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Management of chronic chemotherapy induced peripheral neuropathy using neurostimulation

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Introduction: Several patients on chemotherapy for treating malignant neoplasms suffer Chemotherapy-induced painful peripheral neuropathy, the severity and frequency depends on the regimen used. Unfortunately this nerve damage is partially reversible and patients may continue to suffer the pain and motor dysfunction after the termination of chemotherapy. We are presenting a patient with chemotherapy induced painful peripheral neuropathy who was successfully treated by a spinal cord stimulator after failure of conservative measures.

Case Presentation: Our patient was a 47 years old man who received chemotherapy for treating non-Hodgkin's lymphoma. Patient had successful treatment for his cancer but developed painful chemotherapy induced peripheral neuropathy in both hands. Patient presented to our clinic with severe pain in both hands, 7/10 on VAS. EMG was performed and confirmed the diagnosis of severe polyneuropathy. Patient tried several treatment modalities as physical therapy and medications which were not effective in treating his pain. We performed a spinal cord stimulator trial with placing 2 octad leads into the cervical region at the level of C4-5. Patient indicated great improvement in his pain by about 70-80% with improvement in function and ability to use his hands. Based on this successful trial, we proceeded with the permanent spinal cord stimulator implant. Patient continued to have good improvement in his pain and function as with the trial.

Conclusion: Chemotherapy induced peripheral neuropathy can be very resistant to treatment but can be treated successfully by neurostimulation.

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Development of nanoemulsion for popinirole in treating central nervous system disorders

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Nanoparticles are used in biomedical applications as drug carriers or imaging agents. These include polymeric nanoparticles, SLN, NLC and lipoplexes. The lecture will cover classification and methods of preparation of nanoparticles including polymeric, nonpolymeric and metallic nanoparticles. Therapeutic strategies for tumor targeting using nano particulate systems including Pegylation, role of nanoparticles in inhibition of p-glycoproteins and to overcome drug resistance in tumors as well as application of non-viral gene therapy using nanoparticles will be highlighted. The presentation will highlight the research work which achieved the objective of making transition and paradigm shift of conventional ropinirole formulation to the modern nanotechnology based system for the anti-Parkinson activity. The optimized formulations were designed in nanometric state with mucoadhesion property which synergized and improved the pharmacokinetics requirement in the disease. The route of administration via nose demonstrated and authenticated the concept of nose to brain targeting in the safe effective manner. The optimized formulation consisted of sefsol, tween 80 and transcutol P (NE^{ROP27}) showing desirable particle size, % transmittance, ex vivo permeation and PC. Nanoemulsion NE^{GM1} provided the highest porcine nasal mucosa supported release (72.23%) amongst the optimized formulations whereas ropinirole solution showed a release of only 11.9% in 24 hours. Homogenized nanoemulsion formulations were coated with chitosan to increase the effective mucoadhesion. The tagged formulations were administered into alternating nostrils (total volume=15 µl in each nostril) and the rat was exposed under the gamma camera for imaging and at specified time interval. The drug level in different organs was estimated by gamma scintigraphy. Thus, coated and non-coated nanoemulsions exhibited significantly higher distribution of radioactivity ($p<0.05$) in the brain as compared to the other body organs when compared with the nasal and I.V. solutions of ropinirole. The higher brain uptake of nanoemulsion could be attributed to the superior permeation of the nanocarriers across the biological barriers. Different brain targeting parameters also favored the nose to brain drug delivery over the intravenous route of administration. Brain uptake was significantly ($P<0.05$) increased (in terms of C_{max} and AUC) for the mucoadhesive formulation ($CSNE^{ROP}$) as compared to a simple nasal $Soln^{ROP}$ formulation.

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