Peripheral Nerve Blocks with 0.5% Bupivacaine for the Treatment of Tarsal Tunnel Syndrome and Peripheral Neuropathy in Diabetic Patients

Abstract

Despite advances in the treatment of diabetic peripheral neuropathy, a consensus treatment protocol has yet to emerge from a myriad of invasive, non-invasive, and pharmacologic options. The primary goal would be to design a treatment that is not only effective and reproducible, but also inexpensive and easily administered.

Therapeutic injections consisting of a corticosteroid diluted in a local anesthetic are commonly used to treat localized inflammation in chronic entrapment syndromes of peripheral nerves, most commonly, the entrapment of the posterior tibial nerve in Tarsal Tunnel Syndrome. It has been hypothesized that the symptoms of diabetic peripheral neuropathy occur via a similar mechanism of deficient axoplasmic flow caused by local inflammatory and physical nerve insults combined with a metabolic component of nerve glycosylation and impaired vascular endothelial function. Considering the possible deleterious effects of corticosteroid induced vasoconstriction on metabolically compromised vasa nervorum, we proposed that serial nerve blocks using bupivacaine without a steroid component would provide reproducible symptomatic relief of diabetic peripheral neuropathy. This hypothesis was based on research demonstrating 0.5% bupivacaine’s ability to produce a significant localized anti-inflammatory affect as well as a decrease in systemic cytokine production following local infiltration in a diabetic rat sciatic nerve model.[2]

A total of 22 out of 24 patients receiving the treatment reported successful results. Observed complications were limited to pain during the injection and temporary distal paresthesia. Follow up with these patients also revealed that all complications were found to be temporary and self-limiting.

Materials and Methods

This prospective study consisted of 28 consecutive diabetic patients with clinical and electrophysiologic evidence of tarsal tunnel syndrome and peripheral neuropathy. Patients received peripheral nerve blocks of the tibial nerve, superficial peroneal nerve, and deep peroneal nerve of the symptomatic limbs. Blocks consisted of a total of 9 cc of 0.5% bupivacaine plain (3 cc per nerve) and were performed by the lead author at 2 week intervals for a total of 3 peripheral blocks.

A nerve block series was considered successful if the patient reported greater than 70% relief of all symptoms.

Discussion/Conclusion

The use of bupivacaine to produce a local anti-inflammatory affect as well as a decrease in systemic cytokine production following peripheral nerve infiltration via injection may prove to be a successful counteraction against the harmful effects of diabetes on the peripheral nerves. Although further research involving larger patient populations with post-treatment follow up will be needed to assess the efficacy of this hypothesis, we have found the short term use of serial peripheral nerve injections of 0.5% bupivacaine to be an effective non-surgical option in the symptomatic treatment of pain and instability associated with tarsal tunnel syndrome and peripheral neuropathy in diabetics.

Results

In a study containing a total of 25 patients (89%) reported greater than 70% relief of symptoms following a series of nerve blocks. Only 3 patients (11%) reported less than 70% relief of symptoms. Observed complications were limited to pain during the injection and temporary distal paresthesia. Follow up with these patients also revealed that all complications were found to be temporary and self-limiting.

References