The Usefulness of Nerve Conduction Studies in Objectively Assessing Oxaliplatin-Induced Peripheral Neuropathy

ANDREAS A. ARgyriou,a PANAGIOTIS POLychronopoulos,b ELISABETH CHRONIB

aDepartment of Clinical Neurophysiology, National Hospital for Neurology and Neurosurgery, London, United Kingdom; bDepartment of Neurology – EMG Laboratory, University of Patras Medical School, Rion-Patras, Greece

Disclosure: No potential conflicts of interest were reported by the authors, planners, reviewers, or staff managers of this article.

We read with great interest the recently published paper in your distinguished journal by Wang et al. [1], on the effect of oral glutamine in preventing oxaliplatin-induced peripheral neuropathy. The authors, among others, demonstrated an inconsistency between the electrophysiological findings and the subjective manifestations reported by patients. They report that, despite the clinical difference, the neurophysiological investigation did not show statistically significant differences between treatment groups. They also mention that, although sensory nerve conduction may be affected significantly after oxaliplatin-based treatment, the severity of clinical sensory neuropathy does not always correlate with findings of nerve conduction studies. Cascinu et al. [2] reached the same conclusion, demonstrating that sensory nerve conduction was significantly affected by oxaliplatin only in patients receiving placebo, but not in those receiving glutathione.

The results of these studies raise the issue of whether nerve conduction studies are useful in objectively assessing chemotherapy-induced peripheral neuropathy (CIPN). In contrast to the results of Wang et al. [1], in our recently published study on the efficacy of oxcarbazepine in preventing oxcarbazepine in preventing oxaliplatin neurotoxicity, it was demonstrated that between-group (patients receiving oxcarbazepine versus control patients) longitudinal comparison of the median changes in amplitude of sensory action potentials (a-SAP) during chemotherapy revealed significant differences in two of the three sensory nerves tested, thereby favoring oxcarbazepine administration [3]. In line with existing knowledge on the topic of CIPN [4], the severity of clinical symptoms and signs correlated with our electrophysiological findings [5]. Furthermore, another study conducted by our group evidenced a significant longitudinal decrease in all the a-SAPs examined during therapy with the formal FOLFOX-4 regimen [5].

In our opinion, Wang et al. [1] should provide further explanation to justify this inconsistency. Their claim that the non–placebo controlled, unblinded study design might be the cause of this discrepancy is not sufficient. In their study, a subgroup of approximately one third of the patients underwent neurophysiological investigations; neither the technique nor the quantitative outcomes of the investigations were provided.

In any case, we strongly support the view that nerve conduction studies are useful and capable of objectively assessing the extent of peripheral nerve damage secondary to chemotherapy administration and may also facilitate the identification of patients that manifest subclinical peripheral neuropathy prior to the onset of clinically significant neurotoxicity [6]. Our experience showed that a precise clinical evaluation, combined with a detailed electrophysiological assessment, could provide data regarding the characteristics of peripheral neuropathy during chemotherapy and may also predict the final neurological outcome of CIPN [7]. It is acknowledged that...
electrophysiological examination is not always available in the general oncology practice; however, oncologists should be aware that, particularly, the estimation of vibration perception, deep tendon reflexes, and sural sensory action potential is mandatory in the follow-up course of CIPN [7].

REFERENCES

In Reply

WEI-SHU WANG,a,b JEN-KOU LIN,a,c Tzu-Chen Lin,a,c WEI-SHONE CHEN,a,c JENG-KAE JIANG,a,c HUANN-SHENG WANG,a,c TZEON-JYE CHIOU,a,b JIN-HWANG LIU,a,b CHUEH-CHUAN YEN,a,b PO-MIN CHENa,b

aNational Yang-Ming University School of Medicine, Taipei, Taiwan, Republic of China; bDivision of Oncology & Hematology, Department of Medicine, Taipei Veterans General Hospital, Taipei, Taiwan, Republic of China; cDivision of Colorectal Surgery, Department of Surgery, Taipei Veterans General Hospital, Taipei, Taiwan, Republic of China

Disclosure: No potential conflicts of interest were reported by the authors, planners, reviewers, or staff managers of this article.

Indeed, electrophysiological examinations, including nerve conduction velocity (NCV), are useful tools in assessing oxaliplatin-induced peripheral sensory neuropathy [1–4]. It has been shown that damage to the nucleolus of ganglionic sensory neurons of rats treated with various platinum drugs is closely linked to the alteration of sensory NCV [1]. Interestingly, oxaliplatin reduced NCV mainly in peripheral and sensory nerves, without affecting central or motor nerve conductions [3], which was compatible with the clinical manifestations of patients who have been treated with oxaliplatin. And the severity of neurological symptoms correlated well with electrophysiological findings [4].

Because the symptoms of peripheral sensory neuropathy are, on occasion, subjective, a precise clinical evaluation, including a detailed history-taking as well as physical examination, is crucial for detecting the occurrence of peripheral neuropathy during chemotherapy. In fact, the grading systems we commonly use in daily practice and clinical trials for evaluating chemotherapy-induced peripheral neuropathy do not include electrophysiological studies. For example, the grading scales designed by the World Health Organization, Eastern Cooperative Oncology Group, and National Cancer Institute Common Toxicity Criteria, or the oxaliplatin-specific neuropathy scale designed for the Multicenter International Study of Oxaliplatin/5-Fluorouracil/Leucovorin in the Adjuvant Treatment of Colorectal Cancer trial [5], consist of subjective sensory loss, paresthesias, loss of deep tendon reflexes, constipation, bladder dysfunction, paralysis, etc., without abnormalities in electrophysiological studies.

It is obvious that the evaluation of patients’ neurological symptoms during chemotherapy is very practical and easier to perform than electrophysiological examination, because the latter is not always available in the general oncology practice. In addition, the findings of nerve conduction studies do not always correlate with the severity of sensory neuropathy. For example, it has been shown that the abnormalities of sensory NCV may persist even though the symptoms of oxaliplatin-induced neuropathy have been remarkably reduced after discontinuation of oxaliplatin treatment [6].