Minimizing Risk of Cancer Therapeutics

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KEYWORDS

• Chemotherapy-induced peripheral neuropathy • Platinum-based toxicity
• Taxane-based toxicity • Radiation fibrosis • Radiation fibrosis syndrome

KEY POINTS

- Chemotherapy-induced peripheral neuropathy (CIPN) is typically a dose-dependent peripheral neuropathy presenting in a "glove and stocking" distribution.
- Typical agents leading to CIPN include use of platinum-based, vinca alkaloid, taxane, proteasome inhibitor, antimicrotubule, and antiangiogenesis drugs.
- Use of ionizing radiation in cancer treatment can lead to radiation fibrosis of tissues involved in the treatment field.
- Radiation fibrosis syndrome (RFS) is the clinical presentation of the resultant damage from progressive fibrotic and sclerotic changes seen in some combination of structures involved.
- Although there are currently no preventive or curative measures for either CIPN or RFS, early diagnosis and treatment can reduce interference with oncologic management and improve patient symptoms and quality of life.

CHEMOTHERAPY-INDUCED PERIPHERAL NEUROPATHY

Chemotherapy-induced peripheral neuropathy (CIPN) is a dose-dependent neuropathy typically presenting in a "glove and stocking" distribution. Affecting 30% to 70% of patients who undergo certain chemotherapeutic treatment,[1] this length-dependent neuropathy typically presents as a sensory peripheral neuropathy, but can also cause motor and autonomic neuropathies. Symptoms usually start after several rounds of the offending chemotherapeutic agent, but they can also have an acute onset or progress even after the discontinuation of treatment.

The pathophysiology leading to CIPN varies slightly between chemotherapy therapeutic agents, but predisposing regimens include the use of platinum-based

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antineoplastic, vinca alkaloid, taxane, proteasome inhibitor, antimicrotubule, and anti-angiogenesis drugs.

At this time, no protective agents used before or during chemotherapy have been found to be effective, but treatment regimens have been used to ameliorate the side effects and symptomatic neuropathy that subsequently develops. Treatment includes a variety of over-the-counter, topical, prescription, and therapeutic options. Even with current treatment options, significant and debilitating neuropathic side effects can require modification of chemotherapeutic treatment regimens and even interruption of the regimen altogether. Continued efforts are undergoing in research and development for protective and symptomatic relief, not only for patient comfort and quality of life,[2,3] but to limit the alteration or cessation of chemotherapeutic regimens because of side effects, such as CIPN.

Chemotherapy-Induced Peripheral Neuropathy Clinical Presentation

Chemotherapy-induced neuropathy is a common side effect of many antineoplastic drug regimens, leading to a length-dependent sensory, motor, and/or autonomic neuropathy. The identification of at-risk patients can be difficult, but identifiable predisposing factors include prior therapy with neurotoxic agents, diabetes mellitus, folate/vitamin B12 deficiencies, African race, and older age.[4,5] Some predisposing causes for peripheral neuropathy can be seen in **Fig. 1**. These variables can impact not only the presence of peripheral neuropathy before treatment, but it can also predispose a patient to develop symptoms early in their treatment course. In these cases, patients should be educated about the risks for neuropathic side effects and monitored closely for development of symptoms. In some situations, as in a patient with neuropathy at presentation, alternative regimens could be considered with agents known to have a lower risk of neurotoxicity.

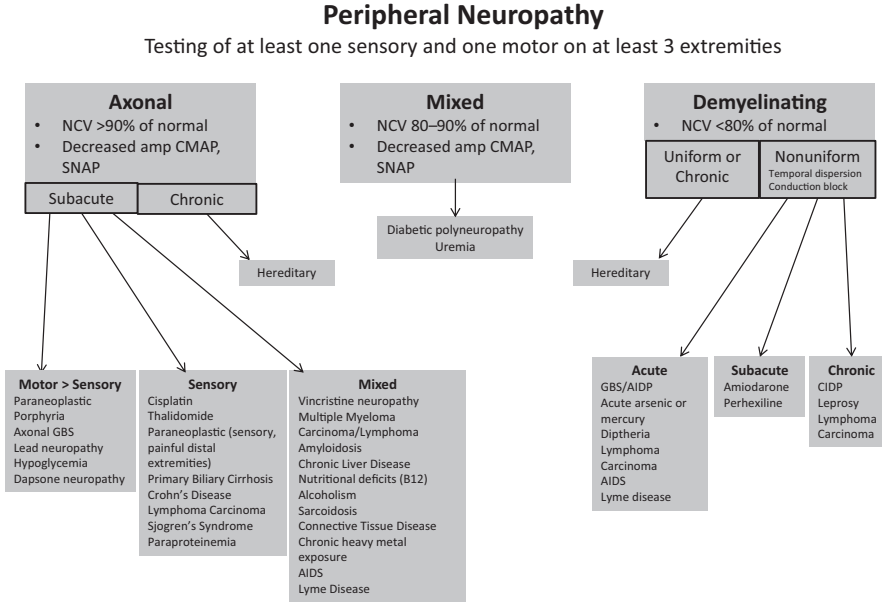

Fig. 1. Peripheral neuropathy diagnostic findings and etiology. AIDP, acute inflammatory demyelinating polyneuropathy; GBS, Guillain-Barré syndrome.