Addressing Catheter Occlusion and Inadequate Blood Draws in Ports

Voice of Experience: Topics in Venous Access

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INTRODUCTION

This is the first in a series of discussion papers addressing current topics in venous access. The purpose of these papers is to present real-world experience in the use, care and management of implanted ports and other central venous access devices coupled with examples of issues facing clinicians and their patients.

This paper is dedicated to the management of implanted ports and presents the real-world problem of catheter occlusion through a brief review of current literature and an interview with a practicing clinician.

DISCUSSION

Implanted ports continue to be a preferred device in the treatment of cancer and long-term disease states requiring venous access for infusion therapies.

A PubMed (www.pubmed.gov) search of current literature speaks to the paucity of clinical research or outcomes reporting for these devices. Recent published data focuses on infection prevention, venous thrombosis, tip position and complications related to implantation.

(Kutar, 2004) recognizes catheter occlusion as being "a very common and usually underreported event (p. 209)."[1] This phenomenon is consistent with anecdotal reports of catheter occlusion and the inability to obtain blood withdrawal as consistent with "activities of daily living" in the oncology infusion setting.

On a visit to an oncology center in the western U.S., this author asked the nurse manager about the incidence of occlusion and the inability to withdraw blood. Her reply was, "We have occasional problems with occlusion and the inability to draw blood from ports." After further discussions, we were able to ascertain that in that month alone 36 doses of CathFlo® Acitvase® enzyme (Genentech, Inc.) were administered to manage implanted port problems.

The incidence of central venous catheter thrombotic occlusion varies by institution, but has been documented to be in the range of 0.6-0.81 per 1,000 catheter days, and up to 93% of patients experience this complication (Kutar, 2004).[1] Moureau (2002), in a review of outcomes, reported implanted port catheter dysfunction related to thrombotic events at 0.06 per 1,000 days (n=8,210 patients with 43 events over 696,370 reported catheter days).[2] Implanted port dysfunction due to thrombosis can lead to unscheduled hospital admission, emergency department visits, interruptions in therapy, device replacement and discontinuation of therapy (Moureau, et al., 2002).[2]

Catheter occlusion and the inability to draw blood or obtain a blood return is a real problem for clinicians managing implanted ports. While these complications may affect overall clinical outcomes of the patient, they may also lead to anxiety and fear on the part of the patient (Kreis, et al., 2006).[3]

Ask the Clinician

Petra Scholl, RN, OCN has practiced as an Oncology Nurse for over 20 years. She is currently working in an oncology infusion center in the Pacific Northwest. In this interview, she presents her concerns and experience providing safe and effective infusion therapy for her patients.

The following expresses the opinions of the author and may not be representative or predictive of other clinical experiences.

What is your primary concern regarding safe infusion therapy for your patients?

A: Many chemotherapy drugs can damage the tissues when leakage (infiltration) occurs. I have seen ulcerations, skin sloughing and nerve damage with infiltration. Depending on the drug and the extent of the extravasation, plastic surgery may be required to repair the damage.

How do you avoid infiltration?

A: Before any chemotherapy infusion is started, a blood return must be obtained from the venous access device. This is our best indication of a functioning device. Our biggest problem is with lack of blood return from central venous catheters such as implanted ports or PICCs. A peripheral site can be changed quickly. A port or PICC requires time-consuming and costly interventions.

What do you do when you are unable to get an adequate blood return from an implanted port?

A: The first intervention is to check the needle position. Reaccessing the port might be helpful. Many times, it is necessary to reposition the patient: standing, bending forward, lying flat, pushing their shoulders back, raising their arm—all this can "free" a pinched catheter. This may indicate a problem, such as "pinch-off syndrome," that will require radiographic evaluation. It may also affect the tip of the catheter if it is lodged against the wall of a blood vessel.

The catheter is assumed to have a partial occlusion if it flushes slowly and we can obtain blood return slowly; a total occlusion if we cannot flush or withdraw; or a withdrawal occlusion if we are able to flush and not aspirate blood. Tissue plasminogen activator (tPA - CathFlo® Activase® enzyme) is instilled into the port to attempt to dissolve the occlusion. This may take as little as 30 minutes, or as long as overnight. If there still is no blood return, a dye study is scheduled to evaluate the problem.

How does the patient react to this?

A: The patient and his family are often very stressed. The delay of their chemotherapy treatment can frighten them. They will have to have additional appointments, which can cause problems with transportation or additional time off from work. It takes a lot of nursing time to deal with the emotional issues. It also impacts scheduling, especially in the outpatient setting, and may cause other patients to have to wait for their treatment.

D INADEQUATE BLOOD DRAWS IN PORTS

What have you done to resolve these blood draw issues?

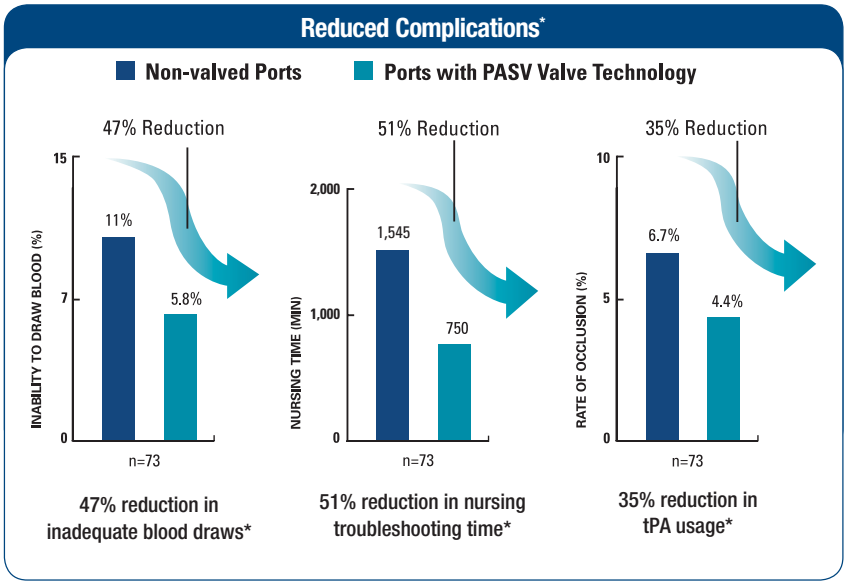
A: Good patient and family education, and preparing the patient for these possibilities, seemed the only way to go, until our practice was introduced to PASV® Valve Technology (from Navilyst Medical, Inc.).

What is PASV Valve Technology?

A: The PASV Valve is located in the stem of the port, away from the bloodstream. It is not at the tip of the catheter like with the Groshong® Vascular Access Catheter (Bard Access Inc.). The valve is closed when not in use, and it opens with the pressure of any fluid infusion or fluid push. When the pressure stops, the valve is designed to close. When blood is withdrawn, greater pressure is needed to open the valve. This increase in pressure sensitivity should prevent the valve from opening accidentally when intra-thoracic pressure increases due to coughing or vomiting; it is designed to prevent reflux of blood into the catheter. Reflux also occurs when the needle is pulled out of the port. The small vacuum that forms inside the port will cause a reflux of as much as one inch of blood into the catheter of a non-valved port. This of course can lead to clots in the catheter tip. The valve is also designed to prevent blood from backing up into the tubing when a patient stands up while receiving an infusion. When the level of a non-valved implanted port is higher than the infusion bag, blood can back up into the tubing and into the medication. A PASV Valve Technology port reduces this risk especially for home infusion patients who are infusing their medications without a pump. The valve at the top of the open-ended catheter works like your finger on top of a water-filled straw. As long as you keep your finger on the straw, the water stays in the straw. As soon as you release your finger, the water will flow out.

Why did you decide to use PASV Valve Technology in your practice?

A: Just by observing the port demonstration itself, I recognized the advantages of this technology. Several studies showed its effectiveness compared to a non-valved product.[4,5] Baylor University (Carlo, et al., 2004; Lamont, et al., 2003) conducted studies that included nursing time spent, x-rays and the use of tPA, that demonstrated significant differences between valved and non-valved ports. The time statistics alone showed that with 364 accessions of PASV Valve Technology ports, only 750 minutes were spent ensuring patency; while 1,545 minutes were spent with 341 accessions of non-valved ports. Similar results were shown in a study at Vanderbilt University in their PICC service (Burns, 2005).[6] I could see the significant impact this would have on my practice. We were looking at a 50% reduction in unproductive chair time.



*Carlo JT, Lamont JP, McCarty TM, Livingston S, Kuhn JA. A Prospective Randomized Trial Demonstrating Valved Implantable Ports Have Fewer Complications and Lower Overall Cost than Non-valved Implantable Ports. *Am J Surg.* 2004;188:722-727.

Has the use of PASV® Valve Technology implanted ports impacted your practice?

A: My institution has been using the port for almost three years now. We had used the port for about six months when I decided to count the number of port declotting incidents. From January 2004 to October 2004, a total of 60 ports were in use for chemotherapy administration, 22 valved ports and 38 non-valved ports. During that time, we declotted 16 ports, once or multiple times. Of these 16 ports, 15 ports were non-valved (39.5%), and 1 port was valved (4.5%). I counted only per port, not per tPA use. In May 2006, I decided to do another comparison study. Between May and October (5 months), we used 50% more tPA on non-valved ports. Again, these numbers demonstrated the superior performance of the PASV technology.

What does this mean for the patient?

A: Again, as the numbers show at our institution, we have decreased our tPA usage by 50%. This has translated for the patient into less time in the clinic, a decrease in stress and anxiety, and ultimately increased quality of life.

References and Further Reading

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Navilyst Medical would like to thank Ms. Scholl for her willingness to provide her experiences. Questions or comments may be addressed to: Ms. Scholl at Petra@wamail.net.

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