QuickSafety
An advisory on safety & quality issues

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Eliminating vincristine administration events

Issue:

Despite the usually deadly consequences of accidentally administering the chemotherapy drug vincristine intrathecally, adverse events still occur, typically because some organizations still administer vincristine via syringe. The good news is that these events are happening less in the United States, mostly because of the efforts of leading national organizations to promote an effective prevention strategy that assures a mechanical barrier to intrathecal administration (into the subarachnoid space). The strategy involves diluting intravenous vincristine or other vinca alkaloids in a minibag that contains a volume that is too large for intrathecal administration (e.g., 25 mL for pediatric patients and 50 mL for adults), and that makes it mechanically difficult to accidentally administer intrathecally.[1]

Vinca alkaloids (vinblastine, vinorelbine, vincristine, and vincristine liposomal) are chemotherapy drugs that are intended to be administered intravenously. If given intrathecally, vincristine is nearly always fatal and associated with an irreversible, painful ascending paralysis.[2] When vinca alkaloids are injected intrathecally, destruction of the central nervous system occurs, radiating out from the injection site. The few survivors of this adverse event experienced devastating neurological damage.[1]

Part of the problem stems from ordering intravenous vincristine in conjunction with medications that are administered intrathecally via a syringe, such as methotrexate, cytarabine and hydrocortisone. In some adverse events, vincristine was mistakenly injected into the cerebrospinal fluid (CSF) of patients when the intent was to inject another intrathecal chemotherapy agent, such as methotrexate or cytarabine.[3]

Intravenous vincristine and other vinca alkaloids are dispensed from the pharmacy with explicit warning labels about their lethality if given intrathecally. However, the transfer of vincristine to a syringe for administration facilitates the erroneous administration of it intrathecally, as the warning labels may not always be transferred to the syringe.

National organizations that support using minibags to administer vincristine and other vinca alkaloids include:

- **Institute for Safe Medication Practices (ISMP)**: In 2001, ISMP President Michael R. Cohen, RPh, MS, ScD (hon.), DPS (hon.), FASHP, along with colleagues from M.D. Anderson authored an article in *Hospital Pharmacy* that recommended dilution of intravenous vincristine.[4] In addition, "Dispensing vinca alkaloids in a minibag of a compatible solution and not in a syringe" has been on ISMP's "Targeted Medication Safety Best Practices for Hospitals" since 2014.[1,5]
- **The Joint Commission**: In July 2005, a *Sentinel Event Alert* was issued (Issue 34, "Preventing vincristine administration errors;" this issue is now retired) that included a recommendation for preparation of vincristine in diluted form, preferably in a minibag.
- **Oncology Nursing Society (ONS)**: The April 2006 issue of the *Clinical Journal of Oncology Nursing* included an article, "Preventing vincristine administration errors: Does evidence support minibag infusions?" by Lisa Schulmeister, RN, MN, CS, OCN.[6]
- **National Comprehensive Cancer Network® (NCCN®)**: NCCN updated the NCCN Chemotherapy Order Templates (NCCN Templates®) to reflect the administration of vincristine in a minibag. As of July 2016, all 32 NCCN Member Institutions follow the recommendation to prepare vincristine in minibags. As part of the NCCN Just Bag It campaign, launched in 2016, more than 100 practices and cancer centers have reported adherence to these new administration guidelines.

(Cont.)

- **American Society of Clinical Oncology (ASCO) and Oncology Nursing Society (ONS)**: The "2016 Updated American Society of Clinical Oncology/Oncology Nursing Society Chemotherapy Administration Safety Standards, Including Standards for Pediatric Oncology" have a standard (3.15) that requires health care settings that administer intrathecal chemotherapy to have a policy that specifies that intravenous vinca alkaloids are administered only by infusion, for example, in minibags.[7]

Survey results on intravenous vincristine administration and prevention
In a 2021 ISMP survey, 94% of hospitals reported they were fully compliant with placing vincristine in a minibag.[8] Also, in 2020, the U.S. Food and Drug Administration (FDA) removed syringe preparation and administration of vincristine in a syringe from the package insert. The insert now only lists administration after dilution in a minibag.

While the vast majority of U.S. hospitals are now in compliance with the new administration practice, many international hospitals are still lagging, although both the International Society of Oncology Pharmacy Practitioners (ISOPP) (in 2019) and the International Medication Safety Network (IMSN) (in 2023) have made minibag preparation and administration a best practice.[9,10] A 2015 international survey of oncology pharmacy practitioners was conducted to determine how vincristine is administered and the strategies in place for preventing accidental intrathecal administration of vincristine. The survey was distributed to members of the ISOPP from 42 countries.

Findings revealed that intravenous vincristine was dispensed in minibags in 77.4% of centers, though some also used syringes. Syringes were used in 31.1% of centers, with half these doses prepared undiluted. The most common reasons for still using syringes were perceived risk of extravasation and faster infusion time. Despite numerous vincristine administrations, extravasation was very rare.[8]

Safety Actions to Consider:

The Joint Commission urges hospitals and other health care organizations that provide chemotherapy services to promote the safe administration of intravenous vincristine and other vinca alkaloids by:

- Ensuring that intravenous vincristine is never dispensed to a location where intrathecal chemotherapy medications, such as cytarabine or methotrexate, are being administered.
- Implementing a policy and procedure(s) that provides for the dilution of intravenous vincristine and other vinca alkaloids in a minibag that contains a volume that is too large for intrathecal administration (e.g., 25 mL for pediatric patients and 50 mL for adults).
- Reinforcing adherence to established medication safety processes, such as medication double-checks and labeling medications that are not immediately used.

Resources:

1 Institute for Safe Medication Practices. Targeted Medication Safety Best Practices for Hospitals, Feb. 9, 2022.
2. Burgess N. High-risk medication alert for vincristine injection. Appendix 3: Literature review. Collingwood, Australia: Society of Hospital Pharmacists of Australia Federal Secretariat, 2005.
3. Sugalski J. NCCN's Commitment to Medication Safety: The Vincristine Initiative. *Journal of the National Comprehensive Cancer Network*, 2016;14:959-960.
4. Trissel LA, et al. The stability of diluted vincristine sulfate used as a deterrent to inadvertent intrathecal injection." *Hospital Pharmacy*, 2001;36:740-45.
5. Institute for Safe Medication Practices. Still Outside the Bull's Eye: 2014-2015 Targeted Medication Safety Best Practices for Hospitals, March 27, 2014.
6. Schulmeister A: Preventing vincristine administration errors: Does evidence support minibag infusions? *Journal of Oncology Nursing*, 2016;10(2):271-3.
7. Neuss MN. 2016 Updated American Society of Clinical Oncology/Oncology Nursing Society Chemotherapy Administration Safety Standards, Including Standards for Pediatric Oncology. *Oncology Nursing Forum*, 2016;44(1):A1–A13.

The Joint Commission.

8. Institute for Safe Medication Practices. Three New Best Practices in the 2022-2023 Target Medication Safety Best Practices for Hospitals. Feb. 10, 2022.
9. International Society of Oncology Pharmacy Practitioners. International Best Practices. June 18, 2019.
10. International Medication Safety Network. Global Targeted Medication Safety Best Practice 2: Prepare and dispense vinca alkaloids in a minibag, never in a syringe. February 2023.
11. Gilbar P, et al. Medication safety and the administration of intravenous vincristine: International survey of oncology pharmacists. *Journal of Oncology Pharmacy Practice*, 2015;21(1):10-8.

Other resources:

- Published data supports dispensing vincristine in minibags as a system safeguard. *ISMP Canada Safety Bulletin*, 2001.

Note: This is not an all-inclusive list.