

## Determining Maturity of New Arteriovenous Fistulae

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**Q:** Our facility is seeing an increase in arteriovenous (AV) fistulae. Is there a way to know when AV fistulae are mature enough to cannulate?

**A:** While access maturity has more to do with the patient's co-morbid conditions, the surgeon's evaluation process, and the surgical technique for access creation, nurses can develop physical assessment skills that will enable them to determine whether the access is maturing and able to be cannulated. Robbin and colleagues (2003) found that 80% of the time experienced dialysis nurses can accurately identify when an AV fistula is mature enough to cannulate.

Arterialization, the process of vein wall thickening and increasing vein diameter, is dependent on the pressure of the arterial inflow and resistance in the vein (Beathard, 1998). Wong et al. (1996) determined that maturation of an AV fistula typically occurs within the first 2 weeks after creation. This is why it is so important to begin evaluation of a new AV fistula immediately after the patient returns to the dialysis facility.

Palpation is the key assessment process to determine access development. The thrill should feel like a vibration or purring that is soft and easy to compress. While staff members often think that a strong pulsation is a sign of a well-functioning fistula, the exact opposite is true – it usually suggests that there is a stenosis present, and the soft easy pulse is replaced with a firmer “water hammer” pulse. Dr. Beathard, an expert in physical assessment of AV fistulae, states that the stronger the vibration/purring of the thrill, the more likely there will be good access arterialization (Beathard et al., 2003).

With a lightly applied tourniquet to the axilla area of the upper arm, document the baseline width of the fistula by either taking a photo, marking the fistula margins with an indelible pen or by measuring the width with a tape measure. If the access is arterializing appropriately, there will be a noticeable increase of the size of the vessel. If no changes are seen over the course of 4 weeks, contact the

surgeon for follow-up. Ideally, it is best if the same person evaluates the access for the first month.

Using your fingertips, palpate the entire length of the fistula. Not only should the vessel increase in size, it needs to thicken in order to withstand repeated needle punctures, increased pressure created by the arterial blood flow and eventually by the blood pump. Take a minute and feel the vein in your wrist and see how soft and pliable an immature “fistula” is. A clinical sign that a patient's fistula wall is thickening is when you compress and release the fistula and the vein wall rebounds under your fingers with a springy, firm feel.

Auscultating the access should be done in conjunction with palpation. To verify patency, the whooshing sound of the bruit should be continuous, but you also want to listen for the quality or strength of the bruit, as this can indicate adequate flow through the access. Listening for pitch changes of the bruit can be helpful in determining if there is a problem like a juxta-anastomotic (inflow) or arterial stenosis that could decrease inflow and not providing for enough resistance in the vein for development of the fistula. When stenosis is present, the usually low pitch will change to a higher pitch at the site of the stenosis.

While this clinical consult has reviewed ways to determine AV fistula maturity, a general nursing assessment also needs to be completed and documented, including a description of the surgical dressing, any swelling, and an overall skin assessment of the arm. General vascular access assessment can be found in the *Nephrology Nursing Standards of Practice and Guidelines for Care* (Burrows-Hudson & Prowant, 2005).

The trend will continue to be the creation of more AV fistulae. The challenge will be to see more AV fistulae that are functional. Nurses will play a key role in making that happen.

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