

LIVING WITH ACES™

ACES™ Automatic
Continuous Effusion
Shunt for Recurrent
Pleural Effusions



ACES is a fully implantable device that provides lasting relief from chronic pleural effusions without the need for painful procedure, external catheters and ongoing drainage and maintenance. ACES offers patients comfort, confidence and freedom to live life on their own terms.

What is ACES?

The Automatic Continuous Effusion Shunt (ACES) is a device that is implanted between your ribs (Figure 1) and uses natural movement from your ribs during breathing, coughing, and motion to move fluid from the chest to the abdomen where it is absorbed.

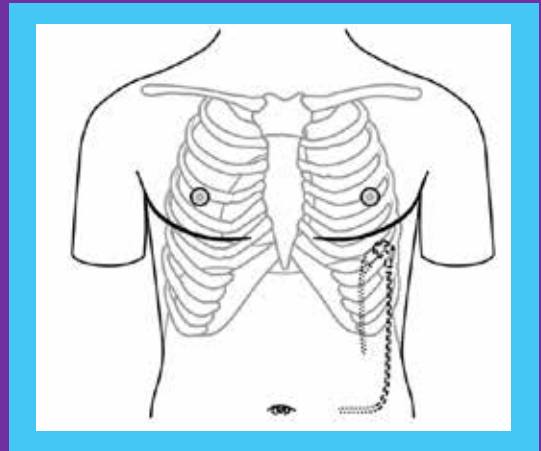


Figure 1. ACES Implant

What to Expect with ACES

The ACES is implanted in a minimally invasive surgical procedure done under general anesthesia that lasts about an hour. The hospital stay is typically less than a day. The surgeon will make three incisions, one for the pump and two smaller ones to place the catheters. You will be sore for a few days following the procedure but should start to feel relief from effusions. Your surgeon may instruct you to pump the bulb on your side. Instructions for manual pumping are found below.

The ACES is designed to remove the need for ongoing effusion management associated with other treatments. Stay as active as possible and live your life freely. Check in with your physician as directed or if you sense the pump isn't functioning properly (see the Ensuring Pump Function section on page 3).



Manually Pumping ACES:

Manually pressing the pump bulb can move additional fluid out of your chest and can help check on the ACES' function. We recommend that you pump the ACES several times at least once a day once the incision has healed. To manually pump:

- 1 Locate the pump bulb which will be along the lower part of your rib cage and near the incision (Figure 2). Your ACES device may be on the right or left side, please refer to your patient information card for location.
- 2 Press the pump chamber down as far as you can and then release it. Wait a second for the pump chamber to re-expand before pressing again. Repeat this as many times as you feel comfortable (Figure 3).
- 3 Pumping may be uncomfortable at first. Pumping to the side of the incision may help. Once the incision has healed, pumping should not be painful anymore.
- 4 If the pump becomes difficult to compress or doesn't decompress after you have pumped it a few times, it may mean that there is no more fluid in the chest to drain. You should stop pumping at this time.

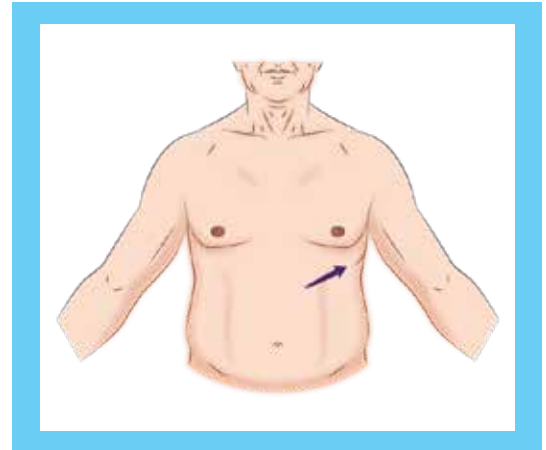


Figure 2. Bulb location

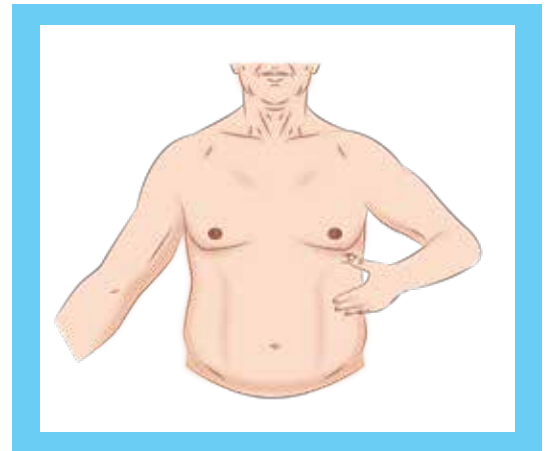


Figure 3. Thumb depression

Ensuring Pump Function

Watch for signs that ACES may not be functioning:

- You become short of breath again.
- When you press the pump chamber it feels solid and cannot be compressed.
- When you press the pump chamber it compresses but does not re-expand.

If you become short of breath again or the pump chamber doesn't compress or re-expand normally, contact the doctor who implanted your ACES.

ACES™ Patient Frequently Asked Questions:

How does the ACES compare to other treatments for chronic pleural effusions?

Typical treatments for chronic pleural effusions are pleurodesis and indwelling pleural catheters (IPCs).

- Pleurodesis is a procedure that uses a chemical to cause scarring and prevent fluid from building up in the pleural space.¹ It can offer a permanent solution but is a painful procedure that requires a hospital stay.² It is not appropriate for many patients.
- Indwelling Pleural Catheters (IPCs) are implanted catheters that have an externalized port to allow drainage of pleural effusions.³ This method requires regular drainage into single-use vacuum bottles, which often requires home healthcare assistance. IPCs have a high risk of infection and symptoms may return between drainage.⁴

The ACES allows you to live your life more freely than other options. The ACES device is implanted in a short procedure with a brief hospital stay. There are no external catheters to drain or drainage bottles to manage and no restrictions on things like swimming or bathing.

What is the procedure like and how long does it last?

The surgeon will make three incisions in the side of your chest, one for the pump and the others for the abdominal catheter. The implant procedure typically takes about an hour and is done under general anesthesia with a short hospital stay.

Is there much pain?

The pump incision may be tender for a few days. Some people have ongoing discomfort at the pump site that may require pain medication. Speak to your physician if you experience persistent pain.

What happens to the fluid that is pumped into my abdomen?

When the fluid from your chest is pumped into the abdomen, the fluid is safely resorbed by the body.

Will I feel the device or will there be discomfort?

The ACES is a low-profile device that you will be able to feel under the skin so you can pump it if needed. It is implanted in an area that is typically not bothersome. Most patients do not report any discomfort.

Is there anything that I can do to help ACES automatically pump more fluid out of my chest?

The ACES works automatically based on rib motion. The more rib motion, the more ACES can pump. You can increase rib motion with simple daily activities such as staying active, taking walks, taking deep breaths, and bending and twisting as you might feel comfortable. You can also increase the amount of fluid pumped by manually compressing the pump bulb if you want or if your doctor instructs you to do so.

ACES™ Patient Frequently Asked Questions:

What are the risks of ACES?

Risks include injury to lung, liver or bowel during implantation that can cause bleeding, air leaking out of your lung, or air and bacteria leaking out of your bowel. These would likely require additional treatment and a hospital stay.

While the ACES is a low-maintenance option for patients, it is possible for the ACES to become clogged and stop working or become damaged; that fluid may again build up in your chest or begin to build up in your abdomen; that fluid may leak out of the incisions; that the incisions may become infected or that you could develop an infection your chest or abdomen. Most of these issues can be easily resolved. Review the materials on caring for ACES carefully and contact your physician as directed.

Is there a risk that the cancer could spread to my abdomen?

In cancer patients, there may be risk of moving tumor cells into the abdomen, although available data shows the risk of cancer spreading to be very low. With previous devices the only patients who experienced cancer spread had mesothelioma, which commonly spreads to the abdomen. We recommend that patients with mesothelioma should avoid the therapy.

How do I manually pump ACES?

Locate the pump bulb along the lower part of your rib cage and near the larger incision. Press the pump bulb down as far as you can and then release it. Wait a second for the pump chamber to re-expand before pressing again. Repeat this as many times as you feel comfortable or as you were instructed by your doctor.

How often should I pump ACES?

We recommend you pump several times a day to ensure proper function as long as it is not uncomfortable.

How much fluid is pumped when I manually compress the pump bulb?

With each pump, two milliliters (mL) of fluid are moved from your chest and into your abdomen. The more you compress the pump bulb, the more fluid is moved. As an example, compressing the pump bulb 15 times will pump two tablespoons of fluid.

Can I tell how much fluid ACES pumps each day?

It is difficult to estimate how much fluid is being pumped each day. Every patient is different. Fluid is automatically pumped by ACES all day long, every day.

How long will I have my shunt in place?

Your doctor will determine when and if it should be removed. It is likely that your ACES device will be left in place until your pleural effusions resolve, as long as it is controlling your effusion and helping your breathing. Many patients have had it removed once their effusions went away.

ACES™ Patient Frequently Asked Questions:

What if shortness of breath comes back again?

If your effusion had been controlled and your breathing had improved, but it starts to get worse again, this may be an indication that the device is clogged. A clogged device may be replaced relatively easily. Contact the doctor who implanted your ACES device.

What do I do if I can't manually pump ACES (if the pump bulb won't compress or re-expand)?

This is typically an indication that the shunt is clogged. A clogged shunt may be replaced relatively easily. Contact the doctor who implanted your ACES device.

What do I do if one of the incisions or the area around the pump bulb become red or tender?

Redness and tenderness can be a sign of infection. An infection may require antibiotics and removal of the ACES device. Contact the doctor who implanted your ACES device.

What do I do if I start to have a fever?

A low-grade fever may occur after implantation as fluid starts to be pumped into the abdomen and is reabsorbed. This low-grade fever generally goes away after a few days. If this fever persists or your fever becomes higher, could be a sign of infection in your chest or in your abdomen. Contact the doctor who implanted your ACES device.

What do I do if fluid starts to leak out of one of the incisions?

Fluid leaking from one of the incisions can be a sign that the ACES device is damaged, that fluid is building up in the abdomen or in the chest, or it can be a sign of infection. An infection may require antibiotics and removal of the ACES device. Contact the doctor who implanted your ACES device.

What do I do if I start bruising easily, having purplish discoloration of the skin, or skin breakdown near the pump bulb?

These changes are likely very rare but could be the result of your immune system reacting to the heparin coating on the ACES device, a reaction called heparin-induced thrombocytopenia. If this were to occur, the ACES device will likely need to be removed. Contact the doctor who implanted your ACES device.

Who do I call if I have a problem with my shunt? Should I go to the emergency room?

If your breathing becomes very difficult you should call 911 and take your patient information card with you. Otherwise, you should contact the doctor who implanted your ACES device for help. A clogged ACES does not typically require a visit to the emergency room.

1. Ali M, et al. Treasure Island (FL): StatPearls Publishing; 2025 Jan-. 2. www.cancercenter.com/treatment-options/pleurodesis. 2025. 3. www.thoracic.org/patients/patient-resources/resources/indwelling-tunneled-pleural-catheters. Patient Education | Information Series. 2025. 4. Lui, Complications of indwelling pleural catheter use and their management, BMJ 2015.

This information is provided for educational purposes only and is not intended to replace the advice of your healthcare provider. All medical procedures carry some risks and potential complications. Please discuss these in detail with your healthcare provider before making a decision.

For additional information on the ACES device, visit www.pleuraldynamics.com.

Sources: Patient Instruction Booklet 01188, Rev. A. ACES Shunt Instructions for Use 01127, Rev. A.

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