

Images in Anesthesiology: Examining the Edges of Extravasation

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THESE two images were obtained 4 days apart around the site of a quadruple-lumen central venous catheter placed in the subclavian vein of a patient with septic shock. The proximal port of the line is believed to have migrated extravascularly, permitting extravasation of vesicants with resulting tissue injury.

Agents and solutions that can cause tissue destruction with extravasation are called vesicants.¹ Vesicants can induce necrosis by multiple mechanisms, including direct cytotoxicity (*e.g.*, chemotherapies), hyperosmolarity (*e.g.*, mannitol), deviation from physiologic pH (*e.g.*, most vasopressors), vasoconstriction (*e.g.*, concentrated electrolytes and α -agonists), and inflammation caused by the drug diluent (*e.g.*, benzyl alcohol).^{1,2}

Central line extravasation with vesicants presents special challenges.¹ Unlike with peripheral lines, the site of extravasation may remain hidden by layers of tissue, leaving only surface stigmata like the rim of erythema seen in the early image. Furthermore, vesicants do not reliably cause severe pain after extravasation. To evaluate for potential extravascular line migration, the most proximal and distal ports could be aspirated regularly during line use (*e.g.*, once per nursing shift if feasible). The distance between the proximal and distal ports can vary from 5.4 cm in triple-lumen catheters to 8.75 cm in quintuple-lumen catheters, so the increasing lumen number may increase the risk of extravascular positioning of the proximal port.¹ When extravasation is suspected, early intervention may decrease the extent of injury. One study found a lower incidence of tissue necrosis when the affected area was opened and irrigated with normal saline within 24 h of the extravasation event.³

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Competing Interests

The authors declare no competing interests.

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References

1. Schummer W, Schummer C, Bayer O, Müller A, Bredle D, Karzai W: Extravasation injury in the perioperative setting. *Anesth Analg* 2005; 100:722–7, table of contents
2. Le A, Patel S: Extravasation of noncytotoxic drugs: A review of the literature. *Ann Pharmacother* 2014; 48:870–86
3. Gault DT: Extravasation injuries. *Br J Plast Surg* 1993; 46:91–6

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