Chemotherapy Extravasations: Prevention, Identification, Management, and Documentation

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A 67-year-old male with non-small cell lung cancer receiving docetaxel via peripheral infusion in the outpatient clinic suffered an extravasation. The nurse caring for him noticed inflammation around the peripheral site, prompting her to stop the infusion and notify the advanced registered nurse practitioner (ARNP). The IV catheter from the peripheral site was removed and cool packs were applied to the site. The patient was discharged from the clinic with instructions from the ARNP to apply cool compresses for 15–20 minutes four times daily for the next 48–72 hours. By the third day, the patient’s hand had become erythematous with a burning-stabbing pain of 7 on a 0–10 scale. The ARNP, in collaboration with the oncologist prescribed Vicodin® (hydrocodone and acetaminophen) for pain and Silvadene cream (silver sulfadiazine) applied over the affected area to prevent infection. Weekly appointments were arranged to follow-up, with specific instructions to call immediately if fever or skin changes occurred. The chemotherapy treatments were resumed four weeks later after the patient’s complete recovery.

Chemotherapy extravasation is the escape of antineoplastic fluid from the vessel into the surrounding tissue, increasing the patient’s risk for a cutaneous injury (Doellman et al., 2009). The severity of the injury depends on the noxious effect of the cytotoxic drug and its mechanism of action. Cytotoxic drugs are classified as irritants and vesicants. Irritants may cause inflammation, burning, or pain. They rarely cause tissue necrosis or ulceration unless large amounts or high concentration of the irritant is extravasated, in which case the injury can be compared to that of a vesicant (Schulmeister, 2011). In contrast, vesicants are capable of causing local blisters and extensive damage to the underlying tissues accompanied with pain, and can lead to tissue death and necrosis (Yarbro, Wujcik, & Gobel, 2011). However, the mechanism of action of the irritant or vesicant solution, which may be DNA binding or DNA nonbinding, must be taken into consideration to have an absolute stance of the potential damage to the patient’s surrounding tissue (Schulmeister, 2010) (see Figure 1). When a chemotherapy agent does not bind to DNA, the solution remains contained within the area of extravasation, which facilitates drug deactivation (Schulmeister, 2010). DNA binding agents, on the other hand, attach to nucleic acid in the cells’ DNA (Schulmeister, 2011). The contaminated cells exchange the caustic solution through the course of cellular ingestion. The result is an indolent and progressive destruction of soft tissue, causing the ulcer to become bigger, deeper, and more painful (Yu et al., 2011). An estimated 10%–25% of peripheral extravasations of this type require surgery (Kane, McGuinn, Dagher, Justice, & Pazdur, 2008).