Cerebellar toxicity is a known potential adverse effect of high-dose cytarabine chemotherapy. Oncology nurses are expected to assess patients receiving high-dose cytarabine for cerebellar toxicity prior to administering each dose. Information regarding cerebellar assessment techniques and documentation of findings is limited in the nursing literature. This article provides nurses with a standardized approach for cerebellar function assessment and documentation of assessment finding for patients receiving high-dose cytarabine therapy.

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Cerebellar Assessment for Patients Receiving High-Dose Cytarabine: A Standardized Approach to Nursing Assessment and Documentation

At a Magnet® community hospital-based outpatient infusion clinic setting, chart audits and staff interviews identified significant inconsistencies in cerebellar assessment techniques and related documentation for patients receiving high-dose cytarabine. High-dose cytarabine traditionally is used in patients with a diagnosis of refractory non-Hodgkin lymphoma, acute myeloid leukemia, or in refractory or recurrent acute lymphoblastic leukemia.

The inconsistencies were identified as a safety issue because high-dose cytarabine can produce central nervous system toxicity, more specifically, cerebellar toxicity (Amen, 2007; Hensley et al., 2000). Neurologic toxicity present in 12%–50% of patients receiving high-dose cytarabine (Hensley et al., 2000; Hwang, Yung, Estey, & Fields, 1985; Nand, Messmore, Patel, Fisher, & Fisher, 1986). Neurologic impairment is noted with cumulative doses ranging from 12–36 g/m² (Nand et al., 1986). The neurologic impairment may be irreversible if no actions are taken to detect and manage it (Hwang et al., 1985).

Fortunately, the neurologic impact of high-dose cytarabine toxicity can be mitigated if it is identified early and appropriate precautions are applied (Hwang et al., 1985; Lundquist & Holmes, 1993). Because of the neurologic risk, nurses should conduct a proper cerebellar assessment in addition to a general neurologic assessment (including muscle strength and Glasgow Coma Scale) prior to administration (Amen, 2007; Lundquist & Holmes, 1993; Nand et al., 1986).

In the outpatient setting where the author works, physicians do not routinely round on patients. For example, a patient receiving high-dose cytarabine once every 12 hours for a total of six doses may see the physician or nurse practitioner in the office prior to the three days of therapy and then again in the office after the three days of therapy are completed. Therefore, nurses at the bedside must understand the toxicity risks of the drug, how to assess for them, and how to adequately document assessment findings. Nurses also must understand actions to take in the event that neurologic toxicity is identified. Nurses can better advocate for patient safety by promptly and accurately identifying neurologic impairment which could otherwise result in permanent neurological damage or a delay in therapy (Lundquist & Holmes, 1993).

Cerebellar toxicity is a dose-limiting toxicity associated with high-dose cytarabine (Herzig et al., 1987). The standard of practice for toxicity management is to hold the chemotherapy and notify the physician immediately for any documented toxicities (cerebellar, ocular, or cutaneous) associated with the administration of high-dose cytarabine (Hensley et al., 2000; Hwang et al., 1985; Lundquist & Holmes, 1993).

Methods

This issue was regarded as a patient safety priority for the organization, a team was formed that included the inpatient neurology and oncology nurse educators, as well as an informatics nurse who is responsible for technical development of electronic flowsheets for nursing documentation. Oncology and neurology physicians were consulted for content validity. The inpatient neurology and oncology units expressed interest in...
Clinical application of a neurologic assessment tool.

Using the Iowa Model of Evidence-Based Practice (Titizer et al., 2001), the team conducted a search of current nursing literature for cerebellar assessment techniques specifically related to high-dose cytarabine administration. Because of a lack of available current nursing literature, the search was expanded to include medical journals, online education modules, and textbooks about assessment techniques and findings documentation.

Results

The team used neurology texts to create a high-dose cytarabine neurotoxicity assessment. The assessment then was compared to a previously published scale (Lundquist & Holmes, 1993). The newly developed tool differs because of the inclusion of a handwriting assessment. Handwriting ability was added to the assessment because it is a fine motor skill that can be impacted by cerebellar toxicity and is easily assessed (Camp-Sorrell & Hawkins, 2006). Data are being assessed to validate whether the lower-extremity assessment is necessary. The nurse educators on the inpatient neurology and oncology units examined face validity of the neurologic assessment.

A proposed standardized cerebellar assessment was developed, including how to perform the assessment and how to document the findings. The assessment takes approximately 5–10 minutes to complete. The following parameters are included in the cerebellar assessment: speech pattern, handwriting, point-to-point testing, rapid alternating hand movement testing, Romberg test, and assessment of nystagmus, gait, and body tremor. This assessment was created in the form of a chart handout so that it could be posted easily on the unit for reference. The chart was attached to the nursing procedure that specifically addresses high-dose cytarabine administration. Minor revisions to the nursing procedure also were made to correlate with the changes.

Next, the hospital’s informatics department created a mock-up of the electronic documentation tool (see Figure 1). The tool was designed to be inserted into the generic neurologic flowsheet on an as-needed basis. Copies of the mock-up were reviewed with clinical staff, and wording was finalized to be generic enough to apply to any patient population within the hospital, not just patients with cancer receiving high-dose cytarabine. All nurses documenting in the system had access to the flowsheet once the finalized parameters were added to the hospital’s electronic charting system.

Shared governance is an active process at the hospital, and the changes required the approval of several entities. The standardization process was presented to and received approval from the hospital’s Cancer Committee, the oncology medical director, the Nursing Standards and Practice Council, and the Clinical Documentation, Informatics, and Technology (CDIT) Council.

Finally, after approvals were obtained, formal education was developed and implemented for the inpatient and outpatient oncology staffs and the inpatient neurology nursing staff. The remaining staff nurses in the hospital were apprised of the change through their representatives on the Nursing Standards and Practice Council and the CDIT Council.

Conclusion

Audit results currently are demonstrating a significant increase in standardization of the assessment and documentation of cerebellar status for patients receiving high-dose cytarabine. The staff nurses interviewed have expressed great appreciation for the concentrated information chart on how to accurately perform the assessment and identify the results. The documentation tool allows the nurses to check the appropriate assessment results and eliminates the need for free text documentation. However, each result section does have a free text option for additional information to be recorded if necessary. Nurses are expressing increased willingness to perform and document the cerebellar assessment because of easy access to instructions and the elimination of cumbersome and time-consuming free text documentation.

Discussion

The clinical application of this content for bedside nurses would be useful because the information is not currently available in a summarized format. The chart is attached to the nursing procedure and specifically identifies cerebellar assessment techniques as well as normal and abnormal findings. The electronic documentation tool for assessment is available to all nurses throughout the hospital to aid in standardization of documentation. Future work includes formal psychometric testing of the tool for further validity and reliability measurements.

Nurses are encouraged to take the results of this project and apply it to their practices, thus elevating the quality of safe care they can provide for their patients receiving high-dose cytarabine. Copies of the assessment and documentation tools are available from the author.
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References


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