TREATMENT OF MEDIAN NERVE COMPRESSION WITH PULSED RADIOFREQUENCY: PRELIMINARY RESULTS IN 25 CASES

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BACKGROUND & AIMS

Carpal tunnel syndrome (CTS), caused by compression of the median nerve at the wrist, is considered to be the most common entrapment neuropathy. The lifetime incidence of CTS has been estimated to range from 2.7% to 16.0%, and is more common in women.

Symptoms of CTS include hand and arm pain, paraesthesia, and numbness or tingling involving the fingers innervated by the median nerve. Symptoms are worst at night and often awake the patient. To relieve the pressure on the median nerve, several treatment options, both surgical and conservative, are available.

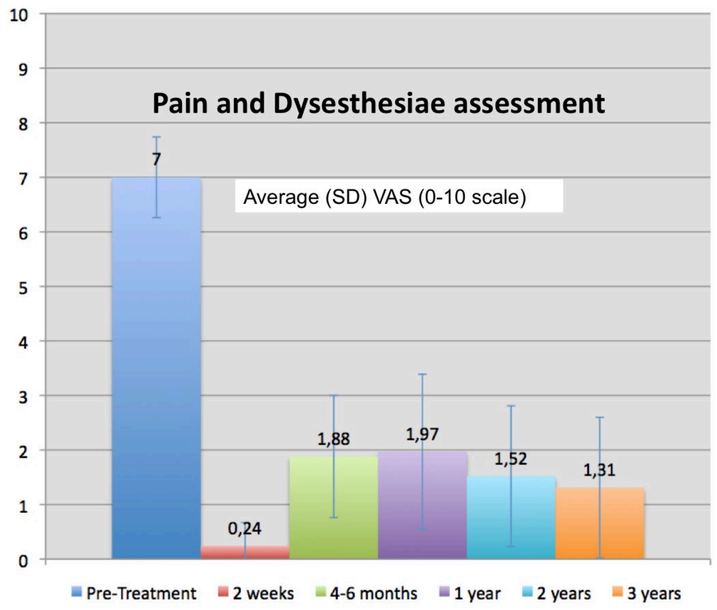
The benefit of non-surgical treatment is limited, although not all patients respond to surgery. Surgical treatment's complications and failures have been shown to occur in 3-19% in large series, requiring re-exploration in up to 12% for a variety of causes.

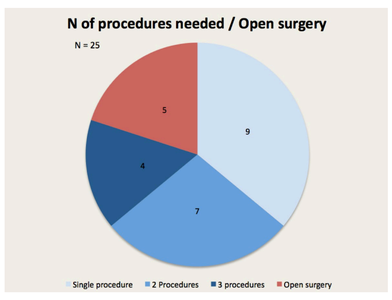
The American Academy of Neurology advises non-invasive treatment first, i.e. wrist splints, modification of activities, NSAIDs or diuretics, as well as steroid injections. Open carpal tunnel release is indicated only if non-invasive treatment has turned out to be ineffective.

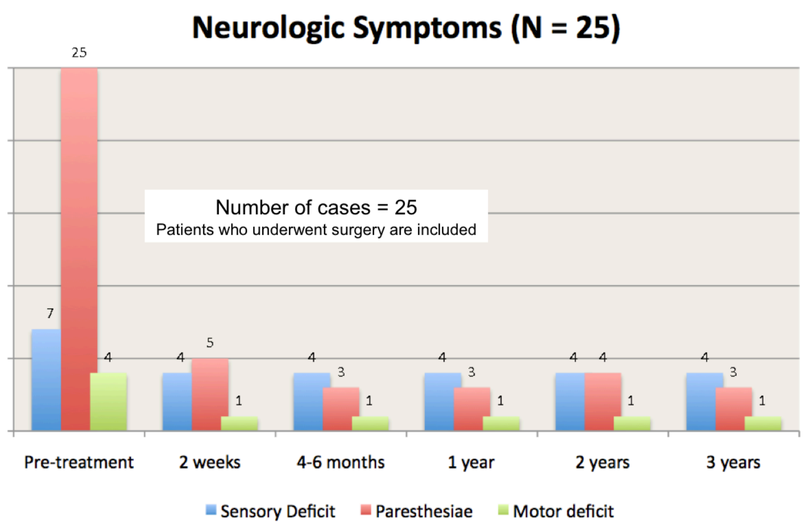
Pulsed radiofrequency, a percutaneous, minimally invasive form of radiofrequency stimulation, has been used in the last years for a variety of neuropathic peripheral pain conditions. It has been developed with the goal of providing reduction in pain from the use of electrical fields, without producing lesions by heat. It was first described in 1998 by M. Sluijter. Since then, several prospective studies have demonstrated its efficacy in relieving pain in various chronic pain conditions. Despite these promising results, the underlying mechanisms remain a question of debate.

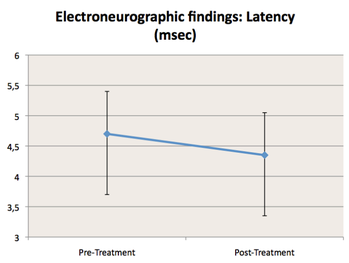
We describe a new technique for treating symptoms of median nerve entrapment neuropathy at the carpal tunnel, and we offer preliminary results in 25 retrospective and correlatively treated cases.

RESULTS









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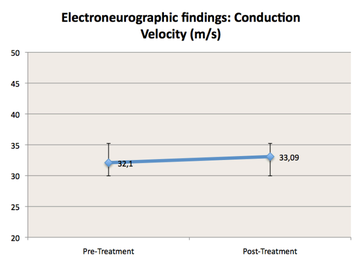

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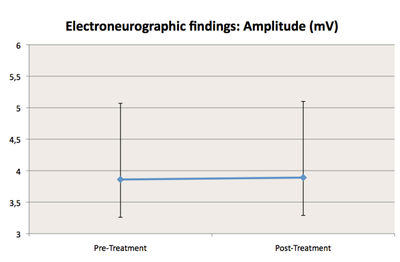

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PATIENTS & METHODS

25 correlative cases (25 wrists, 17 patients) meeting clinical and electroneurographic criteria for with CTS were included in the study and scheduled for treatment with pulsed radiofrequency of the median nerve at the carpal tunnel with bipolar / dual technique.

All of the patients but three (3 cases) were female. Their average age was 64,07 years (40-88).

Of the 25 wrists treated, only 2 had had previous open surgery. One particular patient showed also clinical features suggestive of post-surgical Complex Regional Pain Syndrome Type I in her left hand, while she suffered also symptoms of CTS in her right, non-operated hand.

Spontaneous pain and paresthesia in hand and forearm, as well as night pain and dysesthesia were the main symptoms. Pain measurements were made by means of a visual analogue scales (VAS) ranging from 0 (no pain at all) to 10 (the most intense pain I can imagine). Average VAS for pain and dysesthesiae was 7,0 (range 5,4-10). Additional physical examination included Tinel's test, Phalen's test, two-point discrimination test and grip and pinch strength measurement. Measurement of static two-point discrimination was performed on the pulp of the three radial digits. Measurement of grip strength and pinch strength was also recorded. Hypoesthesia was present in 7 cases and motor deficit in 4 cases.

We recorded electroneurographic parameters: sensory distal latency, nerve conduction velocity at the carpal region, and evoked potentials amplitude, both prior and post procedure (6 months).

All the cases were treated in the Interventional Pain Unit, either with the Cosman Radiofrequency Generator RFG-IA prototype (Cosman, Ruiz-López, 2007), or with the Cosman Four-electrode Radiofrequency Generator G4 (Cosman 2009) . The surgical technique is described elsewhere by this author.

After the procedure, clinical assessments were performed at 2-3 weeks, after 4-6 months, and after 1, 2 and 3 years follow-up. Patients with symptom relief but showing recurrence of symptoms were re-scheduled for repeating the procedure.

Outcome assessment included pain and dysesthesiae rating with Visual Analogue Scale (VAS), self referral of symptoms as paresthesia and tingling, grip strength measurement, sensory two point discriminative test, Tinel and Phalen tests.

CONCLUSIONS

1.Pulsed Radiofrequency is a safe treatment for Median Nerve Entrapment Neuropathy (Carpal Tunnel Syndrome).

2. Bipolar approach as well as the length of the active tips of both cannulae (10 mm each) have been used as a method for enlarge the electromagnetic field throughout the nerve and surrounding tissues.

3. Anatomical landmarks for positioning of cannulae are essential to meet appropriate placement of cannulae in the periphery of nerve.

4. Stimulation parameters have to be well established regarding time, amplitude, pulse duration and temperature.

5. Neurological deficitary findings and conduction velocity might be predictive issues for outcome.

6. Chronicity of neuropathic pain needs to be studied as a variable to evaluate results.

7. Pathological states of connective tissue in the human carpal tunnel could lead to nerve entrapment and could be modified by pulsed RF stimulation.

8.Osteoarthritic changes in carpal bones might correlate with less favourable results.

9. Further prospective, controlled studies are needed to define indications.

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