Patient education: Hemodialysis (The Basics)

Written by the doctors and editors at UpToDate

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What is hemodialysis?

This is a treatment for kidney failure. Normally, the kidneys filter blood, remove waste, and remove excess salt and water (figure 1). Kidney failure, also called "end-stage kidney disease," is when the kidneys mostly or completely stop working.

With hemodialysis, a machine takes over the job of the kidneys. Blood is pumped from the body, filtered through a dialysis machine, and then returned to the body (figure 2).

The exact setup and process of your dialysis treatment will depend on things like:

- If your kidney problems are likely to get better after a short time
- How much extra fluid you have – This is the weight you gain between treatments.
- Blood tests that show how well your kidneys are working

Where will I have hemodialysis?

Most people can choose to either have it at a dialysis center (in a hospital or clinic) or at home.

There are downsides and benefits to both options:

- If you have dialysis at a center, you will need to travel there and back. But doctors and nurses at the center can watch you closely during your dialysis.
- If you have dialysis at home, you or someone else will need to learn how to do it. You will also need special equipment and supplies. But people who do home dialysis often feel better, more independent, and more in control of their life. Also, some studies show people who do home dialysis end up being healthier than those who get dialysis in a center.

How often will I have hemodialysis, and how long does it take?

You will have it at least 3 times a week. Your schedule will depend on where you have it:

- People who go to a center usually have dialysis 3 times a week. Each treatment usually takes about 4 hours.
- People who do it at home usually have dialysis 3 to 7 times a week, but they have more choice with their schedule. Some people do dialysis during the day. Others do it overnight while they sleep. Each treatment usually takes 3 to 10 hours.

When will I start hemodialysis?

You and your doctor will decide the right time for you to start. It depends partly on how well your kidneys work, your symptoms, and your overall health. Your doctor will do blood tests to check how well your kidneys are working.

Before you start hemodialysis, your doctor will create an "access." This is a way for the blood to leave and return to your body. There are 3 different types of accesses:

- Arteriovenous, or "AV," fistula – This is the most common type (figure 3).
- AV graft (figure 4)
- Central venous catheter (figure 5)

What happens during hemodialysis?

It depends on your access and where you have dialysis:

- If you have an AV fistula or AV graft, the doctor or nurse will put 2 needles into your arm, in your access. If you have a central venous catheter, they will connect the catheter tube to tubes from the dialysis machine.
- During hemodialysis, blood leaves your body through the access. The blood travels through and is filtered by the dialysis machine. Then, the blood returns to your body.
- The dialysis machine is disconnected when you are finished with dialysis.
- If you have dialysis at a center, the staff will check your blood pressure and heart rate during the treatment.

What problems can happen with hemodialysis?

People can have problems with their access. An access can get infected or blocked, or stop working.

People can also have problems during dialysis treatments. These can include:

- Feeling lightheaded
- Trouble breathing
- Belly or muscle cramps
- Nausea or vomiting

Some people also feel tired after dialysis. Tell your doctor or nurse if you have any problems. Many of them can be treated.

What else should I do?

If you get dialysis regularly, you need to:

- Take care of your fistula or graft, if you have one – Wash your fistula or graft with soap and warm water every day and before every dialysis treatment. Don't scratch or pick at the area. Don't let anyone use that arm to start an IV (a thin tube that goes into a vein), take blood, or measure your blood pressure.
- Check your fistula or graft every day, if you have one – When your fistula or graft is working normally and blood is flowing through it, you can feel a vibration over the area. Tell your doctor or nurse if you don't feel a vibration.
- Keep your catheter covered, if you have one – To help prevent infection:
  - A doctor or nurse will cover your catheter with a bandage and change it at each dialysis session.
  - Do not try to remove or change your bandages at home.
  - Your doctor or nurse will tell you if it is safe for you to shower.
  - Do not put the area underwater.
- Weigh yourself every day – When your kidneys don't work, fluid collects in your body. Tell your doctor or nurse if you gain more weight than usual between dialysis treatments.

- Follow a special diet – You need to limit how much fluid you drink. You might also need to avoid foods with a lot of sodium, potassium, and phosphorus. These are minerals that can build up in your body if you have kidney problems.

Can I travel if I get dialysis?

Probably. If you do home dialysis, you might be able to take your machine with you. If you get dialysis in a center, you need to find a dialysis center where you are traveling.

When should I call the doctor?

Call for advice if:

- You have symptoms of infection – These include a fever of 100.4°F (38°C) or higher, chills, or redness, drainage, warmth, or pain over the access.
- Your access arm or hand is pale, cold, or hurts during treatment.
- You have bleeding from your access that does not stop after 20 minutes of gentle pressure.
- You don't feel an access vibration – This could mean your access has stopped working or closed up.

More on this topic

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Patient education: Arteriovenous vascular access for hemodialysis (The Basics)
Patient education: Hemodialysis catheter placement (The Basics)
Patient education: How to care for a hemodialysis catheter (The Basics)
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Patient education: Choosing between dialysis and kidney transplant (The Basics)
Patient education: Acute kidney injury (The Basics)
Patient education: Chronic kidney disease (The Basics)
Patient education: Polycystic kidney disease (The Basics)
Patient education: End-stage kidney disease (kidney failure) (The Basics)
Patient education: Continuous kidney replacement therapy (The Basics)

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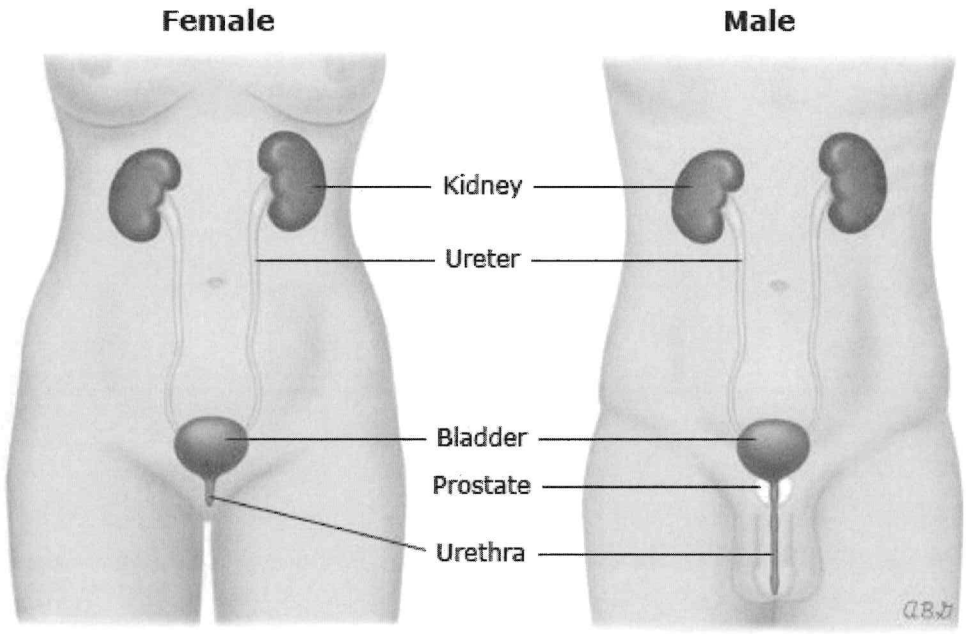
GRAPHICS

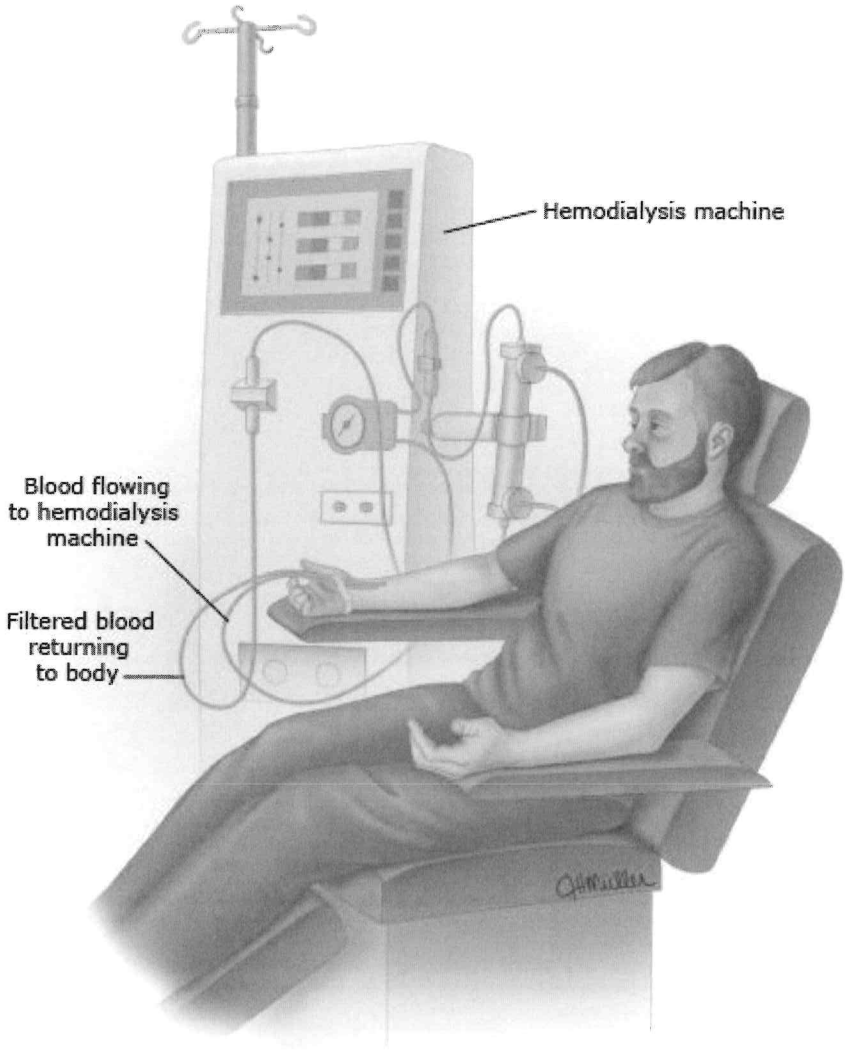
Figure 1: **Anatomy of the urinary tract in adults**



Urine is made by the kidneys. It passes from the kidneys into the bladder through 2 tubes called the "ureters." Then, it leaves the bladder through another tube called the "urethra."

Graphic 79864 Version 10.0

Figure 2: **Hemodialysis**



This drawing shows a person getting hemodialysis. Blood flows from the body to the hemodialysis machine, where it is filtered. Then, the blood is returned to the body. This can be done through an "access" in the person's arm, as shown here. It can also be done through a "central venous catheter," which usually goes into the neck.

The whole process takes about 3 to 5 hours and must be repeated 3 to 7 times a week.

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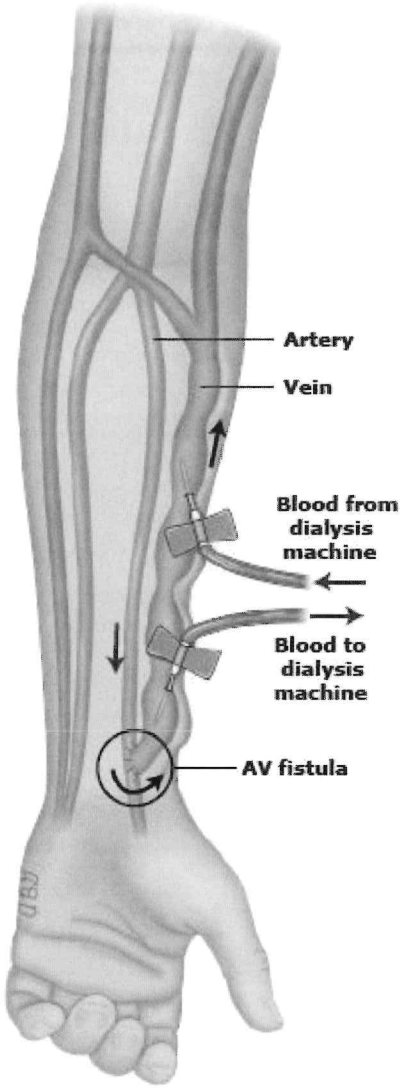
Figure 3: **AV fistula for hemodialysis**

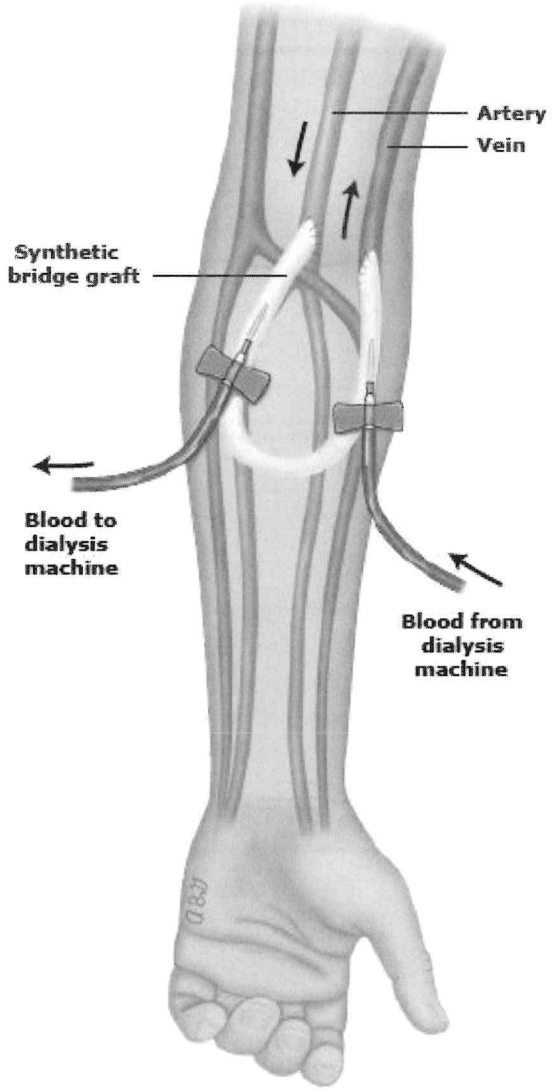


This drawing shows an AV fistula in a person's arm. An AV fistula is under the skin. A doctor makes an AV fistula by doing surgery to connect an artery directly to a vein. It is usually done in the lower arm, but can be done in the upper arm. During hemodialysis, 2 needles are put into the access to remove and return blood to the body.

AV: arteriovenous (this means involving an artery and a vein).

Graphic 71644 Version 11.0

Figure 4: **AV graft for hemodialysis**

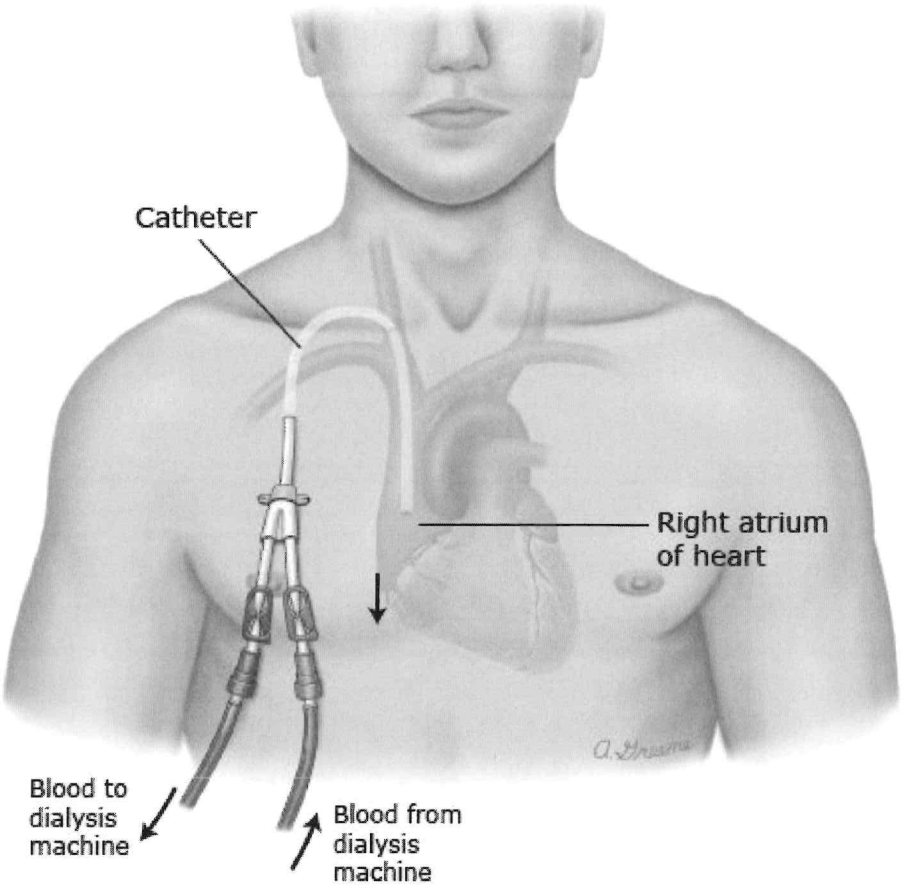


This drawing shows an AV graft in a person's arm. A graft is under the skin. A doctor makes a graft by doing surgery. They use a flexible rubber tube to connect an artery to a vein. During hemodialysis, 2 needles are put into the graft to remove and return blood to the body.

AV: arteriovenous (this means involving an artery and a vein).

Graphic 59794 Version 11.0

Figure 5: **Central venous catheter for hemodialysis and CKRT**



This drawing shows a central venous catheter, which is a thin, flexible tube. It is put inside the body before a person has certain types of dialysis, such as hemodialysis and continuous kidney replacement therapy ("CKRT").

One end of the catheter is put into a large vein, usually in the neck. The other end stays outside the body. During dialysis, the end outside the body is connected to tubes from the dialysis machine.

Graphic 69685 Version 7.0