An intrarenal approach using a percutaneous nephrostomy tube is a novel method to deliver chemotherapy and biotherapy to patients with upper urinary tract urothelial carcinoma. A paucity of evidence exists regarding basic nursing implications for this unique treatment option. This column will provide suggested guidelines to administer intrarenal treatment via a percutaneous nephrostomy tube.

### AT A GLANCE
- Upper urinary tract urothelial carcinoma may be treated using a topical approach, including instillation of chemotherapy/biotherapy agents through a percutaneous nephrostomy tube.
- Nursing implications of instillation directly into the renal pelvis and ureter are discussed, including care and safe handling.
- References and resources are provided to guide nurses who seek additional information on this practice.

### Percutaneous Nephrostomy Infusion

**Nursing considerations for treatment of upper urinary tract urothelial carcinoma**

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A n uncommon oncologic diagnosis is urothelial carcinoma (UC) of the upper urinary tract (UUT). Urothelial tumors are located in the lining (transitional cells) of the upper (i.e., kidney and ureters) or lower (i.e., bladder and urethra) urinary tract. Tumors in the bladder account for most of these malignancies; however, as many as 10% may be attributed to the upper tract (Rouprêt et al., 2015). An estimated 146,650 new cases of urinary cancers will be diagnosed in the United States in 2017; of those, about 79,030 will be bladder cancer and 3,630 will be cancer of the ureter and adjacent spaces (Siegel, Miller, & Jemal, 2017).

About one-third of patients with UUT UC present with hematuria; less common symptoms include flank pain and lumbar mass (Rouprêt et al., 2015). An international panel consisting of members from Europe and representatives from the United States released guidelines specific to treating UUT UC; however, they are directed primarily toward providers and lack specific details about nursing care (Rouprêt et al., 2015). According to these guidelines, current recommendations for diagnosis of suspected UUT UC are urinary cytology and computed tomography imaging; a cystoscopy is generally included in the evaluation to rule out concurrent bladder tumors (Rouprêt et al., 2015).

### Treatment for Upper Urinary Tract Urothelial Carcinoma

Identifying best treatment options for UUT UC has remained difficult, partly because of the low volume of patients diagnosed. Standard of care is generally a surgical resection of the kidney and ureter, known as a nephroureterectomy. The latest guidelines suggest treatment with surgical resection and/or chemotherapy administration, whether systemic or topical (Rouprêt et al., 2015). Treating providers may opt for inclusion of postoperative adjuvant chemotherapy depending on staging, grading, and individual patient factors. Systemic chemotherapy often includes platinum-based agents; however, patients may be ineligible because of renal function and toxicity risks. According to Vassilakopoulou et al. (2011), adjuvant systemic chemotherapy for UUT UC does not necessarily provide significant benefit to affect overall survival, particularly in high-risk patients.

A viable treatment option for patients with UUT UC may be topical instillation of chemotherapy (e.g., Mitomycin C) or biotherapy (e.g., Bacillus Calmette-Guérin [BCG]) via percutaneous nephrostomy tube (Rouprêt at al., 2015). When used as adjunct therapy following tumor...
resection, topical instillation enables an organ-sparing surgical approach that preserves kidney function (Thalmann, Markwalder, Walter, & Studer, 2002). However, treatment targeted to the upper tract presents challenges, and the optimal delivery method remains unknown. Attempts to reach the upper tract are made using either an antegrade or retrograde approach. One retrograde approach involves the placement of a ureteral catheter and slow infusion of chemotherapy agents using an IV pump (Maurice, Madi, Chuang, & Abouassaly, 2013). Antegrade access to the renal pelvis may be reached through placement of a percutaneous nephrostomy tube (see Figure 1) and direct infusion of topical chemotherapy or biotherapy.

Guidelines for Percutaneous Nephrostomy Tube
The American Society of Clinical Oncology and Oncology Nursing Society safety standards are widely accepted and used by nursing practices and provide important practice guidelines for nurses to consider when administering chemotherapy and biotherapy agents (Neuss et al., 2017). Administration of medication (chemotherapy or otherwise) directly into the renal pelvis and ureter is rare; however, oncology nurses must be proficient in medication administration via various routes. A paucity of evidence-based information supports the safe administration of intrarenal therapy, and no known nursing specific standards or guidelines to direct this procedure exist.

The current authors have been asked to administer chemotherapy or biotherapy agents intrarenally to patients in at least two institutions in the United States (Arizona and New Jersey). Consequently, they developed a procedure at each institution for the safe administration of these agents via a percutaneous nephrostomy tube. These institutional resource documents were formulated based on procedures described in the current medical guidelines and existing guidelines for intravesicular chemotherapy and biotherapy administration (Neuss et al., 2017; Rouprêt et al., 2015). This column is written to share the experience and lessons learned in preparing two institutional nursing resources for this practice.

Nursing Practice Related to Percutaneous Nephrostomy
Education for patients treated in ambulatory clinics includes specifics about the procedure and the medication to be administered. Self-care instructions discuss care and handling of the nephrostomy tube, observation for any drainage or leakage, handling of waste output (i.e., urine), and site care and dressing changes.

To administer treatment for UUT UC, a provider (usually an interventional radiologist) places the nephrostomy. The therapeutic agent will generally dictate the duration and frequency of treatment. Following treatment course completion (usually six weeks), the nephrostomy tube will be removed. Regardless of the agent, nursing care guidelines include assessing the patient’s signs or symptoms of infection and renal issues and reviewing the treatment order with special consideration of the route of administration, method of infusion (i.e., manual IV push, IV pump, or gravity instillation), and infusion duration. Nurses should maintain a closed transfer system during administration. In addition, pre- and postinfusion flush volumes must be discussed with the ordering provider, which adds to the total volume infused into the renal space.

"Oncology nurses must be proficient in medication administration via various routes."

Guidelines suggest that nurses review laboratory and other results as appropriate and discuss any abnormal or concerning results with the ordering provider. To minimize personal and environmental exposure to BCG or chemotherapy, nurses should follow standard chemotherapy administration precautions (e.g., using gowns, double gloving, face protection [mask and face shield]) and prepare the administration area with disposable, vinyl-based nonabsorbent pads. The aseptic technique should be used during administration. If administering via gravity, nurses are advised to hang the medication about 25 cm above the tube insertion site. The nephrostomy tube and surrounding skin should be assessed during administration. This includes removing the dressing, looking for signs of infection, and assessing patency of the tube using a 10 ml or larger syringe (to minimize pressure to the upper urinary tract). Any concerns, such as resistance to flushing, leakage around the tube, and abnormal
aspirate contents, should be immediately reported to the provider. On completion of the therapeutic agent, normal saline flush and application of a new sterile cap are recommended, followed by application of a new dressing at the insertion site. In addition, according to chemotherapy disposal guidelines, all equipment (e.g., medication bag and tubing, disposable pads, personal protective equipment as appropriate) should be disposed of in a chemotherapy waste container (Polovich, Olsen, & LeFebvre, 2014). Documentation should include patient and family education, patient assessment findings (including description of any aspirated contents and tube patency assessment), medication administration, and patient tolerance of therapy.

Implications for Nurses and Conclusion
Oncology nurses trained in chemotherapy and biotherapy best practices are ideal for the delivery of treatment via a percutaneous nephrostomy tube. Using a percutaneous nephrostomy tube presents a new and unique challenge for the oncology nurse to consider. Because this is a new and rather unique treatment option, the authors encourage nursing colleagues to continue the discussion. Institutions across the nation that have incorporated this practice into their treatment plans should publish their experience and add to the nursing literature.

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REFERENCES


