

Bubble contrast echocardiogram (echo)

Introduction

This leaflet has been written to give you information about your planned bubble contrast echocardiogram.

What is a bubble contrast echocardiogram?

You may have already had an echocardiogram (sometimes just called 'echo') performed. This is a non-invasive imaging test using ultrasound to look at your heart. Ultrasound is very high-frequency sound which cannot be heard by the human ear. It is used to gain information regarding the structure and function of the heart muscles, chambers of the heart and structures within the heart such as the valves. The test is painless and does not use radioactivity.

A bubble contrast echocardiogram uses imaging ultrasound combined with an injection of microbubble contrast to help determine additional information.

Why am I being asked to come for this test?

The commonest reason for having this test is because your doctor suspects that you may have a hole in your heart. The majority of significant holes in the heart are detected in childhood. However, if there is a small defect or 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 may not show up on a normal echocardiogram.

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

During the normal development of the foetal heart, there is an opening through the inter-atrial septum which allows the circulating blood to bypass the lungs which are not used until birth. 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.

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Patient Information

This may take the form of a hole (Atrial Septal Defect – ASD) or a small channel (Patent Foramen Ovale – PFO) 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 about 25 to 30% of adults in the general population are said to have a PFO.

What happens if I have a PFO or ASD?

Most people do not have any symptoms or problems because of this defect, and it is detected by chance. However, some people have symptoms of breathlessness or fatigue (tiredness) due to some of the blood circulation bypassing the lungs (known as a shunt).

Sometimes, usually when the defect is an ASD, it can lead to enlargement of the right side of the heart.

PFO have also been associated with decompression sickness (the bends) due to the changes in pressure which occur with deep sea diving.

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 (embolus) passes from the right to the left side of the heart; this then may block an artery resulting in:

- Stroke (loss of brain function)
- Heart attack (damage to the heart muscle)

Up to 40 to 50% of patients who have had a stroke without any cause being found, may have a PFO.

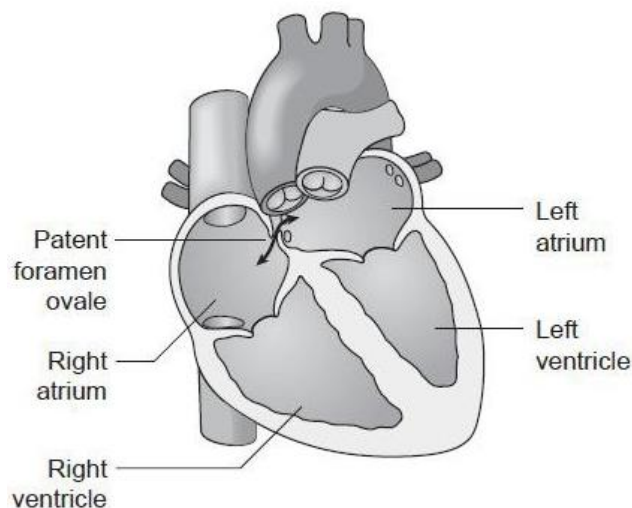


Figure 1: Position of the PFO

**Patient
Information****Are there alternative reasons to perform the test?**

Whilst the commonest reason we do this test is to look for holes in the heart as described on the previous page, we are sometimes asked to do this test to investigate patients who have low blood oxygen levels and breathlessness.

Examples may include:

- Extra communications (small holes) between blood vessels in your lungs (known as pulmonary arterio-venous malformations) which may cause the circulating blood to bypass the part of the lungs where oxygen is transferred into the blood stream.
- Chronic liver disease which may cause the blood vessels in the lungs to widen and make it harder for your lungs to transfer oxygen to the red blood cells.

What does the bubble contrast echo involve?

- You will be taken into a room with usually a doctor and a sonographer (ultrasound technician).
- You will be asked to undress to the waist and will be offered a hospital gown that should be left open to the front (like a coat). You will then be asked to lie on a couch. ECG stickers will be attached to your chest and connected with wires to the echocardiogram machine. This will monitor your heart rate and rhythm during the test.
- 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 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 performed in semi-darkness so the lights will be dimmed once you are comfortable.
- The sonographer will place the echocardiogram probe on your chest (this is like a thick blunt pen) with cold lubricating jelly (this helps to get good contact with the skin).
- If you have already had an echocardiogram, we will go straight on to perform the bubble contrast study. If not, a number of pictures of the heart will be recorded from different areas of your chest.

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- Once the baseline study has been completed, we will go on to do the bubble contrast study. The bubbles are made up in a syringe using sterile saline (salty 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 your 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.
- You will then be asked to sniff, and with further injections you will need to perform a special breathing and blowing technique called the Valsalva manoeuvre. We will explain this technique carefully and allow you to practice before we continue with this part of the test. You do not need to know how to do the Valsalva manoeuvre before you attend.
- The test will take about 30 to 45 minutes to complete.

Do I need to take any special precautions before 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. We advise that you keep well-hydrated (having plenty to drink) and keep your hands and arms warm before the test. This increases the chance that we can access a vein for the cannula insertion during the test.

Is injecting air into the bloodstream harmful?

If a large amount of air was injected into a vein as a large bubble, it could potentially cause harm. However, 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) some bubbles will appear on the left side of the heart and then will gradually make their way through the circulation and be filtered out through the lungs.

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Risks, contra-indications and side effects

- The Valsalva manoeuvre involves breathing techniques to change the pressure in your chest. This may lead to your 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.
- 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.

After the procedure

You may be given the results immediately, but some findings take longer to interpret and may need a second opinion. If there is a hole, the doctor will explain this. The results will be sent to your referring doctor.

Contact information

If you have any questions about your planned bubble contrast echocardiogram, please contact:

Cardiac Investigations

Tel: 0300 422 6551

Monday to Friday, 9:00am to 4:00pm

Alternatively, you can contact to your consultant's secretary through switchboard.

Further information

Patient

Website: <https://patient.info/heart-health/echocardiogram>

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Making a choice

Shared Decision Making

If you are asked to make a choice, you may have lots of questions that you want to ask. You may also want to talk over your options with your family or friends. It can help to write a list of the questions you want answered and take it to your appointment.



Ask 3 Questions

To begin with, try to make sure you get the answers to three key questions if you are asked to make a choice about your healthcare.

1. What are my options?
2. What are the pros and cons of each option for me?
3. How do I get support to help me make a decision that is right for me?

These resources have been adapted with kind permission from the MAGIC Programme, supported by the Health Foundation

* Ask 3 Questions is based on Shepherd HL, et al. Three questions that patients can ask to improve the quality of information physicians give about treatment options: A cross-over trial. Patient Education and Counselling, 2011;84: 379-85



<https://aqua.nhs.uk/resources/shared-decision-making-case-studies/>