

# Perineural Injection Therapy (PIT) with Dextrose for Treatment of Chemotherapy Induced Peripheral Neuropathy: A Case Report

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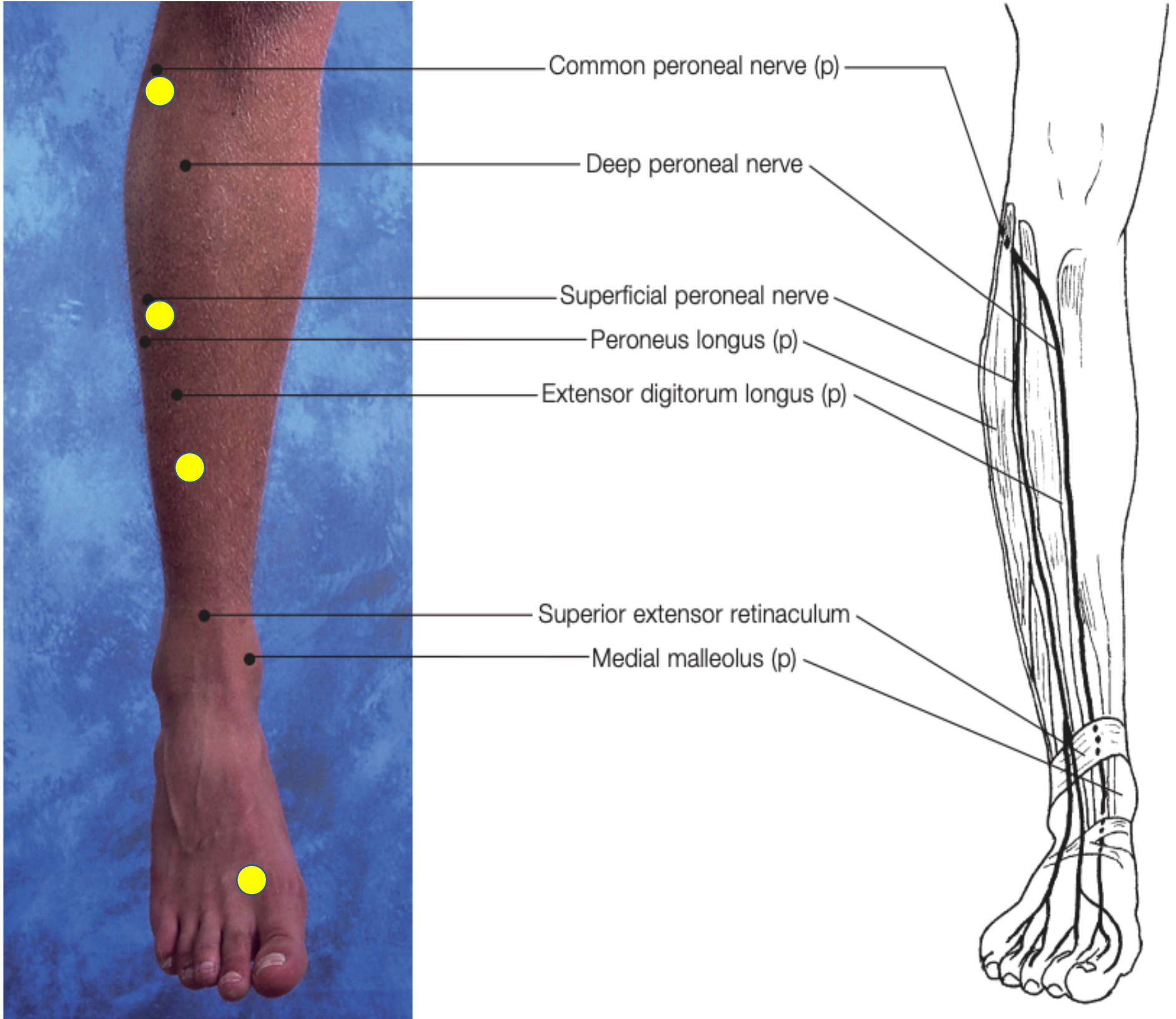
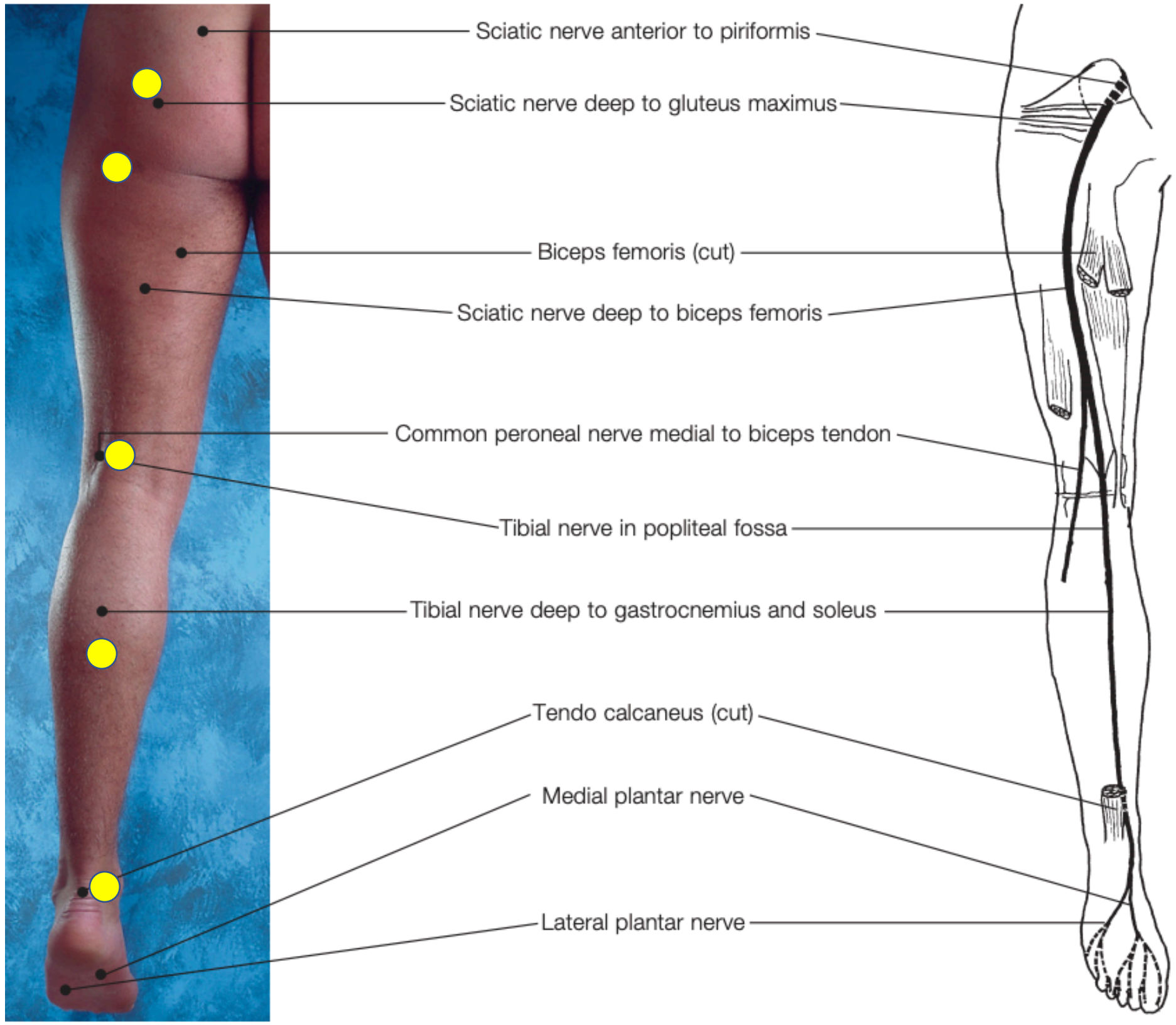
BACKGROUND

- The injection of isotonic dextrose (5% dextrose in water, D5W) stimulates regeneration and repair of injured tissue by reducing neurogenic inflammation in the peripheral nervous system
- Chemotherapy induced peripheral neuropathy (CIPN) affects up to 80% of patients during treatment and if severe may limit dose and choice of chemotherapy agent
- Chemotherapeutic agents cause disruption of axonal neural transport, receptor activity, neural injury and inflammation causing peripheral neuropathy
- This case study assesses treatment response of CIPN to perineural dextrose prolotherapy injection

CASE DESCRIPTION

A 69 year-old-male with history of mantle cell lymphoma stage IIIB was treated with 6 cycles of cyclophosphamide, doxorubicin, vincristine, and rituximab. After chemotherapy treatment he experienced several years of progressive bilateral lower extremity paresthesia and associated difficulty with ambulation. The patient was referred to the rehabilitation clinic after multiple falls due to impaired ambulation and failed response to gabapentin for treatment of peripheral neuropathy. Physical examination was significant for dry scaling skin, decreased sensation to light touch in the bilateral lower extremities and slow wide based gait requiring rolling walker. EMG was significant for sensorimotor axonal demyelinating tibial and peroneal neuropathy of the bilateral lower extremities.

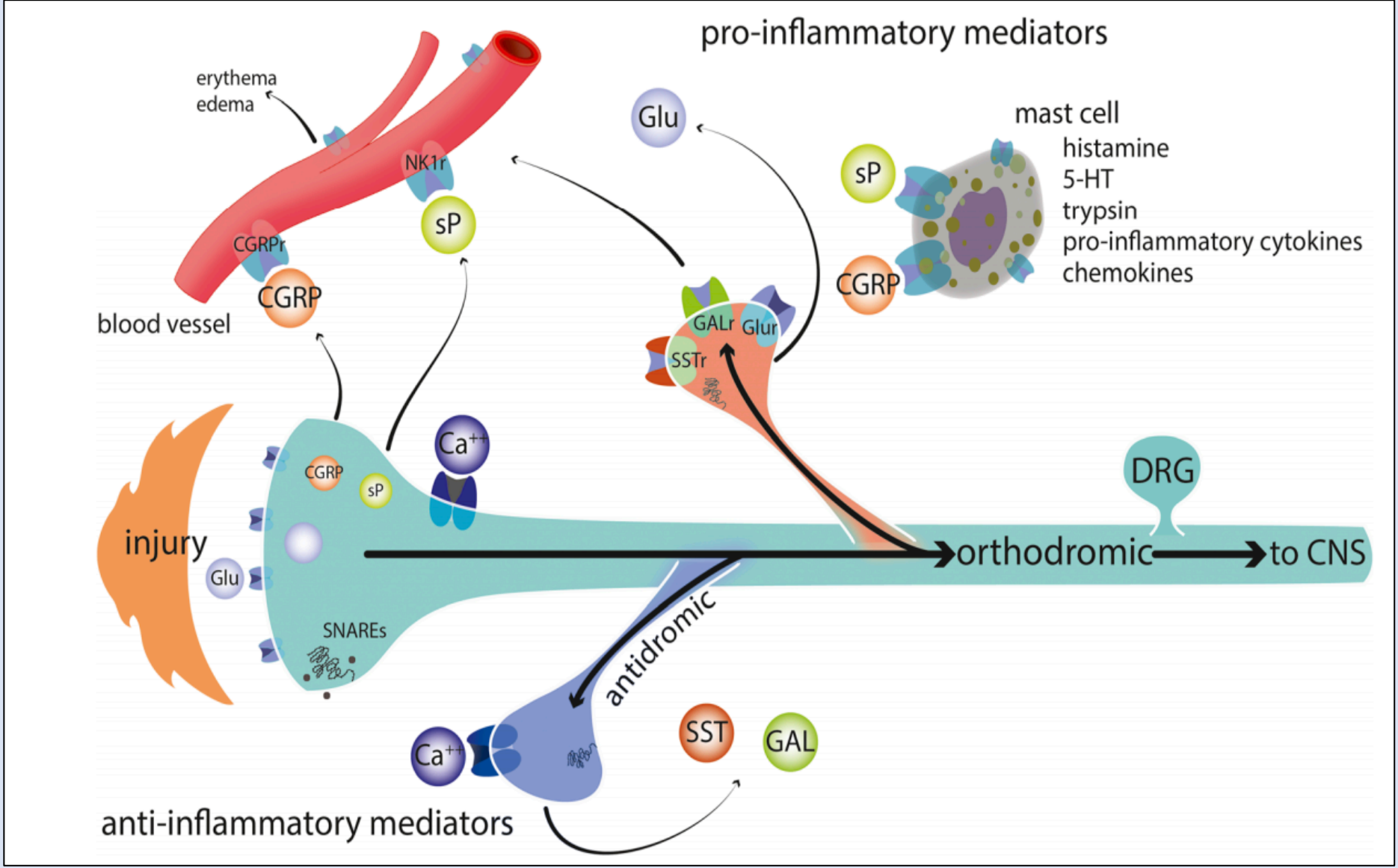
INTERVENTION



Field, D., Owen, H. J., & Redmond, A. D. (2008). *Field's lower limb anatomy, palpation and surface markings*. Edinburgh: Churchill Livingstone Elsevier.

- 0.5mL to 1mL aliquots of 5% dextrose were injected along the course of the sciatic, tibial and peroneal nerves and their respective distributions (yellow points) in both lower extremities
- Patient endorsed relief of discomfort related to paresthesia in the lower extremities immediately after initial treatment lasting several days
- The patient returned for repeat treatments at 2 week intervals for a total of 5 dextrose prolotherapy treatments
- Improvement in peripheral neuropathy symptoms was maintained at greater time intervals after each respective treatment

- After 5 treatment session he reported overall improvement of 25-50% in severity of paresthesia of the lower extremity and was able to ambulate with a cane for house hold and short distance community ambulation



Sorkin, L. S., Eddinger, K. A., Woller, S. A., & Yaksh, T. L. (2018). Origins of antidromic activity in sensory afferent fibers and neurogenic inflammation. *Seminars in Immunopathology*, 40(3), 237-247. doi:<http://dx.doi.org/eresources.mssm.edu/10.1007/s00281-017-0669-2>

DISCUSSION

- Neurogenic inflammation is induced by noxious stimuli that cause the nervi nervorum surrounding the nerve to release pro-inflammatory mediators substance P (Sub P) and calcitonin gene related peptide (CGRP) onto C-pain fibers
- Activation of this pathway activates erythema and edema in peripheral tissue causing pain and swelling around the nerve
- Dextrose binds to calcium channels inhibiting the release of sub P and CGRP reducing peripheral sensitization and creating an environment for nerve repair
- PIT also may improve nerve pain and injury via hydro dissection of peripheral nerves from encasing fascia providing a decompressive effect
- Points around the course of the nerve vulnerable to pressure, known as valleix points, are targeted in the prolotherapy treatment for peripheral neuropathy

CONCLUSIONS

- Dextrose prolotherapy is an under investigated potential treatment option for peripheral neuropathy
- Currently treatment options for CIPN are limited and have poor treatment response. This case demonstrates improvement in discomfort and function in a patient with chronic neuropathy induced by chemotherapeutic agents
- Further investigation of dextrose prolotherapy as a potential treatment modality is of interest in the field of cancer rehabilitation

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