Chemotherapy Extravasation

Incidence of and factors associated with events in a community cancer center

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BACKGROUND: The administration of chemotherapy is a high-risk and nurse-sensitive practice. One complication is extravasation.

OBJECTIVES: The purpose of this study was to determine the incidence of and iatrogenic factors associated with extravasation in the ambulatory and inpatient settings of a community cancer center.

METHODS: Events were reviewed by agent, route of administration, patient characteristics, and RNs administering the agent. A one-year, retrospective review of electronic health records and pharmacy and nursing reports was conducted.

FINDINGS: The number of vesicants, irritants, and irritants with vesicant properties administered was 12,260 in the ambulatory setting and 612 on the inpatient unit, with 21 and 1 extravasation events, respectively. Incidence rates for both settings were 0.001%. The most common agent to extravasate was docetaxel, and all events occurred via peripheral route. The incidence of events was lower than the reported benchmark for National Cancer Institute–designated cancer centers.

KEYWORDS
chemotherapy; extravasation events; incidence; community cancer center

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EXTRAVASATION IS DEFINED AS THE INADVERTENT LEAKAGE or escape of a vesicant chemotherapy from a blood vessel into the subcutaneous or subdermal tissue at the injection site and can result in varying degrees of tissue damage (Kreidieh et al., 2016). Depending on the potential for causing tissue damage, drugs are classified as vesicants, irritants with vesicant properties (IVPs), irritants, exfoliants, and nonvesicants (Jakel & Schulmeister, 2019; Kreidieh et al., 2016). There is a lack of consensus regarding the classification of antineoplastic agents. For example, taxanes, such as docetaxel and paclitaxel, are considered to be irritants (Su et al., 2000), vesicants (Barbee et al., 2014), exfoliants (Kreidieh et al., 2016), and IVPs (Jackson-Rose et al., 2017). The development of tissue damage during an extravasation event depends on the binding capacity of the agent to DNA (Jakel & Schulmeister, 2019; Kreidieh et al., 2016).

Vesicant chemotherapy is divided into two categories depending on the mechanism of action: DNA-binding and non–DNA-binding. DNA-binding vesicants rapidly cause cell apoptosis and result in damage to the surrounding tissue (Jakel & Schulmeister, 2019; Kim et al., 2020). These agents are retained and recirculated in tissue for a prolonged period, resulting in continuous tissue damage with the potential for necrosis (Jakel & Schulmeister, 2019; Kim et al., 2020). Non–DNA-binding vesicants are easily metabolized in tissue and rapidly neutralized into inactive compounds, resulting in less damage to tissue (Jakel & Schulmeister, 2019; Kim et al., 2020). When extravasated, exfoliants can cause inflammation, desquamation, and superficial tissue injury but not necrosis (Kreidieh et al., 2016).

Previous studies regarding the incidence of chemotherapy extravasation are limited. The absence of a centralized registry and lack of consensus regarding classification of antineoplastic agents as being vesicants, IVPs, exfoliants, or irritants have contributed to the difficulty. In addition, incidence varies according to the route of administration. When administered peripherally, the reported incidence of extravasation events was 0.1%–6% (Kreidieh et al., 2016) and 4.7% when administered through a central venous access device (CVAD) (Haslik et al., 2015). Jackson-Rose et al. (2017) reported a 0.09% incidence for all extravasation events involving vesicants, irritants, and IVPs.

Initial signs of extravasation include pain, pruritus, burning, tingling, edema, and mild erythema at the infusion site (Jakel & Schulmeister, 2019).