



TRANSDERMAL DELIVERY OF ANTI INFLAMMATORY DRUGS IN THE CASE OF LATERAL EPICONDYLITIS

St. Radev*

Department of Pharmacology and Clinical Pharmacology, Medical Faculty, Trakia University, Stara Zagora, Bulgaria

ABSTRACT

Lateral epicondylitis (tennis elbow) is a common condition characterized by pain and impaired function of the affected forearm. Analgesia and pain management are two very important aspects in the therapeutic process

A mixture of Diclofenac and Dexamethasone was given locally via dermoelectroporation in the area of the damaged lateral humeral epicondyl. The pain threshold was recorded with Pressure Algometry and used as a criterion for the drug efficacy.

Using this method of application of nonsteroidal and steroidal anti-inflammatory drugs has significant benefits like: quick pain relief, lower traumatic effect for the patient and minimum side effects. Based on these advantages it is thought that dermoelectroporation could be a preferable way of administering anti inflammatory drugs in inflammatory - degenerative conditions related to the musculoskeletal system, such as myotendinosis.

Key words: epicondylitis, dermoelectroporation, pressure algometry.

INTRODUCTION

Lateral epicondylitis (tennis elbow) is an inflammatory-degenerative disease affecting the insertion point (epicondylus lateralis humeri) of the extensors and supinator of the wrist, fingers, and the palm. The manifestation of the condition is characterized by pain in the anterior shoulder muscles, loss of the grasping activity and impaired outward rotation (supination) (1). The epicondylar area becomes sensitive and painful when pressure is applied, and the pain irradiates distally along the forearm muscles. The patients have difficulty in performing their routine daily activities when using the affected arm (dressing and undressing, work with a computer, remote control, screwdriver, etc.), which in itself leads to a worse quality of life and physical invalidation.

The common therapeutic approaches, such as

providing rest for the affected elbow, local (gels and unguents) and systemic administration of nonsteroidal anti-inflammatory drugs, steroid injections, physiotherapy, laser therapy, ice application, heat therapy, complete immobilization with a splint, etc., do not lead to satisfactory results in all cases (1, 2).

MATERIAL AND METHODS

The procedure was carried out in 17 individuals (15 males and 2 females) aged between 35 and 55, diagnosed with lateral epicondylitis, and no other accompanying diseases. All the patients presented with a persistent pain and limited activity for more than one month, despite the application of various therapeutic approaches.

Prior to the subcutaneous injection of the anti-inflammatory drugs, by palpation we determined the area of pain around the affected epicondylus, while at the same time we measured symmetrically and bilaterally the threshold of pain in the affected and the healthy elbow joint by using Pressure Algometer Somedic (3, 4, 5).

*Correspondence to: Stefan Radev, Department of Pharmacology and Clinical Pharmacology, Medical Faculty, Trakia University, 11 Armejska Str., 6000 Stara Zagora, Bulgaria, radev.st@abv.bg

A mixture (cocktail) of 75 mg 3 ml Diclofenac, 2 mg 0,5 ml Dexamethasone and 1,5 ml saline was administered (6, 7).

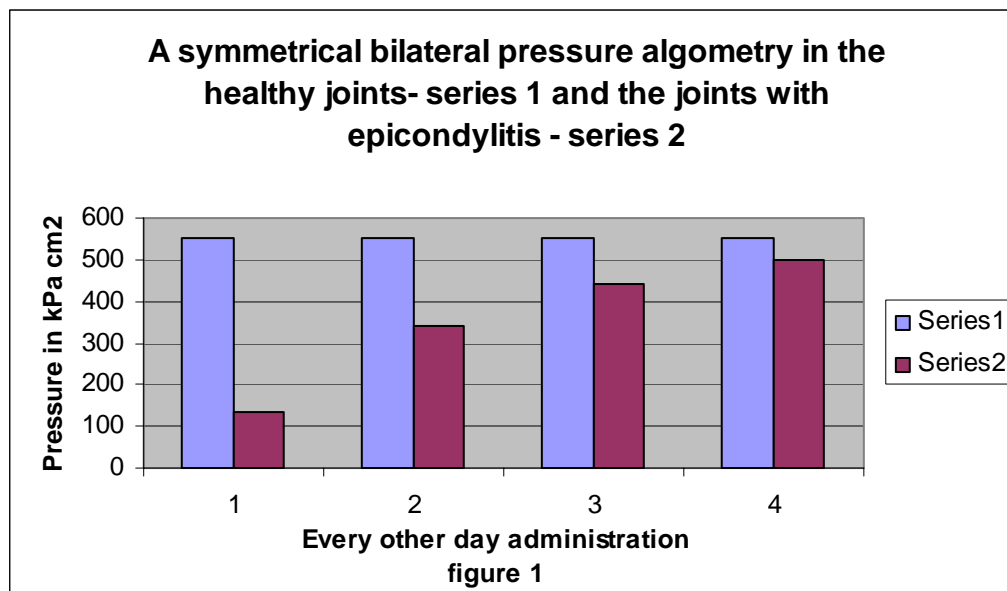
The transdermal drug administration – dermoelectroporation® - is utilized locally by using Ultrapeel® Transderm® Ionto System by Mattioli Engineering, in the area of the affected epicondylus, following microdermoabrasion (6). Through this method it is possible to perform a controlled exfoliation of the stratum corneum, which increases the skin permeability for the drugs applied in the treated area.

The therapeutic procedures were performed every other day, 3 or 4 times depending on the patients' condition.

RESULTS

The threshold of pain sensitivity measured in the healthy elbow joint was on the average 550 kPa/cm², which correlates with the data we obtained in our previous studies (5).

In the affected by the condylitis elbow joint the algometric result was registered before each transdermal administration of the anti-inflammatory agents. The measured threshold of the pain before the first administration was on the average 135 kPa/cm², before the second 340 kPa/cm², before the third 440 kPa/cm², while before and after the fourth it was 500 kPa/cm² on the average.



The analysis of the algometric results complies with the reported improvement of the patients and objectively confirms that the Diclofenac-Dexamethasone combination, administered via the Transderm Ionto System, eradicates the pain in lateral epicondylitis effectively and fast.

The treatment scheme with the Transderm Ionto System is entirely painless and non-traumatic.

During the course of the procedures and after discontinuation of the therapy no adverse drug effects were observed.

DISCUSSION

The fast control over the pain syndrome in epicondylitis lateralis through this mode of administration of drug combinations is a

reliable criterion for the efficacy of the therapeutic application. The non-traumatic approach and the lack of adverse effects are amongst its other advantages. Pain and discomfort are alleviated after the first manipulation, whereas after the second and third the threshold for pain increases up to the values approximating these in a healthy joint. The normal condition of the affected elbow and forearm is re-established.

The long-term perspective is similar to that of the other therapeutic approaches; there always exists a risk of a relapse, especially when intense activity is undertaken immediately after the course of treatment (2).

CONCLUSION

The existent positive therapeutic results in cases of joint and muscle pain, as well as in other regions of the body (2), expand the application of the Ultrapeel® Transderm® Ionto System. It is of clinical-pharmacological interest to find out the lowest effective doses for drug administration in this manner. Such an approach would optimize the use of anti-rheumatic agents and could also be a promising perspective for the risk groups of patients, in whom the anti-inflammatory drugs of the steroidal and nonsteroidal type are counter-indicated.

REFERENCES

1. De Smedt T, de Jong A, Van Leemput W, Lieven D, Van Glabbeek F. Lateral epicondylitis in tennis; update on aetiology, biomechanics and treatment. *Br J Sports Med*, 41 (11): 816-819, Nov 2007.
2. Andreas BM, Murrell GA. Treatment of tendinopathy: what works, what does not and what is on the horizon. *Clin Orthop Relat Res*. 466(7): 1539-54, Jul 2008.
3. Fisher AA - Pressure algometry over normal muscles. Standard values, validity

and reproducibility of pressure threshold. *Pain* vol. 30 p.115 – 126, 1987.

4. Fisher AA - Pressure algometry for quantification of diagnosis and treatment outcome. An update. *Journal of musculoskeletal pain*, vol. 6, (1) p. 5 – 32, 1998.
5. St. Radev, Zh. Tsokeva, K. Sokolova, R. Radev – The Algometry by pressure as a method to optimize painrelief therapy. *Trakia Journal of Sciences*, vol.6, No 2, pp 146 – 148, 2008.
6. Buselli P., Spaggiari PG. Post traumatic suffering and tendinopathies of sportsmen: a new method for the local pharmacological administration. XIV International Congress on Sports Rehabilitation and Traumatology, 2005.
7. Robert P Nirshl, Dennis M Rodin, Derek H Ochiai, Craig Maartmann-Moe. Iontophoretic administration of Dexamethasone sodium phosphate for acute epicondylitis: a randomized, double blinded, placebo-controlled study. *Am J Sports Med*, vol.31(2): 189 – 195, March 2003..