, Goodwin AL, Shroff S, Jarvis WD. Somatostatin and gamma-aminobutyric acid inhibit interleukin-1 beta-stimulated release of interleukin-6 from rat C6 glioma cells. Neuroimmunomodulation 2004; 11(5):332-40.
12. Janbroers JM. Review of the toxicology, pharmocodynamics and pharmacokinetics of thiocolchicoside, a gaba-agonist muscle relaxant with antiinflammatory and analgesic actions. Acta Therapeutica 1987;13:221-50.
13. Weinling E, Sandouk P, Debray M, Scherrmann JM. Single- and repeated-dose pharmacokinetics of intramuscular thiocolchicoside in healthy volunteers. Int J Clin Pharmacol Ther 1999;37(10):503-9.
14. Barton PM. Piriformis syndrome: a rational approach to management. Pain 1991;47(3):345-52.
15. Parziale JR, Hudgins TH, Fishman LM. The piriformis syndrome. Am J Orthop 1996; 25(12):819-23.
16. Pace JB, Nagle D. Piriform syndrome. West J Med 1976;124(6):435-9.
17. Fishman LM, Anderson C, Rosner B. BOTOX and physical therapy in the treatment of piriformis syndrome. Am J Phys Med Rehabil 2002;81(12):936-42.
18. Fishman LM, Konnoth C, Rozner B. Botulinum neurotoxin type B and physical therapy in the treatment of piriformis syndrome: a dose-finding study. Am J Phys Med Rehabil 2004;83(1):42-50.
19. Hanania M, Kitain E. Perisciatic injection of steroid for the treatment of sciatica due to piriformis syndrome. Reg Anesth Pain Med 1998;23(2):223-8.