

Department of Cardiac Services

Bubble Contrast Echocardiogram

What is it?

- An echocardiogram or 'echo' is a scan that uses ultrasound (sound waves) to produce pictures of the heart. This test does not use radiation.
- A bubble contrast echocardiogram uses imaging ultrasound combined with an injection of water with tiny, microscopic bubbles (microbubble contrast) to help determine additional information. In the majority of cases this is to check for the presence of any holes in the heart, and in rarer cases to look for a specific abnormality with the blood vessels in the lungs.

Why am I being asked to come for this test?

- In the vast majority of cases, it is because your doctor wants to check if there is a hole in your heart.
- The majority of significant holes in your heart are found in childhood. However, if there is a small hole in the wall (inter-atrial septum) separating the left and right upper chambers of the heart (atria), this may not come to light until adulthood.
- The microbubble contrast allows for the detection of these small holes as they do not usually show up on a normal echocardiogram.

Patient Information

Why might there be a defect in this part of my heart?

- During the normal development of the heart in the womb, there is an opening through the inter-atrial septum which allows blood to bypass the lungs, which are not being used whilst in the womb.
- Normally, this opening closes in the first few days or weeks after birth, but if it does not, the child will have a communication between the left and right atria.
- This may take the form of a hole (atrial septal defect – ASD) or a small channel PFO (patent foramen ovale – figure 1) which behaves rather like a ‘trapdoor’.
- The defect will often correct itself without any medical intervention before the child reaches the age of 2, but around 25% of adults in the general population are said to have a PFO and hence it is a very common finding.

What happens if I have a PFO (patent foramen ovale)?

- Many people do not have any symptoms or problems because of this defect, and it is found coincidentally.
- However, some people have symptoms of breathlessness or fatigue (tiredness) due to some of the blood circulation bypassing the lungs (known as a shunt).
- In other people, symptoms can result from blood clots forming in one of the veins in the leg (a deep vein thrombosis – DVT) and then a fragment of clot passes from the right to the left side of the heart; this then may block an artery resulting in:
 - Stroke/TIA (loss of brain function)
 - Heart attack (damage to the heart muscle)

Patient Information

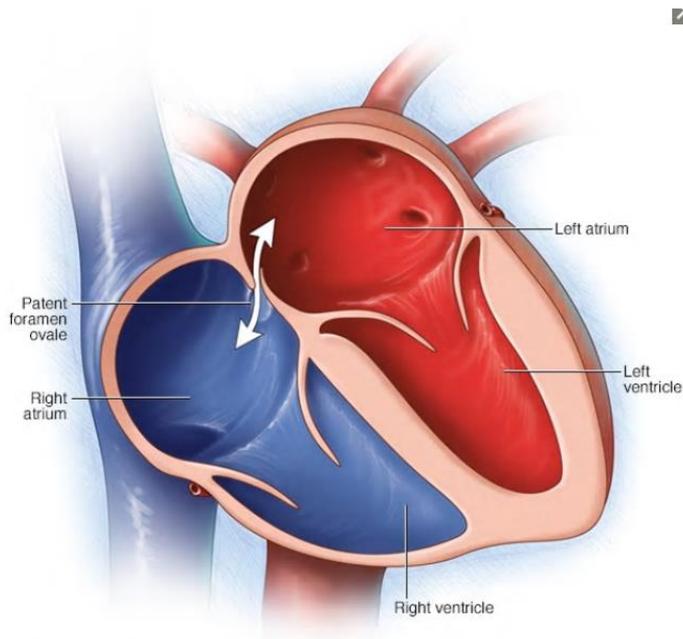


Figure 1 Position of a PFO

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What does the echo involve?

- You will be taken into a room. The person performing the test is called a sonographer, who may be male or female. The sonographer may sometimes be a doctor.
- You will be asked to undress to the waist and will be offered a hospital gown that should be left open to the front. You will be asked to lie on a couch and ECG stickers will be attached to your chest and connected to the echocardiogram machine. This will monitor your heart rhythm during the test.
- You are entitled to bring an adult friend or adult relative of your choice into the echo room or alternatively, our department will provide a chaperone for you.
- If you require a gender specific sonographer/doctor and/or a chaperone, then please inform a staff member before the test begins. Your request will be accommodated accordingly.

Patient Information

- Verbal consent will be obtained from you to make sure you are happy to proceed.
- You will have a small plastic tube (cannula) inserted into one of the veins in your arm. This will be used later for the injection of microbubbles. You will then be asked to lie onto your left hand side. If you are unable to lie on your left side, we can carry out the echo while you are lying on your back. The test is carried out in semi-darkness so the lights will be dimmed once you are comfortable.
- An ultrasound probe (like a small microphone) covered by a small amount of gel is placed gently on your chest in different areas. This provides images of your heart from different angles which are then recorded.
- If you have already had an echocardiogram, we will go straight onto the bubble contrast study. If not, a number of pictures of the heart may be recorded from different areas of your chest first.
- Once the baseline study has been completed, we will go on to the bubble contrast study. The bubbles are made up in a syringe using sterile saline (salt water) mixed with a little bit of air and a little bit of your blood drawn back from the vein via the cannula.
- These are rapidly mixed up to make very tiny microbubbles which are then injected into the vein. We will record pictures and watch carefully to see if any bubbles cross through from the right to the left side of the heart.
- If necessary, you will need to perform a special breathing and blowing technique called the Valsalva manoeuvre. This will be carefully explained to you and practised on the day.
- The test can take about 30 to 45 minutes to complete.

Patient Information

Do I need to take any special precautions before or after the test?

- No, you should take all of your usual medication as normal on the day of the test. You can also eat and drink normally.
- You can drive a vehicle after the test has completed.
- We advise that you stay hydrated (have plenty to drink) and keep yourself warm before the test. This increases the chance that we can access a vein for the cannula insertion during the test.
- Please note that there are no childcare facilities in the department and any child that you choose to bring with you to this appointment remains your responsibility.

Is injecting air into the bloodstream harmful?

- If a large amount of air was injected into a vein as a large bubble, it could cause harm, but the bubbles injected in this test are very small. If there is no hole in the inter-atrial septum, the bubbles will simply be filtered out by the lungs.
- If you have a patent foramen ovale (PFO) or atrial septal defect (ASD) some bubbles will appear on the left side of the heart and then will slowly make their way through the circulation and be filtered out through the lungs. This is therefore a very safe test.

Risks, contra-indications and side effects

- The Valsalva manoeuvre involves breathing techniques to change the pressure in the chest. This can sometimes lead to the ears 'popping' or a slight headache. If you have any ear problems, you should let the doctor know at the start of the test.
- Some people find performing the Valsalva manoeuvre difficult, but we will help you practice as much as we need to and can often still get reasonable images, even if the technique cannot be perfected.

Patient Information

- The test does not carry any specific risks; ultrasound waves are harmless (they are used on pregnant women), no chemicals or contrast agents are used, so even if you have been allergic to x-ray contrast in the past that does not stop you having this test.
- If you are taking any blood thinning medication, you may bleed or bruise more easily when the cannula is removed.

At the end of your echocardiogram

- Once the echocardiogram is complete you can get dressed and leave. There are no limitations to what you can do after the scan, for example, you may drive.
- Detailed measurements are carried out by the sonographer and doctor analysing your scan. These are best performed after the scan is completed. Results are sent to your referring consultant. This is why the result cannot be provided to you when you come for the scan.

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