

Cannulation of Upper Arm Fistulas: Limb Position Is Everything

Harold L. Moore
Stuart Mott

Q: Is there anything I can do to be more successful cannulating an upper arm fistula that rolls or retracts into the tissue upon attempted cannulation? Even stretching the skin does not help much.

A: Vascular access is a hemodialysis patient's life-line, and successful cannulation is critical to the viability of the vascular access. One of the best ways to preserve the access is to try to make every cannulation trouble-free by decreasing cannulation attempts and needle manipulation. This will lessen the chance of infiltration and damage to the intimal lining of the vessel wall of the vascular access.

Problems with cannulation of upper arm accesses are common, particularly in obese patients. Because immobilization of vessels is a problem, cannulation can require multiple attempts to achieve a viable access. Cannulation can be troublesome due to a variety of reasons, including the blood vessel rolling or retracting into the surrounding tissue (Ball, 2005). Multiple needle sticks increase the probability of vessel damage due to the development of aneurisms, infiltrations, and vessel lining damage. The number of possible access sites is limited, so it is crucial to use strategies that prolong the viability of the vascular access.

Limb Position Is Important

The staff in the authors' clinic found that extension of the arm to a 90-degree angle in patients with rolling and retracting blood vessels made successful cannulation easier to achieve. The technique of extending the limb was successful because the arm had been inadvertently placed in the surgical position. In his book, *Vascular Access in Clinical Practice*, Berman, a vascular surgeon, discusses the cannulation of the hemodialysis access and states, "The better positions to use closely mimic those used during the surgery to implant the access" (Berman, 2002, pp 200-201). This made clinic staff more aware of the need for

greater understanding and utilization of the surgical construction of the access.

The typical position for cannulation is with the patient's arm somewhat parallel to the body as the patient sits in the chair with his or her arm on the arm rest (see Figure 1). In this position, the largest angle is approximately 45 degrees. However, the arm is at a 90-degree angle from the body when the access is surgically created. Blood vessels are lax when the arm is in any position where the angle is less than 90 degrees, thus making it easier for the vessels to roll or retract. By placing the arm in the extended or the surgical position (see Figure 2), clinic staff are able to cannulate an access more successfully. The surgical position provides a solid base from which to cannulate the blood vessels in the access, making it less likely that the blood vessels will roll or retract in the 90-degree position. This limiting of the fistula's or graft's ability to move or "roll" makes cannulation much more successful.

Rationale for the Surgical Position

When the arm is down close to the body, which is a common cannulation position, an upper arm fistula may have as much as one-third of the usable length masked by the chest wall (Berman, 2002). This concentrates cannulation sites in a smaller portion of the access, creating the potential for decreased life-expectancy of the access. With the use of a technique, such as the Cushion Cannulation Technique (Mott & Prowant, 2006), the arm can be easily extended to the surgical position, which will stretch and expose the entire usable length of the fistula yet still be comfortable for the patient and cannulator.

The **Clinical Consult** department is designed to provide answers to questions concerning clinical problems and to report innovative clinical practices. Readers are invited to submit questions to be answered by a guest consultant. Questions should provide background information and state specific information requested. Answers will be referenced. Manuscripts that address clinical problems or present innovative ideas are also invited. These should be between 400 and 600 words and contain one to three references. Address correspondence to: Charlotte Szromba, Clinical Consult Department Editor, through the ANNA National Office; East Holly Avenue/Box 56; Pitman NJ 08071-0056; (856) 256-2320. The opinions and assertions contained herein are the private views of the contributors and do not necessarily reflect the views of the American Nephrology Nurses' Association.

Harold Moore, ED, MA, BS, BSE, is a Research Associate, Division of Nephrology, School of Medicine, University of Missouri, Columbia, MO.

Stuart Mott, BS, BA, LPN, is a Vascular Access Nurse, Dialysis Clinic, Inc., Columbia, MO.

Figure 1
Cannulation of Upper Arm Fistula in a Common Cannulation Position with Arm next to Body on Chair Arm



Figure 2
Cannulation of Upper Arm Fistula in the Surgical Position with Arm 90 Degrees from Body Using the Cushion Cannulation Technique



Role of the Nephrology Nurse

It has been shown that in a focused, outcomes-driven access practice, significant strides can be made in optimizing vascular access (Arnold, 2000). The nephrology nurse holds key responsibility for cannulation and infection prevention and management, as well as maintenance of the access sites, and can take the lead in optimization of vascular access use and care. Consequently, the nephrology nurse has a profound effect upon access outcomes, which has been confirmed by Dialysis Outcomes and Practice Patterns Study (DOPPS) data. When analyzing the effect of nursing experience upon outcomes, it was found that for every 20% increase in nursing staff with over 3 years' experience, there was an accompanying 11% reduction in fistula failure and an 8% reduction in graft failure (Pifer et al., 2002). These data highlight the opportunity and need for the nephrology nurse to take a lead role in the development of access policies, procedures, staff mentoring, continuing education, and patient education. The development of a multidisciplinary access team that might consist of a nephrologist, the vascular surgeon, nurse educator, vascular access nurse, and social worker has been successful in improving patient outcomes (Arnold, 2000).

Communication between the surgeon and the vascular access nurse is critical in determining the best way to approach cannulation of a particular access. One of the most effective methods involves the nurse manager or vascular access nurse arranging to have the surgeon include an annotated schematic drawing of the access to be sent with the patient. This drawing/sketch should become part of the permanent record and be accurately recorded on the flow sheet and in the electronic record. The nurse edu-

cator and/or vascular access facilitator need to diligently maintain a continuous staff education program so that the technical expertise will not only be developed but maintained at the highest degree possible.

All too often, patients come to the unit with anxiety due to the number of times it takes to cannulate the access. In one patient's words, "I endured many days of missed needles, resulting in a swollen and painful arm. There were tough days when I was stuck up 6 to 8 times before I could begin treatment. I went to the unit with fear and anxiety. How many needles would it take today?" (Weintraub, 2005). Staff members need to be aware of patients' fears and use strategies to decrease pain during cannulation.

Implications for Nursing Practice

Commitment to improving vascular access outcomes by the nurse manager, vascular access nurse, staff, and educators can result in great improvement in access longevity. It was through such commitment that the use of surgical positioning of the arm was developed in the authors' dialysis unit. By combining the arm position with other techniques, such as the 3-point technique (Ball, 2003, 2005) and cushion cannulation (Mott & Rowant, 2006), the authors' clinic staff believe that vascular access life expectancy will be increased, and patient and cannulator comfort will be enhanced. Commitment to such a program can help prevent fear and anxiety, making nephrology nurses more aware of what we do each day with an eye always toward improvement.

continued on page 74

Clinical Consult

continued from page 62

References

- Arnold, W. (2000). Improvement in hemodialysis vascular access outcomes in a dedicated access center. *Seminars in Dialysis*, 13(6), 352-363.
- Ball, L.K. (2003). *On course with cannulation: Techniques and troubleshooting AV fistulas for dialysis staff*. Seattle, WA: Northwest Renal Network. Retrieved January 19, 2009, from www.nwrenalnetwork.org/fist1st/oncoursewithcannulationbookletversion.pdf
- Ball, L.K. (2005). Improving arteriovenous fistula cannulation skills. *Nephrology Nursing Journal*, 32(6), 611-617.
- Berman, S.S. (2002). *Vascular access in clinical practice*. New York: Marcel Dekker, Inc.
- Mott, S., & Prowant, B.F. (2006). The "cushion cannulation" technique. *Nephrology Nursing Journal*, 33(6), 683-684.
- Pifer, T., Satayatham, S., Dykstra, D., Mapes, D., Goodkin, D., Canaud, B., et al. (2002). Hemodialysis (HD) staffing and patient outcomes in the dialysis outcomes and practice patterns study (DOPPS). *Journal of the American Society of Nephrology*, 13, 425.
- Weintraub, J. (2005). *Taking matters into your own hands*. Houston, TX: The Nephron Information Center. Retrieved January 19, 2009, from http://links.nephron.com/nephsites/nic/self_cannulation.htm

Additional Reading

- Young, E., Dykstra, D., Goodkin, D., Mapes, D., Wolfe, R., & Held, P. (2002). Hemodialysis vascular access preferences and outcomes in the dialysis outcomes and practice patterns study (DOPPS). *Kidney International*, 61(6), 2266-2271.

Reprinted from the *Nephrology Nursing Journal*, 2009, Volume 36, Number 1, pp. 61-62, 74. Reprinted with permission of the publisher, the American Nephrology Nurses' Association (ANNA); East Holly Avenue, Box 56, Pitman, NJ 08071-0056; (856)256-2300; FAX (856)589-7463; E-mail: anna@ajj.com; Web site: www.annanurse.org For a sample copy of the journal, please contact the publisher.