Ion Resonance vs. Vitamin C to Prevent Complex Regional Pain Syndrome Type I in Elderly with Wrist Fractures

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INTRODUCTION:

Extra-articular distal radius fractures are one of the most common orthopaedic fractures predominantly in the elderly population and they can be the trigger of algodystrophy. Algodystrophy, also known as complex regional pain syndrome (CRPS), is a painful disease characterized by erythema, edema, functional impairment, sensory and vasomotor disturbance. The Food and Drug Administration (FDA) recommends Vitamin C supplement to reduce the prevalence of complex regional pain syndrome after wrist fractures. A daily dose of 500 mg for 50 days is recommended. Moreover, in 1987, the first medical application of ion resonance was authorized by the American FDA to treat bone fractures consolidation delays. Ion resonance is based on two parallel magnetic fields, one static and one variable over time. The purpose of this study is to report whether the use of ion resonance or Vitamin C is the best to prevent complex regional pain syndrome type I in elderly with nonsurgically treated wrist fractures.

METHODS:

We enrolled 66 patients suffering extra-articular wrist fractures in elderly (over 75 years/old). We divided the patients into three groups. The first group (n=26) was a group of patients treated by Cast. The second group (n=20) was a group of patients treated by Cast and ion resonance. The third group of patients (n=60) were treated by Cast and Vitamin C.

Patient division was done through the free choice of patients to adhere to one of the relative and absolute contraindications and treatments for the therapies. The plaster was retained 35-days by all patients in the three groups. All patients in the second and third groups underwent adjuvant therapy for 50 days None of the patients received anti-osteoporotic therapy during the study.

The chosen criteria to evaluate the three groups during the clinical and radiological follow up were: complication of appeared CRPS in the three groups; the duration of stiffness; the objective quality Bone UNION measured by Radiographic Union SCORE WRIST (RUSW); and functional results were evaluated according to The Disabilities of the Arm, Shoulder and Hand (DASH) life correlated with wrist function by the Short Form 12 Health Survey (SF-12); the correlation between marrow bone with X-rays and MRI.

RESULTS:

In the First Group, 8 out of 26 (30.77%) patients developed a CPRS. The Second Group had 0 cases of CPRS. The Third Group only 1 out 20 (5%) presented CPRS.

There are no statistical differences between the three groups, regarding type of fractures, mean age, gender ratio, etc. We found the worst radiographic and stiffness results in the first group with a $p = 0.021$. The second group showed better bone healing with a $p = 0.043$, better performance in functional recovery measured by DASH ($p = 0.045$), and a better quality of life on cast removal ($p = 0.039$) and on 90 days after removal ($p = 0.047$). At the cast removal, the X-rays and MRI Index had better results for the second group ($p=0.032$).

DISCUSSION AND CONCLUSION:

The idea is to attenuate the proinflammatory processes through ionic exchange, balancing pH and reduction of osteoclastic activity to improve the increased levels of osteoblast through Vitamin C or two parallel magnetic fields, one static and one variable over time, that help in new bone formation.

From our study we can conclude that the association between cast and ion resonance or Vitamin C to treat elderly extra-articular wrist fractures helps to reduce CPRS.

Ion resonance group has reported better outcomes to improve the functional outcomes; it allows a more rapid healing of the regenerated bone and, consequently, an early removal of the device and a corresponding improvement of quality of life.