

Vascular Access for Hemodialysis

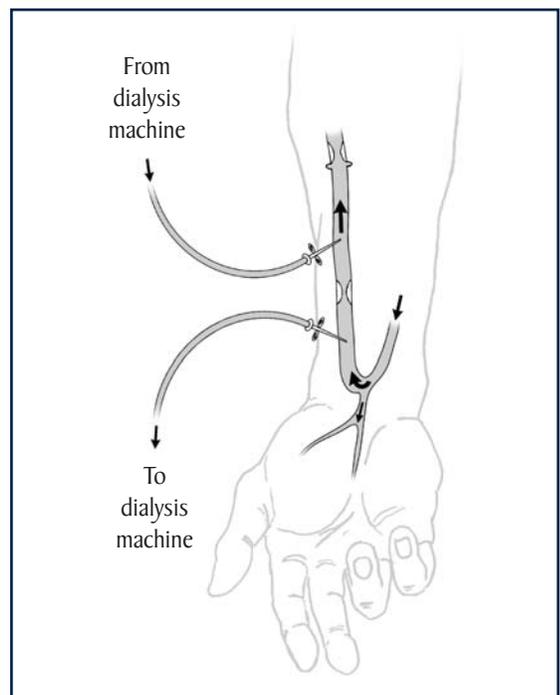
If you will be starting hemodialysis treatments in the next several months, you will need to work with your health care team to learn how the treatments work and what you can do to get the most from them. One important step before starting regular hemodialysis sessions is preparing a vascular access, which is the site on your body where blood will be removed and returned during dialysis. To maximize the amount of blood cleansed during hemodialysis, the vascular access should provide high volumes of blood flow continuously during treatments.

A vascular access should be prepared weeks or months before you start dialysis. It will allow easier and more efficient removal and replacement of your blood with fewer complications. There are three basic kinds of vascular accesses for hemodialysis: an arteriovenous (AV) fistula, an AV graft, and a venous catheter. A fistula is an opening or connection between any two parts of the body that are usually separate, for example, a hole in the tissue that normally separates the bladder from the bowel. While most kinds of fistula are a problem, an AV fistula is useful because it causes the vein to grow large and strong for easy access to the blood system. The AV fistula is considered the best long-term vascular access for hemodialysis because it provides

adequate blood flow for dialysis, lasts a long time, and has a complication rate lower than the other access types. If an AV fistula cannot be created, an AV graft or venous catheter may be needed.

Arteriovenous Fistula

An AV fistula requires advance planning because a fistula takes a while after surgery to develop (in rare cases, as long as 24 months). But a properly formed fistula is less likely than other kinds of vascular accesses to form clots or become infected. Also, fistulas tend to last many years, longer than any other kind of vascular access.



Forearm arteriovenous fistula.



A surgeon creates an AV fistula by connecting an artery directly to a vein, usually in the forearm. Connecting the artery to the vein causes more blood to flow into the vein. As a result, the vein grows larger and stronger, making repeated insertions for hemodialysis treatments easier. For the surgery, you'll be given a local anesthetic. In most cases, the procedure can be performed on an outpatient basis.

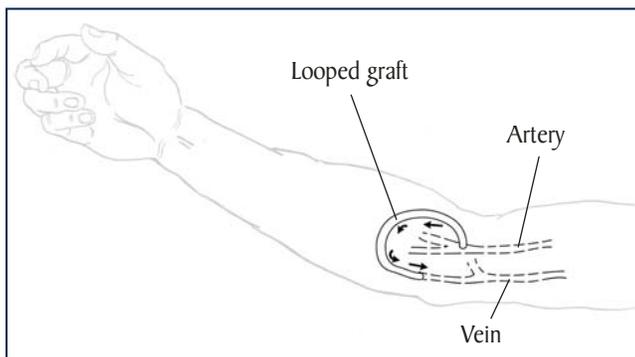
Arteriovenous Graft

If you have small veins that won't develop properly into a fistula, you can get a vascular access that uses a synthetic tube implanted under the skin in your arm. The tube becomes an artificial vein that can be used repeatedly for needle placement and blood access during hemodialysis. A graft doesn't need to develop as a fistula does, so it can be used sooner after placement, often within 2 or 3 weeks.

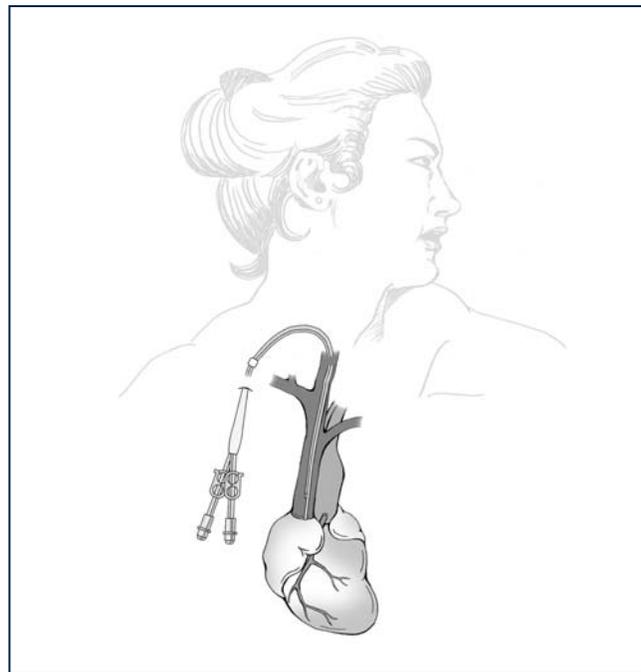
Compared with fistulas, grafts tend to have more problems with clotting or infection and need replacement sooner, but a well-cared-for graft can last for several years.

Venous Catheter for Temporary Access

If your kidney disease has progressed quickly, you may not have time to get a permanent vascular access before you start hemodialysis treatments. You may need to use a venous catheter as a temporary access.



One kind of AV graft.



Venous catheter for temporary hemodialysis access.

A catheter is a tube inserted into a vein in either your neck, chest, or leg near the groin. It has two chambers to allow two-way flow of blood. Once a catheter is placed, needle insertion is not necessary.

Catheters are not ideal for permanent access. They can clog, become infected, or cause narrowing of the veins in which they are placed. But if you need to start hemodialysis immediately, a catheter will suffice for several weeks or months while your permanent access develops.

For some patients, fistula or graft surgery is not successful, and a long-term catheter access must be used. Catheters that will be needed for more than about 3 weeks are designed to be tunneled under the skin to increase comfort and reduce complications.

What to Expect During Hemodialysis

With every hemodialysis session, needle insertion is required. Most dialysis centers use two needles—one to carry blood to the dialyzer and one to return the cleaned blood to your

body. Some specialized needles are designed with two openings for two-way flow of blood, but these needles are less efficient. For some patients, use of this needle may mean longer treatments.

Some people prefer to insert their own needles. You'll need training for this to learn how to prevent infection and protect your vascular access. You may also learn a "ladder" strategy for needle placement in which you "climb" up the entire length of the fistula session by session so you won't weaken an area with a grouping of needle sticks. An alternative approach is the "buttonhole" strategy in which you use a limited number of sites but insert the needle precisely into the same hole made by the previous needle stick. Whether you insert your own needles or not, you should know about these techniques so you can understand and ask questions about your treatments.

Possible Complications

All three types of vascular access—AV fistula, AV graft, and venous catheter—can have complications that require further treatment or surgery. The most common complications are access infection and low blood flow due to blood clotting in the access.

Venous catheters are most likely to develop infection and clotting problems that may require medications and catheter removal or replacement.

AV grafts may also develop low blood flows, an indication of clotting or narrowing of the access. In this situation, the AV graft may require angioplasty, a procedure to widen the small segment that is narrowed. Another option is to perform surgery on the AV graft and replace the narrow segment.

Infection and low blood flow are much less common in AV fistulas than in AV grafts and venous catheters. Still, having an AV fistula is not a guarantee against complications.

Taking Care of Your Access

You can do several things to protect your access.

- Make sure your nurse or technician checks your access before each treatment.
- Keep your access clean at all times.
- Use your access site only for dialysis.
- Be careful not to bump or cut your access.
- Don't let anyone put a blood pressure cuff on your access arm.
- Don't wear jewelry or tight clothes over your access site.
- Don't sleep with your access arm under your head or body.
- Don't lift heavy objects or put pressure on your access arm.
- Check the pulse in your access every day.

For More Information

Your health care team will help you learn more about how to care for your access site. Also, for a copy of the booklet *Getting the Most from Your Treatment: What You Need to Know About Hemodialysis Access*, contact

National Kidney Foundation

30 East 33rd Street
New York, NY 10016
Phone: 1-800-622-9010
Internet: www.kidney.org

For a copy of the booklet *Understanding Your Hemodialysis Access Options*, contact

American Association of Kidney Patients

3505 East Frontage Road, Suite 315
Tampa, FL 33607
Phone: 1-800-749-2257
Internet: www.aakp.org

The Life Options Rehabilitation Program has developed an interactive patient education website called Kidney School. Module 8 of this program deals with vascular access for hemodialysis. To view this module, log in to www.kidneyschool.org or contact

Life Options Rehabilitation Program
Medical Education Institute, Inc.
414 D'Onofrio Drive, Suite 200
Madison, WI 53719
Phone: 1-800-468-7777
Internet: www.lifeoptions.org

The Centers for Medicare and Medicaid Services (CMS), the End-Stage Renal Disease (ESRD) Networks, and the Institute for Healthcare Improvement (IHI) launched the National Vascular Access Improvement Initiative in 2003. Materials from the Fistula First Change Package are available through the IHI website, or contact

The Institute for Healthcare Improvement
375 Longwood Avenue, 4th floor
Boston, MA 02215
Phone: 617-754-4800
Internet: www.ihl.org

About the Kidney Failure Series

The NIDDK Kidney Failure Series includes six booklets and seven fact sheets that can help you learn more about treatment methods for kidney failure, complications of dialysis, financial help for the treatment of kidney failure, and eating right on hemodialysis. For free single printed copies of this series, please contact the National Kidney and Urologic Diseases Information Clearinghouse.

National Kidney and Urologic Diseases Information Clearinghouse

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Internet: www.kidney.niddk.nih.gov

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