

ADVANCED CARDIAC THERAPIES IMPROVING OUTCOMES NETWORK

Impella® Heart Pump

Patient Education Handbook



action n



ADVANCED CARDIAC THERAPIES
IMPROVING OUTCOMES NETWORK

Working together to improve critical outcomes for all pediatric and congenital heart failure patients.

The Advanced Cardiac Therapies Improving Outcomes Network (ACTION) was established to improve the care of patients with heart failure. ACTION unites all stakeholders (providers, patients/families and researchers), to share experiences, improve education and search for best practices to drive improvement in areas that are often untouched by clinical trials alone.

The learning network approach allows for critical improvements to be made faster across a collaborative system.

Visit our online education site myactioneducation.org to learn more about:

- understanding your heart failure diagnosis
- medicine treatment options
- knowing your device and surgery options
- maintaining your health and wellness

For more information about the learning network approach or the work ACTION is doing, visit actionlearningnetwork.org.

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This is **MY** Journey

Hi, my name is:



(_ _ _) _ _ _ - _ _ _



_ _ _ _ _

My caregiver is:



_ _ _ _ _

Quick References

It's important to keep some basic information about your *diagnosis* and surgeries available for quick reference.

My Care Team Contact Info



My Hospital

Name

Street Address

City, State, Zip

– My Heart Disease –



I am Allergic to:



My Past Surgeries

My Impella® Day | Date:

Notes: _____

I have an Impella® _____ heart pump

Model of Device

implanted through the vessel in my: ☐ Arm ☐ Leg

I am listed for transplant: ☐ No ☐ Yes _____

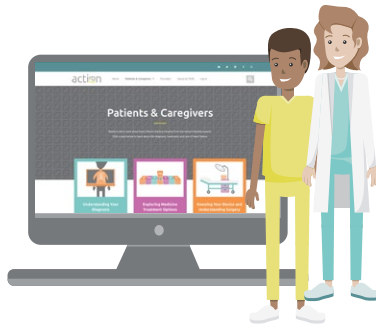
Listing Date

Using this Handbook



This handbook is like a helpful friend on your heart journey. It's here to teach you, as well as keep your memories safe. Make sure to **use a pencil** in this handbook to record the important things your doctors and nurses may tell you, as well as take note of your own thoughts. Always ask questions to learn more and work with your care team to keep your information up to date.

Online Education: Learning about your diagnosis is an important part of getting you ready to be discharged and keeping you safe. Your care team and our online educational platform: ***MyActionEducation.org*** will provide more in depth training with electronic modules and videos to prepare you for your journey. To get personalized content, create a login and write it below to remember it!



myactioneducation.org



My Login Information

Username: _____

Password: _____

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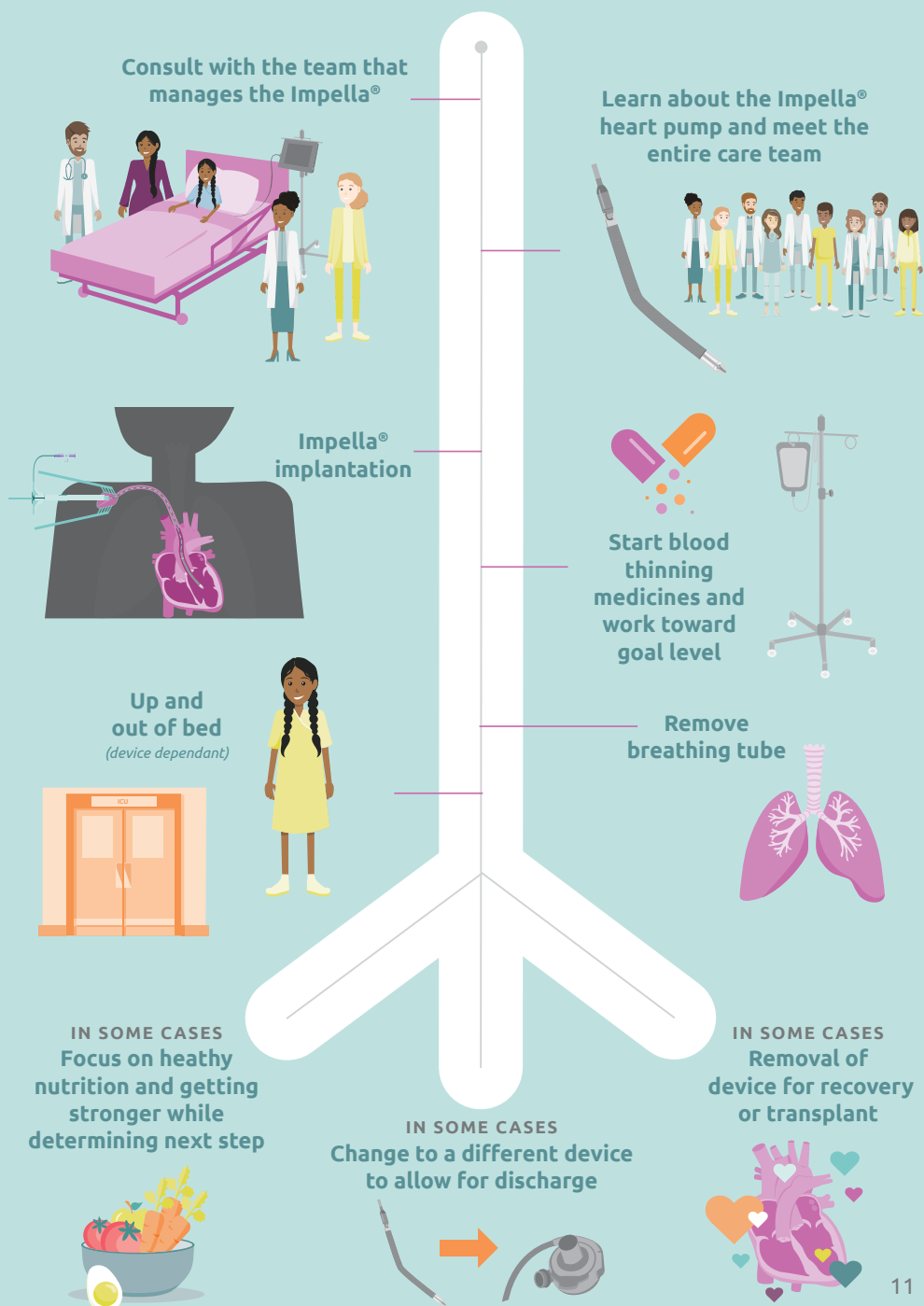
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Introduction to the Impella®

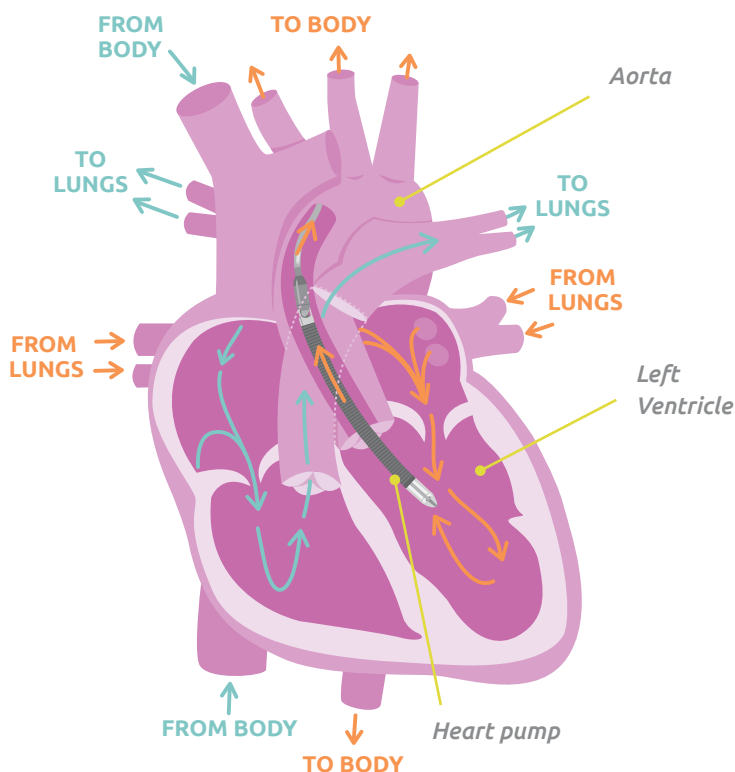
- ♥ Impella® Patient Journey
- ♥ What is an Impella®?
- ♥ How will an Impella® help me?
- ♥ What are my questions and concerns?
- ♥ Who will be the care team?

Impella® Patient Journey

Note: All patients are unique and may not follow the path exactly as shown. Some steps will need to be determined by your care team and/or some may not apply.



What is an Impella®?



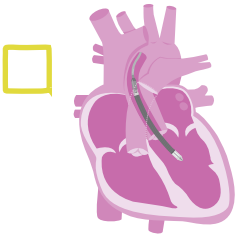
How does it work?

The **Impella®** is a type of **heart pump** placed in the heart. A heart pump helps take the workload from a weak or sick heart by moving blood from the heart to the body.

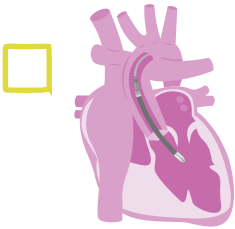
The Impella® works by continuously pumping blood from the **ventricle**, through the device to the **aorta** and then delivers to the rest of the body. The small heart pump is connected to a thin flexible tube called a **catheter**. The catheter connects to a special computer called a console, on the outside of the body. The console powers the heart pump and displays information on how the pump is working.

Where is the Impella® implanted?

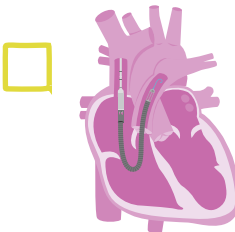
The heart pump can be placed, or ***implanted***, in either the left or right ventricle in the heart. The location of the device is determined by which side of your heart is weak and needs support. With your care team, check the box next to the pump that is right for you.



Left Ventricle Support: As the most common form of support, a heart pump is inserted in the left ventricle of the heart and carries blood out through the aorta to the rest of the body. It improves blood flow to the entire body. *Note: An Impella may be placed in the left ventricle in addition to **ECMO** (Extracorporeal membrane oxygenation) to give extra support to the sick heart.*



Single Ventricle Support: A systemic assist device for patients who were born with only one working ventricle. A heart pump is inserted into the “systemic” ventricle that pumps blood to the body.



Right Ventricle Support: A heart pump is inserted into the right ventricle of the heart and then through the pulmonary **artery** to carry blood to the lungs.

How will an Impella® help me?

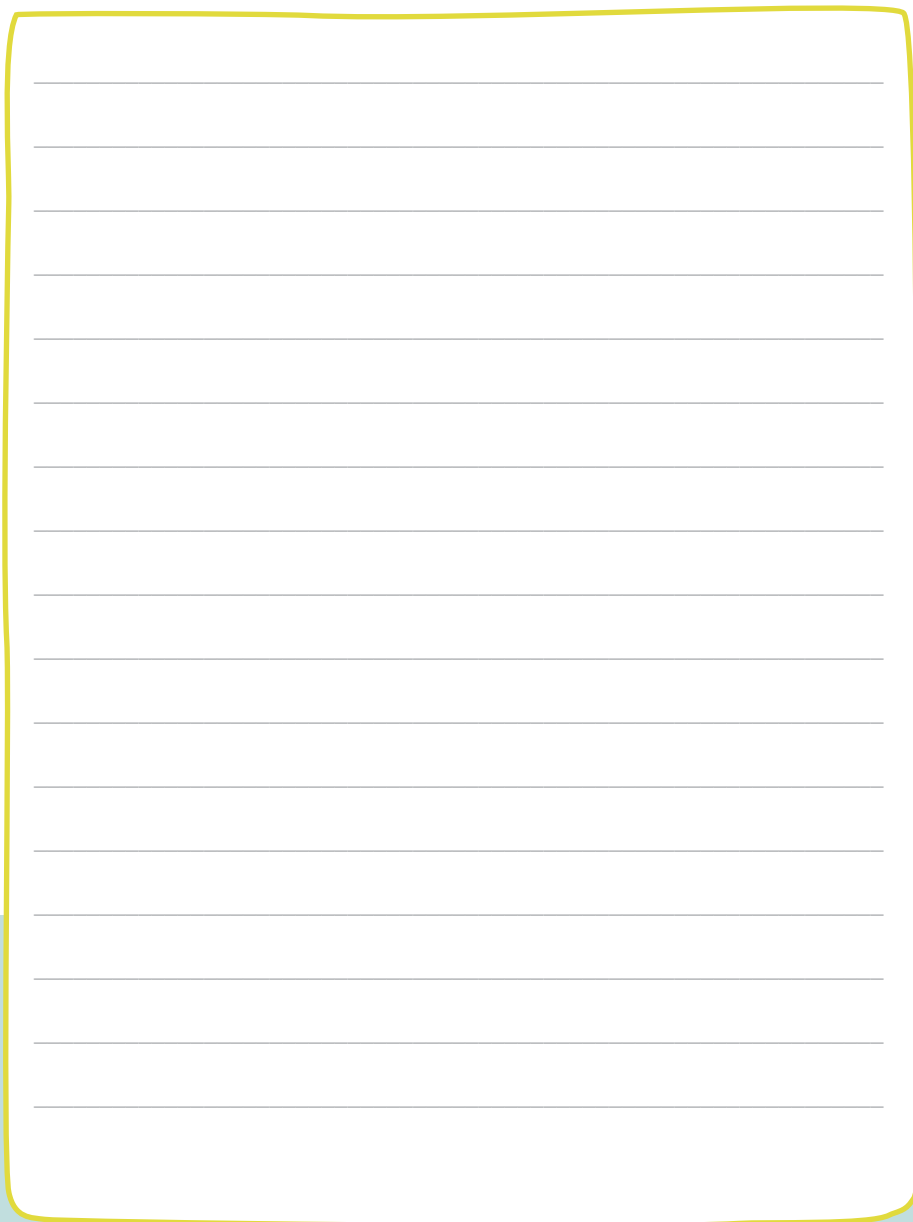
Heart pumps are placed for different reasons. Check the boxes below that apply for why you need a pump.

- ☐ The pump will help my body prepare for transplant.
- ☐ The pump will stabilize me until I can get a different kind of heart pump.
- ☐ The pump will give my body more blood flow while I undergo another procedure.
- ☐ The pump will give more blood flow to my body and make me feel better, but my future journey is unknown.
- ☐ The pump will help my heart recover.



What are my questions and concerns?

What are your biggest worries about a heart pump? Use the space below to take notes and jot down any concerns you may have.

A large yellow-outlined box with rounded corners, containing 20 horizontal lines for writing. The box is positioned in the center of the page, below the text prompt. The lines are evenly spaced and extend across the width of the box.

Who will be my care team?

There are many people that will care for you during your journey. You and your family are a very important part of the team and will always help to make decisions about your care.

Fill in your care team member's names under their titles.



Cardiac Surgeon _____

Cardiac Interventionist
(Cath Lab Doctor) _____

Heart Failure/
Transplant Doctor _____

VAD Coordinator _____

Nurse Practitioner/
APRN _____

ICU Doctor _____

Nurse(s) _____

Physical Therapist(PT)/
Occupational Therapist(OT) _____

Psychologist _____

Cardiac Rehabilitation
Specialist _____

Dietitian _____

Pharmacist _____

Social Worker _____

100

0



Send Thanks!

Send a thank you note to anyone who has made an impact in your journey. Let them know how they are doing or why they are special to you.

Procedure & Hospital Stay

- ♥ Expectations
- ♥ Procedure
- ♥ Intensive Care Unit (ICU)
- ♥ Transfer Ready

Expectations

Many patients with an Impella® heart pump notice an improvement in symptoms, but it can take time to get stronger and recover. During recovery, emotions will change frequently. Feelings of sadness or anxiety are normal, make sure to share your honest feelings with your care team. Here are some other things to keep in mind:

- ♥ The recovery time varies; it can take a while to get stronger. You will have to work hard on your exercises in order to get strong.
- ♥ Medicines and time will help lessen the pain.
- ♥ The **Intensive Care Unit (ICU)** can be loud and it may be hard to sleep at times. If sleeping is difficult, talk with your care team.
- ♥ Nutrition is really important to recovery. Your care team will help you make proper food choices.
- ♥ Your care team will help keep you comfortable and teach you a lot of information in order to keep you safe while you have an Impella® heart pump.
- ♥ Sometimes, things may not go as planned, and there may be bumps in the road. Ask questions if you feel like things are not going as planned.

Changes in Your Journey

There are times when a plan may not go as expected, causing your journey to take a different path. Sometimes patients with a heart pump may experience **complications**. Complications may result in removing the device, switching to a different device, or altering your candidacy for transplant, including removal from the transplant waitlist.

Unexpected changes in your journey can be overwhelming. Your care team will be there to help guide you through your options.

Procedure

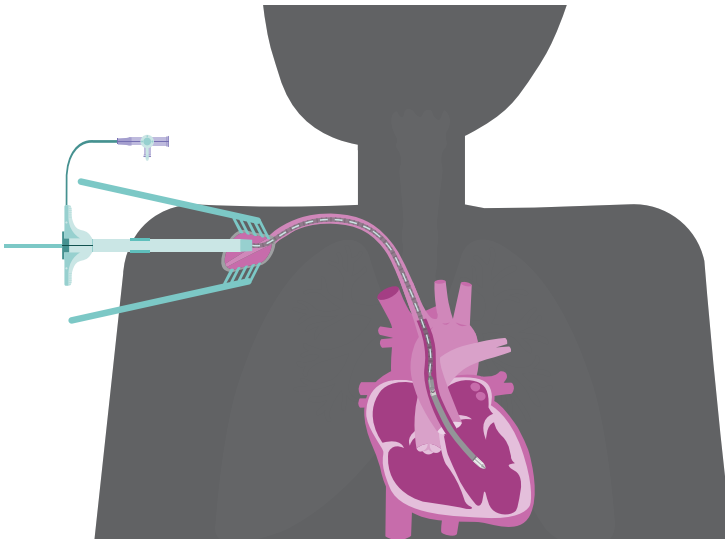
How is the Impella® placed?

With the Impella®, doctors do not generally have to perform surgery to open the chest. The device is inserted into a **blood vessel** in your leg, arm, or chest, and carefully guided up the artery or vein until it reaches the heart. The procedure may be **minimally invasive**, but an incision in your leg or chest may be needed. If your chest is already open (for open-heart surgery), a heart pump may be placed in the heart directly through the aorta.

Once in your heart, imaging is used to help position the device. The catheter is then connected to the console, and the pump is turned on. The Impella® heart pump remains in place and continues to flow while your heart rests.



My procedure took _____ hours.



Pictured: Impella® 5.5 Heart Pump

How I feel after my procedure...

Intensive Care Unit (ICU)

After the procedure, you will recover in the ICU. During the beginning stages of recovery, your lungs and body will need extra support while you get used to your new heart pump. You may have a breathing tube connected to a ventilator (breathing machine) as well as additional IV lines, tubes and other medical equipment (*see illustration below*).

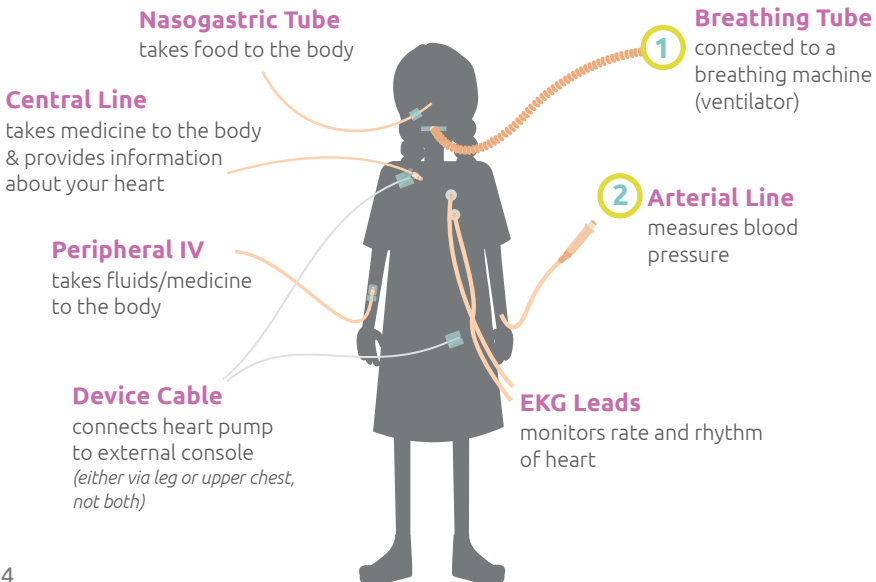
This equipment is necessary to monitor your body and give medicine needed for recovery. The equipment and lines can be scary, but are completely normal. Day by day, your care team will work towards removing lines and tubes. Once your breathing tube is removed your care team will work towards getting you out of bed and stronger.

1 My breathing tube was removed on _____.

2 My arterial line was removed on _____.

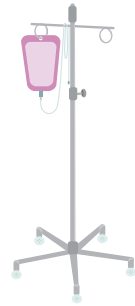


I got out of bed post-procedure on day _____.



Intensive Care Unit (ICU)

Fluid Management: The heart pump needs the right amount of fluid volume in the heart (*preload*) to pump it out to the rest of your body. Your care team will constantly monitor your fluid volume to determine whether you have too much, or if you are *dehydrated* and have too little fluid. To keep the correct fluid balance, you may be given *diuretics* (water medicines) to help remove extra fluid.



High or Low Blood Pressure:

When blood pressure is too high, the heart pump may have trouble delivering blood to the body. If your pressure is too low you may feel dizzy or sick to your stomach. Your care team will monitor your blood pressure closely and may adjust medicines and fluids to help keep your blood pressure within a target goal.

As you recover you may notice a few changes.

Weak pulse/no pulse: You may notice that your pulse is hard to find or is not there. This is normal and due to the continuous flow of blood from the pump.

Immobilization Device: For the pump to work well, it is important the catheter remains in the same location. You may have an arm sling or leg brace to help maintain the catheter's position.

Transfer Ready

When you become stronger you may transfer out of the ICU to the Cardiac Floor or Cardiac Step Down Unit. These areas of care centers are for patients who are not critically ill but are still recovering from a procedure. Some hospitals keep all patients with an Impella® in the ICU.

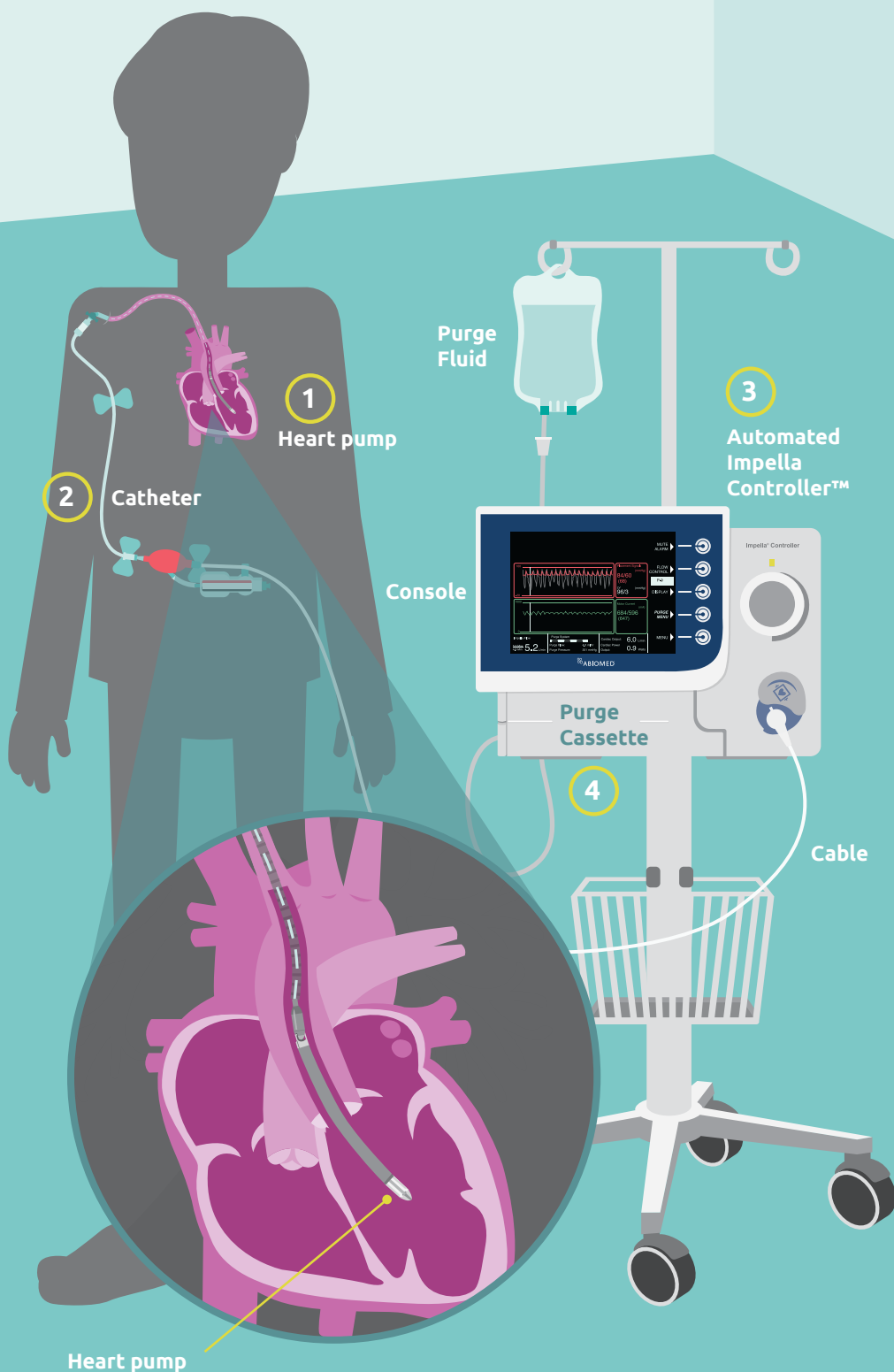


After my procedure, I was in the ICU
for _____ days. I transferred
out of the ICU on _____.



Device Education

- ♥ Impella® Components
- ♥ Mathematics & Mechanics



Impella® Components

Your care team is focused on providing the best care, so there's no need to worry about the technical details. However, for those who are curious and want to learn more about the device and how it works, additional information is included below.

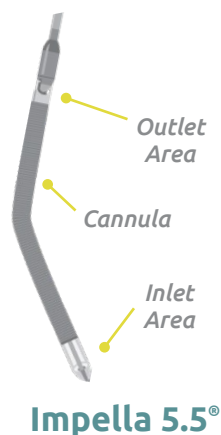
The Impella® comes with the Impella® Catheter, Automated Impella® Controller (AIC), and the purge cassette. The complete system works together to provide your heart support. Below is a brief explanation of each part of the system.

1 Heart pump

There are different Impella® heart pumps depending on the type of support you may need or how long you may need to stay on the pump. The most common pump used in adults is the Impella 5.5®. It's usually put into your body through a small cut near your shoulder or directly into your aorta.

During the surgery the doctor will make a small cut, then feed the catheter through your artery until it reaches your aorta, and then continue down to your ventricle. The catheter is then secured in place on your skin. The catheter has a small opening at its tip that brings blood into the device. The catheter's motor spins to help move the blood from your ventricle to your aorta, to the rest of your body.

The Impella RP Flex® is inserted through your arm/chest into a vein. The inlet of the pump is located in the right ventricle, and outlet is in the pulmonary artery to help support right heart function.



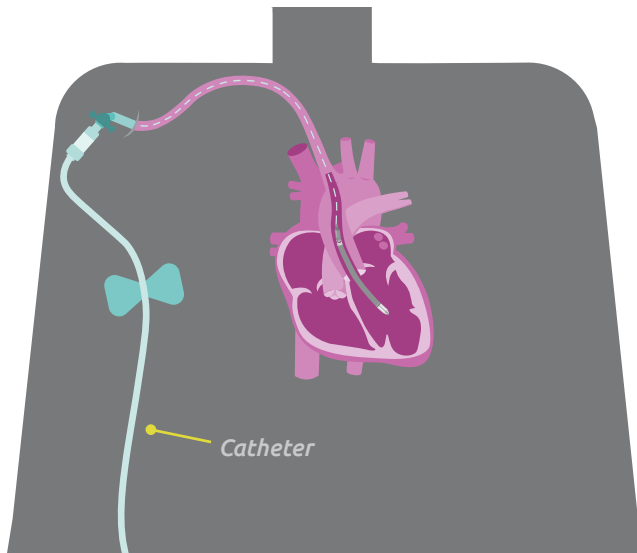


The Impella CP® can be placed through the skin into a blood vessel in your leg, arm, or chest. It is usually used for a short amount of time. If the pump is placed in the leg, patients can't move around much and will need to wear a leg brace to help keep the pump in the right place.

All Impella® devices have a special sensor called 'SmartAssist.' It helps make sure the catheter stays in the right spot in your heart and tells doctors if it needs to be moved to help it work better.

2 Catheter

The catheter shaft is a long cord that both provides power to the heart pump, and transmits information from the device to the controller. It is important that this cord is anchored to the skin correctly to prevent movement. The insertion site must stay clean and covered to prevent infection.

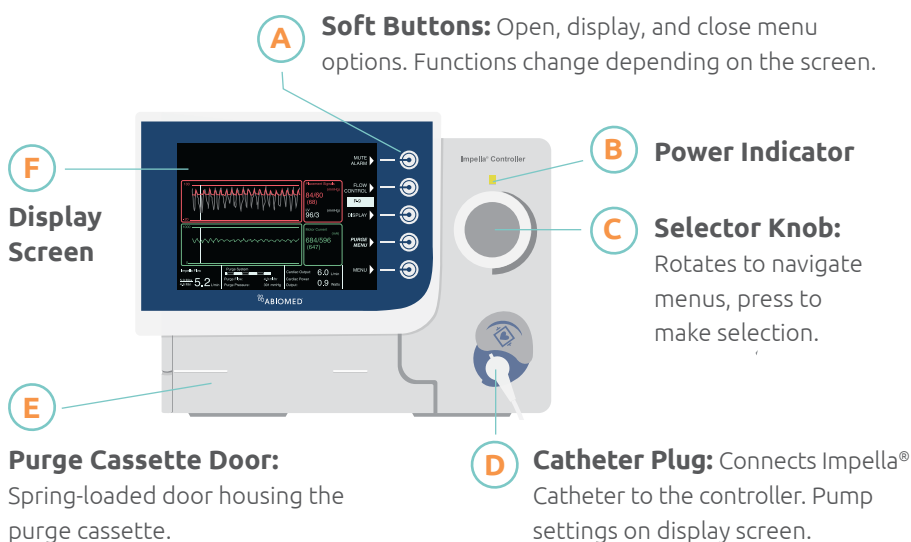


Pictured: Impella® 5.5 Heart Pump

Impella® Components

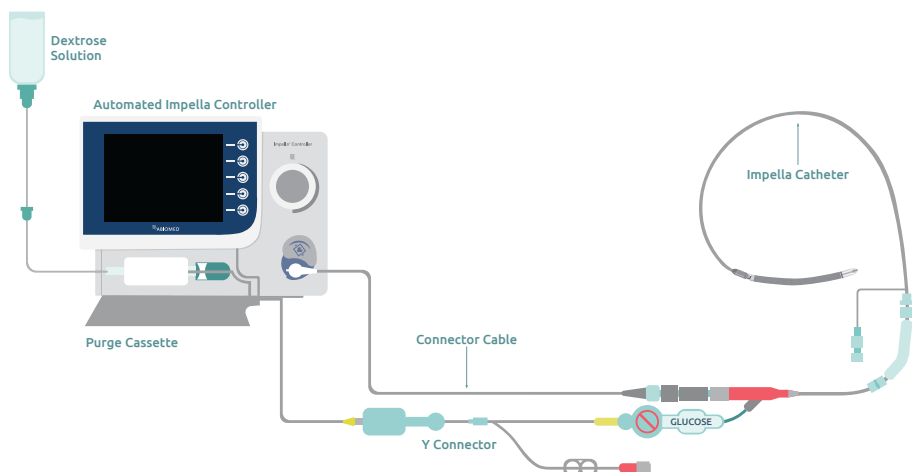
3 Automated Impella® Controller

The catheter is connected to a machine called the Automated Impella® Controller (AIC). The controller provides power to the heart pump, helps regulate the speed, and displays important information. It's generally placed on a cart with wheels, making it easy to move around. When fully charged, the controller battery lasts for 60 minutes or more.



4 Purge Cassette

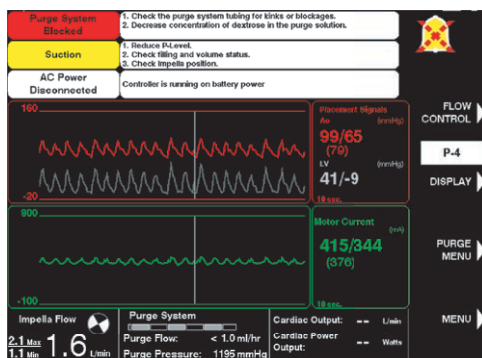
To help the device work properly, a special fluid constantly flows through the purge cassette system. This fluid moves slowly from the cassette through the catheter to the heart pump. It helps stop blood from getting into the motor. Your care team will change the cassette as needed to make sure everything keeps working as it should.



Alarms

The AIC shows three types of alarms: Critical (red), Serious (yellow), and Advisory (white), with red being the most urgent. Alarms appear in the top left corner of the screen. Your care team will monitor and respond to them, but let them know right away if alarms continue without being addressed.

Critical alarms mean there's a serious problem with the device that needs urgent attention and may require tests like an echocardiogram, x-ray, or blood work. Examples include battery failure, controller or device disconnect, and flow or purge errors.



Serious alarms signal that something isn't normal and needs follow-up, such as battery or temperature issues or signal errors.

Advisory alarms are less urgent and often act as reminders or alerts for minor issues, like running on battery or changes in purge flow.

Mathematics & Mechanics

What Does the Device Calculate and Display?



Flow Control or P-level: To control blood flow, the care team will set a P-level. The P-level tells the pump how fast to spin. A higher P-level means the pump spins faster and sends more blood to the body.



Impella Flow (L/min): Shows how much blood is being pumped through the device to your body. It is measured in liters per minute. A circular icon will spin to show the device is running.



Motor Current (mA – Green Waveform): Displays how much energy the Impella pump is using. The care team monitors this waveform to help make sure the device is positioned correctly..



Aortic Placement Signal (mmHg – Red Waveform) & Left Placement Signal Waveform (mmHg – White Waveform): Pressure waveforms used with left heart support devices to help the care team make sure the device is in the correct position.



Pulmonary Artery (PA) Placement Signal Waveform (mmHg –Yellow Waveform): Pressure waveform used with right heart support devices to help the care team make sure the device is in the correct position.



Purge Flow (mL/hour): The amount of fluid flowing through the catheter to prevent blood from entering the motor.



Purge Pressure (mmHg): The amount of pressure needed to push the purge fluid through the pump.

Self Care

- ♥ Labs
- ♥ Tests
- ♥ Medicines
- ♥ Nutrition & Hydration
- ♥ Emotional Wellbeing

Labs

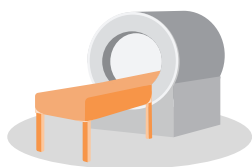
You will have laboratory tests (labs), including blood draws, at scheduled times and at times when your care team feels closer monitoring is needed. Requested labs may include the following:

ANTICOAGULATION	
Heparin Level or Anti-Xa	♥ measures the amount of Heparin or Lovenox in your blood to make sure you are on the right dose.
ACT	♥ measures how long it takes for your blood to clot
PTT	♥ test performed as frequently as every 6 hours when on IV medications ♥ measures how thick the blood is when on Heparin or Bivalirudin
DTT	♥ measures how thick the blood is when on Bivalirudin
LDH	♥ shows if red blood cells are breaking, signaling there may be a clot in the device or settings may need to be adjusted
CARDIAC	
BNP/ NT-pro BNP	♥ helps monitor fluid status and how well the heart and Impella are working together
HEMATOLOGY	
CBC	♥ measures red blood cells, white blood cells and platelets in the blood
KIDNEY	
Renal (BUN/ Creatinine)	♥ monitors kidney function and measures fluid status and electrolytes
LIVER FUNCTION	
Hepatic Profile	♥ measures how well the liver is functioning
INFECTION & INFLAMMATION	
CRP	♥ measures if there is any infection or inflammation within the body

Tests

You will have tests at scheduled times and additional ones can be requested whenever your care team thinks you need closer attention. You may have had one or more of these tests before your heart pump was placed.

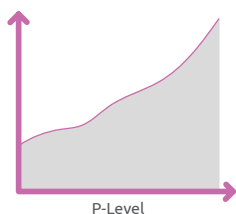
Tests may include:



CT Scan: If the care team is concerned about the heart pump, they may order a CT scan of the heart. A CT scan of the head may be performed if there is a concern for ***stroke***.



Echocardiogram: An “Echo” is an ultrasound that uses nonradioactive, high-frequency sound waves to view the heart. An Echo is a non-invasive test to help the care team look at the placement of your heart pump.



Ramp Study: A ramp study is performed to determine the best settings for your heart pump. Your care team will watch how your heart reacts as the settings of the pump are changed.



IMPORTANT Once you have an Impella®, DO NOT have an MRI test.

A MRI uses strong magnets that attract metal objects and would damage your heart pump.

Medicines

Below is a list of medicines that you may take. Check off the medicines you are taking and write in any additional ones that are not listed below.

☐ Acid Reflux Reducers

☐ Enalapril/Lisinopril

☐ Amlodipine

☐ Enoxaparin sodium (Lovenox)

☐ Antibiotics

☐ Furosemide (Lasix)

☐ Aspirin

☐ Heparin

☐ Beta Blocker (Metoprolol)

☐ Hydralazine

☐ Bivalirudin (Angiomax)

☐ Sildenafil (Revatio)

☐ Chlorothiazide (Diuril)

☐ Spironolactone (Aldactone)

☐ Clonidine

☐ Warfarin (Coumadin)

☐ Clopidogrel (Plavix)

☐ _____

☐ Dapagliflozin (Farxiga)

☐ _____

☐ Digoxin

☐ Dipyridamole (Persantine)



information above completed on ____/____/____

Medicines

Blood Thinners

When on a heart pump, you will be on a blood thinner medicine.

Heparin/Bivalirudin: Once ready, you will start blood thinning medicine to help prevent blood clots. While on heparin, you will need frequent labs performed to monitor the thickness of your blood. Your dose of medicine will be adjusted based on the lab results.

Blood Pressure

On a heart pump, you may have high blood pressure, which will prevent the device from pumping blood to the rest of your body well. Your care team will determine a target blood pressure goal. Blood pressure medicine examples include:

- ♥ Enalapril
- ♥ Amlodipine/Nicardipine
- ♥ Clonidine
- ♥ Nipride

Preventing Infection

Antibiotics are given in the operating room and ICU to prevent infection. They are also given if your site gets infected.

Acid Reflux

Medicines to prevent “heartburn” are used to decrease the acid in the stomach. This may help with decreasing your stomach discomfort.

Extra Body Water (Diuretics)

Diuretics were important when you were in heart failure. When you are on a heart pump you should require less, but you still may need a small amount to get the fluids in your body just right. Examples include:

- ♥ Furosemide (Lasix)
- ♥ Spironolactone (Aldactone)
- ♥ Chlorothiazide (Diuril)

Steroids

Sometimes the heart pump can trigger an inflammatory response. This can cause fevers and an increase in your CRP lab value. It can also increase the risk of forming a clot. Your care team may use steroids to decrease the inflammation.

Nutrition and Hydration

Once you have your Impella®, you must be on a healthy diet. This will help you heal and get stronger.



Fluids

To function properly, the Impella® needs a certain amount of fluid flowing through it. Preload is the amount of fluid in the body or how “full” the heart is. Being dehydrated from not drinking enough or increased fluid losses (vomiting, diarrhea, sweating) will lead to low preload. High preload is usually caused by drinking too much or not peeing enough.



With **low preload** (dehydrated) you may experience:

- ♥ lightheadedness, tiredness, falls
- ♥ poor filling of the Impella®

With **high preload** (fluid-overload) you may experience:

- ♥ swollen face, hands, or legs
- ♥ poor appetite
- ♥ shortness of breath

Nutrition and Hydration

Your care team will track your weight and fluid intake to know if your fluid balance is off. To make sure there is a perfect fluid balance, medicines (diuretics) are given to help get rid of extra fluid. In some cases, your care team may need to put restrictions on how much fluid you are able to drink as well.

Emotional Wellbeing

For some patients, having a heart pump and needing medical care can be hard. You or your caregiver may feel sad, worried, or even angry at times. Taking care of your emotional and mental health is a very important part of your care. Be sure to talk with your care team if you have these feelings or any changes in behavior. Your care team will be able to connect you with the right support services.

Things that make me feel better when worried or upset:

Potential Challenges

- ♥ Infections
- ♥ Strokes
- ♥ Bleeding
- ♥ Hemolysis
- ♥ Pump Clots
- ♥ Right Heart Failure
- ♥ Limb Ischemia

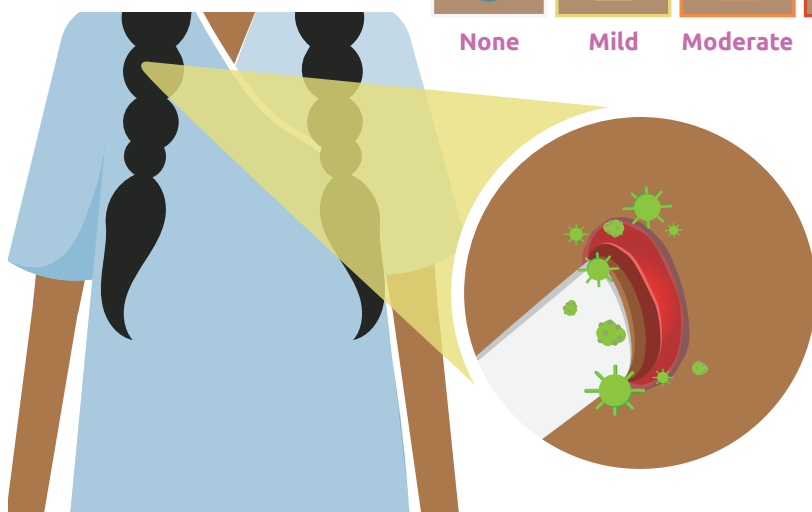
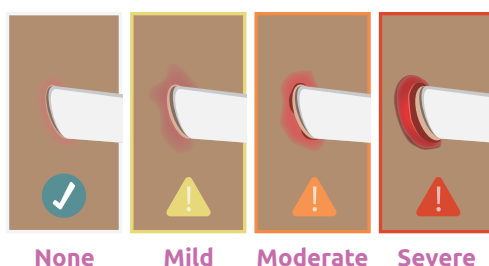
Infections

When you come out of the operating room after the procedure, you may be on antibiotics to help prevent infection. Everything will be kept as clean as possible to ensure good **hygiene**. Your care team will perform frequent **sterile dressing changes** to prevent germs from causing an infection at your surgical sites.

If an infection develops in or around your Impella® site, it can be very serious. Most infections can be treated with antibiotics and changes to your dressing care. If the infection becomes more severe and spreads to your blood, it is called **sepsis** or bacteremia. This will need to be treated with antibiotics through an IV.

Signs and symptoms of an infection include:

- ♥ Redness
- ♥ Pain or tenderness
- ♥ Drainage (new or increased)
- ♥ Swelling and warmth
- ♥ Fever



Strokes

With all heart pumps there is a risk of stroke, which is caused by bleeding or a blood clot in your brain. Both may cause injury to your brain. Your care team manages your medicines carefully to prevent strokes, however sometimes strokes may occur.

Notify your care team of any of the following symptoms:

- ♥ Headaches that are different than usual
- ♥ Numbness and/or tingling on one side of the body
- ♥ Weakness on one side of the body
- ♥ Losing feeling and/or movement in the legs or arms
- ♥ Slurring words or trouble when talking
- ♥ Facial expressions and movements don't match (or mirror) on each side of the face
- ♥ Pupil (the dark circle in the middle of the eye) sizes don't match



Bleeding

When on blood thinners, you are at risk of bleeding.

Nose Bleeds: Blood thinners often can lead to nose bleeds. To prevent nose bleeds, use petroleum jelly or saline nose spray in your nasal passages.

If you have a nose bleed:

- ♥ Stay calm. Look forward. Do not tilt your head back.
- ♥ Hold pressure at the bridge of your nose for 10 minutes without letting go.
- ♥ If pressure doesn't stop the bleeding, your care team may advise you to use Afrin® or saline nasal spray.

- ♥ Let your care team know if you can't stop the bleeding.
- ♥ Your care team may need to decrease your blood thinner medicine, or you may need to see a special Ear, Nose, and Throat (ENT) doctor.



Gastrointestinal (GI) Bleeds:

Rarely, you may have a more serious bleed in your belly. Signs and symptoms of a GI bleed include:

- ♥ Belly pain and no appetite
- ♥ Black, tarry, or sticky stools
- ♥ Vomit with blood in it
- ♥ Fatigue and shortness of breath

Hemolysis

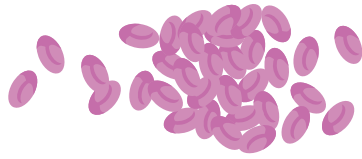
Red blood cells carry oxygen to your tissues and organs. When using a heart pump, there's a risk these cells can break down—a condition called **hemolysis**—which can happen for various reasons. Your care team will monitor your urine color and lab results to watch for signs of hemolysis. If it occurs, they may adjust your pump settings, change your medicines, or replace the pump to help fix the problem.

Signs of hemolysis include:

- ♥ Pink, red, cola, or tea colored urine
- ♥ Kidney injury detected by your blood labs

Pump Clots

If a clot forms inside your heart, it could affect how well your pump works. If adjusting your blood thinner medicine doesn't fix the issue, you may need to have the device replaced.

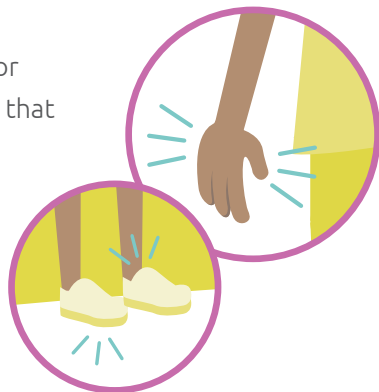


Right Heart Failure

For the heart pump to work properly, the right side of the heart needs to pump blood to the left side. When this doesn't happen, it's called "right heart failure." It's difficult to predict how the right side of the heart will respond to the heart pump implantation procedure. In some instances, you may need to remain on IV medicines or even need a second pump to help the right side of the heart move blood to the left side of the heart.

Limb Ischemia

An Impella® placed in an artery is at risk of reducing or blocking blood flow to your arm or leg. This is called **limb ischemia**, which means that part of your body isn't getting enough blood. Symptoms may include numbness, tingling, pain, or discoloration in the hand and foot where the Impella® is located. If you notice any of these signs, let your care team know right away.



Your Journey Continues

- ♥ Removal of the Impella®
- ♥ Waiting for a Heart Transplant
- ♥ Changing to a Different Type of Device

Removal of the Impella Device

The Impella® heart pump may be used temporarily, such as during a medical procedure, or for a longer period to support your heart as it recovers and gains strength. If your heart is able to function on its own or if the pump is no longer needed, it will be removed. In some cases, if the Impella® is not providing enough help, it may also be removed.

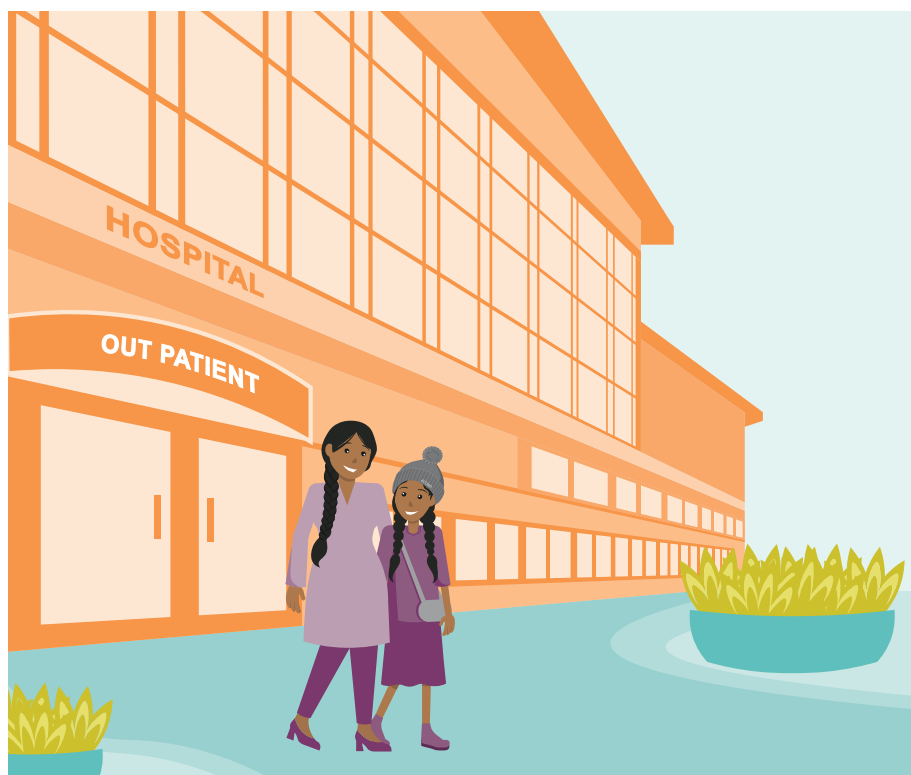
Waiting for a Heart Transplant

If you need a heart transplant, your care team might use an Impella® to help your heart pump blood while you wait for a new heart. It works like a temporary helper, giving your body time to stay strong and healthy until a donor heart is ready.



Changing to a Different Type of Device

The Impella® is usually used for a short time. Other heart pumps can work for a longer time, even for years. If your care team thinks you need longer support, they might switch you to a different pump. This pump could be one that stays inside your body, and you might be able to go home with it. You would need surgery to place this type of pump in your chest.



Glossary

- ♥ Glossary
- ♥ Word Search

Glossary

Afterload: The amount of pressure the heart has to work against to push blood out.

Antibiotics: Medicines to treat bacteria and germs.

Anticoagulation: Medicines to make your blood thinner so your VAD pump does not clot.

Aorta: A large artery (blood vessel) in the chest that blood flows through as it travels from the heart to the rest of the body.

Artery: A blood vessel that carries red blood to the body.

Blood Vessels: A large network of flexible tubes that carry blood to and from the heart and throughout the body.

Catheter: A thin, flexible tube used in medical devices and procedures.

Clot: When red blood cells stick together to form a 'glob' in one of your blood vessels. Similar to a scab.

Complications: A disease or problem that happens in addition to the first disease.

Dehydrated: When you do not drink enough water, or you have diarrhea, the volume of fluid in your body goes down. This can make your pump not work as well.

Diagnosis: Determining the cause of the disease or problem.

Diuretics: Medicine to make you pee more.

Dressing changes: Bandages at the surgical incision site. They are changed regularly to reduce the risk of infection.

ECMO: Extracorporeal membrane oxygenation, or ECMO, is a life support therapy that temporarily takes over the function of the heart and/or lungs when a patient's own organs are too sick or weak.

Femoral Artery: A large artery (blood vessel) in the upper leg or groin area.

Heart pump: A pump used to support the heart function and blood flow for patients who have weakened hearts.

Hygiene: Keeping yourself clean to prevent infection.

Implanted: Placed or put inside a person's body.

Intensive Care Unit (ICU): A place in the hospital where patients recover after surgery when they leave the operating room.

Kidney: The organs in your body that remove waste and make pee.

Limb ischemia: A condition where blood flow to a limb is reduced or blocked.

Liver: The organ in your body that cleans the blood.

Minimally Invasive: In minimally invasive surgical procedures, surgeons use small incisions and specialized tools to injure as little tissue as possible. This can be safer than conventional surgery and lead to faster healing.

Preload: The amount of fluid that travels through your blood vessels to your heart.

Sepsis: An infection in your blood which can make you very sick.

Sterile: Keeping a wound clean. Using a procedure that includes clean gloves and masks to make sure germs do not get near the driveline.

Stroke: When a blood clot travels to your brain through a blood vessel.

Subclavian Artery: A large artery (blood vessel) in the chest area.

Word Search

W Z X A N A C V
 N L W N N L V M L O V D
 G L O T W S G U H N M F M T A T
 Q W B J I D R M N E B C Y Y T P V O O V
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☐ Antibiotics

☐ Anticoagulation

☐ Aorta

☐ Clot

☐ Complications

☐ Dehydrated

☐ Diagnosis

☐ Diuretics

☐ Dressing

☐ Hygiene

☐ Implant

☐ ICU

☐ Kidney

☐ Liver

☐ Preload

☐ Sepsis

☐ Sterile

☐ Stroke

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The Impella CP with SmartAssist and Impella 5.5 with SmartAssist are advanced intravascular blood pumps designed to support the heart by moving blood from the left ventricle into the aorta. The RP flex with SmartAssist is a specialized device that supports the pulmonary circulation by moving blood from the SVC or IVC into the pulmonary artery. These devices help reduce the heart's workload to support recovery. They incorporate sophisticated sensors and automation to optimize performance and enable continuous monitoring.

Pediatric Indications

These devices are used in children experiencing acute or ongoing cardiogenic shock to help reduce the heart's workload, promote recovery, and stabilize circulation after open heart surgery and conditions such as myocarditis, cardiomyopathy that have not responded to medicine. Proper assessment and precise placement, guided by fluoroscopy and echocardiography, are vital.

Pediatric Contraindications

Certain conditions, such as a mural thrombus in the left ventricle, mechanical aortic valves, significant aortic stenosis, moderate or severe aortic insufficiency, severe peripheral arterial disease, septal defects, or extensive systemic or heart failure, may influence device placement or safety. Clinicians are encouraged to review the Instructions for Use (IFU) for full guidance on contraindications and procedural considerations.

Potential Risks & Adverse Events

As with any medical intervention, there are potential risks including bleeding, limb ischemia, vascular injury, hemolysis, infection, kidney complications, myocardial injury, or device malposition. These risks can often be minimized through careful procedural technique, proper management, and vigilant monitoring. For comprehensive information on potential risks and safety precautions, please refer to the Instructions for Use (IFU). In the event of device issues, prompt imaging and backup options are recommended to ensure safe management.



To learn more about important risk and safety information please scan the QR code to the left or visit:
www.abiomed.com/en-us/important-safety-information

actionlearningnetwork.org | myactioneducation.org



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