PROCEDURE

Hemodialysis access procedures

Hemodialysis access procedures create, place, or repair a route for blood to reach a dialysis machine.

PURPOSE
Create or maintain reliable blood flow for hemodialysis

PROCEDURE TYPE
Therapeutic; surgical or minimally invasive interventional radiology

WHERE IT IS DONE
Operating theatre, interventional radiology suite, or bedside

ANAESTHESIA
Local, often with sedation; general for some surgical procedures

HOW LONG IT TAKES
About 30 minutes to three hours, based on procedure

PREPARATION
Possible fasting; medication and blood-thinner plan

RECOVERY
Usually same day; no driving after sedation or general anaesthesia

MAIN RISKS
Bleeding, infection, clotting, reduced hand circulation

RESULTS
Technical result immediate; access readiness assessed later

Overview

Hemodialysis removes waste and extra fluid by passing your blood through a dialysis machine. The machine needs a reliable way to take blood from your body and return it. This route is called vascular access.

There are three main types:

Fistulas and grafts can also need procedures to restore blood flow. These include imaging the access with contrast dye, opening a narrowed area with a balloon, removing a clot, or revising the access with surgery.

The best option is not the same for everyone. Your kidney team considers how soon dialysis is needed, your blood vessels, other health conditions, previous access procedures, and your

preferences.

- An arteriovenous fistula , or AV fistula, joins one of your arteries directly to a vein, usually in an arm.
- An arteriovenous graft , or AV graft, uses a soft artificial tube to connect an artery and vein.
- A hemodialysis catheter is a flexible tube placed into a large vein, usually in the neck or upper chest.

Why the procedure is performed

You may be offered an access procedure if you are expected to need hemodialysis, need to start it soon, or have an access that is not working properly.

A fistula is often planned before dialysis is expected to begin because it needs time to enlarge and strengthen. This process is called maturation. A graft may be considered when your veins are not suitable for a fistula or when access may be needed sooner.

A catheter can usually be used immediately. It may provide temporary access while a fistula or graft heals, or when dialysis must begin urgently. Some people need a catheter for longer because other access options are not suitable.

An existing access may need treatment if it develops narrowing, low blood flow, a clot, swelling, repeated bleeding after dialysis, or problems during treatment.

Who should and should not have it

A fistula or graft may be appropriate if you are likely to need ongoing hemodialysis and have blood vessels that can support it. Ultrasound vessel mapping can help show whether the arteries and veins are suitable.

A particular procedure may be avoided, changed, or delayed if:

A catheter is generally not preferred as permanent access when a suitable fistula or graft is possible. Catheters have higher risks of bloodstream infection, clotting, and narrowing of major veins. However, they can be the safest or most practical option in some circumstances.

Your team should explain why it recommends one access type, where it would be placed, how soon it could be used, and how it fits your longer-term kidney treatment plan.

- There is an active infection near the planned site or in the bloodstream.

- The chosen artery or vein is too small, blocked, or previously damaged.
- Blood flow to the hand is already poor.
- Increased blood flow through a fistula or graft could place too much strain on a severely weakened heart.
- Bleeding risk is temporarily high or medicines need adjustment.
- Dialysis is needed before a new fistula or graft could be used.

How to prepare

Follow the treating facility's own instructions first, because preparation differs between surgical access creation, catheter placement, and access repair.

Tell the team about all medicines and supplements you take. This is especially important for blood thinners like warfarin or apixaban , antiplatelet medicines such as aspirin or clopidogrel, and diabetes medicines. Do not stop a prescribed medicine unless the treating team tells you to.

You may be asked not to eat or drink for several hours if sedation or general anaesthesia is planned. Procedures using only local anaesthetic may have different instructions.

Before fistula or graft surgery, you may have ultrasound mapping of the blood vessels in both arms. Try to protect the planned arm from blood tests, intravenous lines, and blood pressure cuffs if your team asks you to do so.

Arrange for someone to take you home if you will receive sedation or general anaesthesia. Tell the facility if you could be pregnant, have an allergy to contrast dye, or have previously reacted to anaesthesia.

What happens during the procedure

For an AV fistula, the surgeon makes a small cut and connects an artery to a nearby vein. The increased blood flow gradually makes the vein larger and stronger so it can be used for dialysis needles.

For an AV graft, the surgeon places a synthetic tube under the skin and connects it between an artery and vein. The graft provides the area into which dialysis needles are placed.

For a tunneled catheter, the skin is numbed. The clinician guides the catheter into a large vein, usually using ultrasound and X-ray imaging. Part of the catheter passes under the skin before

leaving through the chest. This tunnel helps hold it in place and provides some protection from infection. A temporary, non-tunneled catheter may be placed at the bedside in urgent situations.

If an access has narrowed or clotted, a specialist may insert a thin tube into it. Contrast dye and X-rays show the blood flow. A small balloon can widen a narrowed section, and devices or medicines may be used to remove a clot. Some accesses need surgical revision instead.

You may be awake with local anaesthetic, relaxed with sedation, or asleep under general anaesthesia. The approach reflects the procedure and your health.

Recovery and what to expect afterward

Pain: Mild soreness, bruising, or swelling near the site is common. Use pain relief approved by your team. Pain that becomes severe or is associated with a cold, pale, weak, or numb hand needs urgent assessment.

Eating: You can usually eat and drink once you are fully awake. Start with light food if sedation has made you nauseated.

Activity: Keep the dressing clean and dry as instructed. Avoid heavy lifting or pressure on a new fistula or graft until your team says it is safe. Do not wear tight clothing or jewellery over the access. Never allow blood pressure measurements, blood draws, or intravenous lines in that arm unless there is an emergency and no alternative.

Driving: Do not drive after sedation or general anaesthesia. Follow the facility's stated restriction, which may extend into the next day. You also need someone else to drive you home.

Work: Many people return to light work within a few days, but jobs involving heavy lifting may require more time. Recovery after a simple catheter procedure or access repair may be shorter than after open surgery.

A fistula cannot usually be used immediately. It must mature first. A graft may become usable sooner, depending on its type and healing. Your dialysis team will examine the access before using it.

Risks and possible complications

Possible risks include bleeding, bruising, infection, narrowing, clotting, and failure of the access to provide enough blood flow. A fistula may not mature enough to use and may need another

procedure.

A fistula or graft can sometimes divert too much blood from the hand. This is called steal syndrome and can cause hand pain, coolness, numbness, weakness, or skin changes. Increased blood flow can also place extra strain on the heart in susceptible people.

Catheters can cause bloodstream infection, clotting, vein narrowing, or an irregular heartbeat during placement. Rare placement complications include injury to a blood vessel or air around a lung.

Procedures using contrast dye or sedation have their own risks. Your team can explain which risks apply to the specific procedure being offered.

Results and follow up

The clinician usually knows immediately whether a catheter was positioned or a narrowed access was reopened successfully. After surgery, you may be asked to feel for a continuous vibration over a fistula or graft. This is called a thrill and shows that blood is flowing.

Follow-up checks whether the wound is healing and whether the access is developing enough flow for dialysis. A fistula or graft should not be used until the dialysis or surgical team confirms that it is ready.

Routine care includes checking the access before each dialysis session. Report changes in its vibration, swelling, prolonged bleeding, increasing pressure during dialysis, or difficulty achieving the prescribed treatment. These can be early signs of narrowing or clotting.

Catheter dressings and caps must be cared for using the dialysis unit's infection-prevention process. Do not remove the dressing or submerge the catheter unless your team has specifically shown you how to manage it.

Alternatives

Alternatives depend on why the procedure has been offered.

A graft may be used instead of a fistula when the veins are unsuitable or access is needed sooner. It may be ready earlier, but it generally needs more procedures for narrowing or clotting.

A catheter avoids fistula or graft surgery and can be used promptly. The trade-off is a higher risk of infection, clotting, and damage to central veins.

For a narrowed or clotted access, alternatives to a minimally invasive balloon or clot-removal

procedure include surgical revision or creation of a new access. Surgery may offer a more durable repair in some situations but usually involves a larger incision and longer recovery.

Peritoneal dialysis uses the lining of the abdomen rather than blood-vessel access. It requires an abdominal catheter and regular dialysis at home. Kidney transplantation may remove the need for dialysis, but it involves major surgery, eligibility assessment, donor availability, and lifelong anti-rejection medicine.

Some people choose comprehensive conservative kidney care without dialysis. This focuses on symptom relief and quality of life but does not replace lost kidney function.

When to call your healthcare team

Contact your dialysis or access team promptly for increasing redness, warmth, drainage, swelling, fever, worsening pain, loss or weakening of the access vibration, or bleeding that takes longer than usual to stop.

Seek urgent medical care if your hand becomes cold, pale, blue, very painful, weak, or numb.

Call emergency services for bleeding that does not stop with firm direct pressure, severe shortness of breath, chest pain, fainting, or a catheter that has come out. If bleeding occurs, apply firm pressure with clean gauze while help is arranged.

Routine questions about dressings, bathing, work, or when the access can be used can usually wait for the dialysis unit or scheduled follow-up visit.

Common questions

Will I be asleep?

Not always. Many catheter and access-repair procedures use local anaesthetic with or without sedation. Fistula or graft surgery may use local, regional, or general anaesthesia.

Can I drive home?

Not after sedation or general anaesthesia. Arrange a ride and follow the facility's driving restrictions.

How painful is it?

You should not feel sharp pain during the procedure after anaesthetic is given. Mild soreness and bruising afterward are common. Tell the team if pain is severe or worsening.

When will I know if it worked?

The technical result is usually known immediately. A new fistula or graft needs later checks to confirm that it has healed and is ready for dialysis.

When can dialysis use the new access?

A catheter can usually be used immediately. A fistula needs time to mature, while graft timing reflects its design and healing. Your dialysis team will confirm readiness.

Can I shower with it?

Instructions differ. A healing incision or catheter dressing must be kept dry as directed. Ask for specific bathing instructions before leaving the facility.

Sources

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