Direct Translumbar Inferior Vena Cava Ports for Long-Term Central Venous Access in Patients with Cancer

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ABSTRACT

Purpose: To evaluate the indications, complications, and long-term results of translumbar port placements to the inferior vena cava for long-term central venous access in a single tertiary center.

Materials and Methods: This retrospective study included all patients with cancer who underwent translumbar port placement from January 2000 to July 2012; 31 patients (all women) with an average age of 53.1 years ± 11.1 (range, 30–77 y) were included in the study. Of these patients, 26 (81%) had breast cancer, 3 had lung cancer, 1 had ovarian cancer, and 1 had rectal cancer. Indications included central venous occlusion in 9 patients (29%) and bilateral mastectomy and lymph node dissection in 22 patients (71%).

Results: All procedures were technically successful. The overall 30-day complication rate was 9.7% (n = 3). Average catheter use was 14.1 months ± 21 (range, 0.75–108 mo). Thirteen (41.9%) ports were removed because they were no longer needed; 4 (12.9%) ports required removal for port malfunction; 12 (38.7%) patients died with their ports still in place; 2 (6.5%) ports remain in use. Three (9.7%) ports required delayed secondary intervention to remain functional. One patient had a systemic infection attributed to the port, resulting in an overall infection rate of 0.08 per 1,000 catheter days.

Conclusions: Translumbar inferior vena cava port placement is a technically feasible and safe alternative method for long-term central venous access.

ABBREVIATION

IVC = inferior vena cava

Ports for long-term central venous access are typically placed with the reservoir implanted on either the chest wall or the upper arm, with the catheter entering the internal jugular, subclavian, or upper arm veins (1,2). However, traditional approaches for long-term central venous access may not always be feasible or preferable. Alternative approaches for central venous access may be required in patients with superior vena cava, bilateral internal jugular, or brachiocephalic vein occlusions. Furthermore, in patients with breast cancer after bilateral mastectomy with lymph node dissection, potential thrombosis from port catheters may impair venous outflow and exacerbate lymphedema. The common femoral vein is often used for temporary access, but it is not preferred for long-term venous access because of the increased rate of infection (3–5). In such circumstances, direct translumbar access to the inferior vena cava (IVC) may be considered for long-term central venous access. The safety and efficacy of direct translumbar access to the IVC for central venous catheter placement have been reported previously in patients requiring long-term central venous and hemodialysis catheters (6–9). The aim of this study was to perform a retrospective evaluation of translumbar IVC port catheters in cancer patients in a single tertiary center.

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MATERIALS AND METHODS

A retrospective study with institutional review board approval and compliant with the Health Insurance Portability and Accountability Act was performed. Informed consent was waived. The interventional radiology electronic database was used to identify all patients who underwent translumbar port placement for long-term intravenous access in our department from January 2000 to July 2012. Thirty-one patients were identified (all women) with an average age of 53.1 years ± 11.1 (range, 30–77 y). Of these patients, 26 (81%) had breast cancer, 3 had lung cancer, 1 had ovarian cancer, and 1 had rectal cancer. Electronic medical records were reviewed for demographics, indications for both the port placement and placement via the translumbar IVC approach, procedural details, patient notes, and imaging studies performed after the procedure.

Indications included central venous occlusion in 9 patients (29%) and bilateral mastectomy and lymph node dissection in 22 patients (71%). Among the 9 patients who had central venous occlusion, chest port placement was attempted in four patients unsuccessfully. Diagnosis of superior vena cava occlusion was made in one patient with a nonfunctioning chest port during an unsuccessful attempt at revision. Central venous occlusion was identified by contrast-enhanced computed tomography (CT) scan of the thorax in the remaining four patients.

The decision to use a direct translumbar route to the IVC was made in discussion with the referring physician and the patient. CT scans of the abdomen and pelvis, available in all patients, were reviewed before procedures to delineate the anatomy of the IVC and its relation to the kidneys and renal veins. All procedures were performed under conscious sedation, and patients were advised to stop any anticoagulant or antiplatelet medications before the procedure according to Society of Interventional Radiology (SIR) guidelines (10). All patients had normal coagulation parameters (international normalized ratio < 1.5 and platelets $> 50{,}000/\mu L$). Prophylactic intravenous antibiotics to cover skin flora (cephazolin or clindamycin) were routinely administered at the time of the procedure. In 13 patients, 6-F low-profile single-lumen ports were placed, and in the remaining 18 patients, 8-F standard-profile single-lumen ports were placed (Xcela Power Injectable Port; Navilyst Medical, Inc, Marlborough, Massachusetts, or PowerPort; Bard Access Systems, Inc, Salt Lake City, Utah).

For port placement, patients were placed supine on the angiography table, and the right common femoral vein was accessed to place a 0.035-inch guide wire or pigtail catheter into the IVC. The wire or catheter was secured to the skin. The patient was then repositioned in prone or left lateral decubitus position. The skin was entered with a 15- to 20-cm-long, 21-gauge needle (Neff Percutaneous Access Set; Cook, Inc, Bloomington, Indiana, or AccuStick II Introducer System; Boston Scientific, Natick, Massachusetts) posteriorly, just above the level of the right iliac crest, approximately 3–4 finger widths lateral to midline and angled approximately 45 degrees cephalad and medially toward the IVC. When access to the IVC was obtained, a 0.018-inch guide wire was advanced through the needle, which was exchanged for a transitional sheath that permitted placement of a 0.035-inch stiff guide wire. Over this guide wire, a long peel away sheath (6-F 30-cm Peel-Away Sheath Introducer Set or 8-F 30-cm Silhouette Transitionless Micropuncture Introducer Set; Cook, Inc) was introduced, through which the port catheter was advanced and the tip positioned at the junction of the IVC with the right atrium. The subcutaneous port pocket was created over the lower rib cage along the anterior axillary line or over the right iliac crest, depending on operator or patient preference.

RESULTS

All procedures were technically successful. There were 29 catheters positioned with the catheter tip placed at the junction of the IVC with the right atrium. Two catheter tips were suboptimally positioned; one was in a hepatic vein and another one was in the suprarenal IVC at the end of the procedure. However, both ports functioned appropriately at the end of the procedure, and no further intervention was performed.

There were no procedure-related deaths or hemorrhage requiring intervention. Early ($\leq$ 30 days) and delayed ($>$ 30 days) complications and their management are presented in Tables 1 and 2. There was an overall 30-day complication rate of 9.7%.

During the entire duration of catheter use, the overall primary catheter patency rate was 77.4%, and the secondary patency rate was 87.1%. Average catheter dwell time was 14.1 months ± 21 (range, 0.75–108 mo). Three catheters (9.7%) required repeat interventions to remain functional. These consisted of one repositioning (2 mo after insertion) because of arrhythmia, one catheter-straightening procedure (3 mo after insertion), and one port and catheter replacement. Catheter repositioning and straightening procedures were

Table 1. Early Complications ($\leq$ 30 d) of Translumbar Port Placement via the IVC and Their Management

Minor Complications (3.2%; n = 1 patient)	Major Complications (6.5%; n = 2 patients)
Partially occlusive IVC thrombosis—required warfarin (Coumadin) therapy (day 30)	Catheter migration to subcutaneous tissues—port removed (day 23)
	Catheter kink at lumbar facet—port removed and replaced (day 2)