NHS
Royal Papworth Hospital
NHS Foundation Trust

Balloon Pulmonary Angioplasty

Patient's guide and agreement to consent form

Introduction

Chronic thromboembolic pulmonary hypertension (CTEPH) occurs in approximately 2-4% of patients who are diagnosed with blood clots on the lungs (pulmonary emboli). The best treatment for CTEPH is surgical removal with pulmonary endarterectomy but not all patients are suitable for this and in some patients the surgery does not fully remove the narrowings (webs) in the lung blood vessels (pulmonary arteries).

Balloon pulmonary angioplasty (BPA) is a new procedure that targets these narrowings and has been shown to lower the blood pressure in the lung arteries, improve breathing and increase exercise tolerance in carefully selected patients.

Although experience in this technique is rapidly increasing in Japan and Europe, it remains an unproven treatment option, which can only be considered when definitive therapy by surgical pulmonary endarterectomy is inappropriate or has failed to fully resolve the problem in the lung vessels.

How is BPA performed?

BPA usually involves up to four catheter lab treatment sessions, each lasting up to two hours, spaced two to four weeks apart. The procedure is staged this way to minimise the risk of procedure-related side effects to the kidneys (from the contrast medium used) and lung from reperfusion injury (see explanation below).

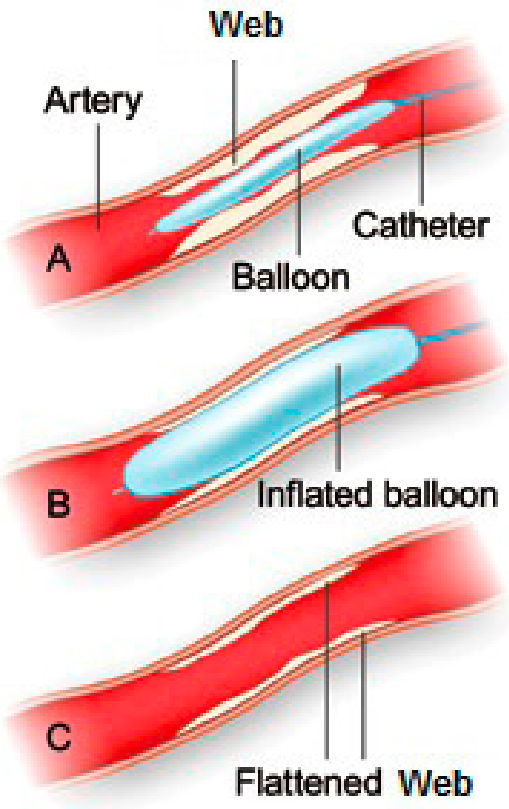
The procedure is performed under a light sedation and local anaesthetic; this means that you are given a combination of medicines to help you relax and to block the pain. You may feel very sleepy but will be able to respond to instructions.

A small tube is placed in a vein in the groin (or in a neck vein) and a second hollow tube is then introduced through this and passed to the lung vessels.

The narrowed vessels are identified by injections of iodine containing contrast medium into individual vessels while performing X-ray imaging.

A very fine wire is then passed into the vessels to be treated and a balloon guided into position over the wire. The balloon is then inflated for a few seconds to push the blockage aside (see diagram) and restore blood flow to that segment of lung tissue. The balloon is then deflated and removed.

This may be repeated several times and in multiple vessel locations during a single treatment session. You will feel drowsy after the procedure and may not remember much about what happened.



Balloon Angioplasty

Benefits of BPA

Early use of this technique has demonstrated that BPA can significantly improve breathlessness symptoms, lower lung blood vessel pressures and relieve heart failure. The effects appear to be long lasting although further work is required to confirm these results in the longer term.

Risks of BPA

BPA is associated with a mortality risk (likelihood of death) of around 2% (1 person in 50).

There is also a 2% risk that you may need an emergency operation to support the heart and lungs (called extracorporeal membrane oxygenation - ECMO) if there is major bleeding from a lung blood vessel that cannot be sealed by a balloon or coil. You will be given a general anaesthetic if this is required.

Around 10% (1 person in 10) may experience short term deterioration in breathlessness and may cough up blood or fluid from the treated area of the lung. This is often termed reperfusion injury and occurs when lung tissue with a poor blood supply is rapidly resupplied with blood.

This can usually be managed with a tight fitting mask supplying oxygen that supports your breathing but occasionally it may require you to be given a general anaesthetic to allow a machine to support your breathing.

The reperfusion injury usually resolves spontaneously, within 24-48 hours. Your breathing will be monitored closely after your procedure for any early signs of this.

There is a 1% (1 person in 100) chance that the contrast medium given may cause damage to the kidneys. This usually responds to supportive measures but rarely (less than 0.1% or 1 person in 1000) may require temporary kidney supportive treatment with dialysis. We may give you fluid to help the kidneys flush out the contrast medium.

There is also a 0.1% (1 person in 1000) chance of contrast medium allergy that may require supportive treatment.

There is a 0.1% (1 person in 1000) risk of vascular damage in the groin or neck vein that may require surgical repair.

It is more common (10% or 1 in 10 patients) to have bruising or a collection of blood called a haematoma after the procedure. This may be painful. You will be asked to lie flat and rest after the procedure while the vessel is compressed to avoid bruising.

Procedure

Pulmonary angioplasty is performed in the X-ray department and usually takes 1-2 hours. Occasionally if the patient is very nervous sedation maybe administered.

The room is a little cold to prevent the apparatus from over-heating. The procedure is performed under local anaesthetic which is injected into the skin. A small tube (catheter) is passed into the vein in your groin. The X-ray table and machine move around you to obtain the best pictures.

A dye which shows up under X-ray is injected into the catheter. This can cause a warm feeling all over the body for a few seconds. The X-rays are taken at this point. The pulmonary angioplasty is not painful, but sometimes you may feel the urge to cough. **Do not worry**, this does not mean anything is wrong, but do **tell the doctor**.

When the procedure has been completed you will be returned to the ward. A nurse will assess you on your return and pressure will be applied to the groin area, either manually or using a compression device to stop the bleeding. It is important to keep your leg still for at least two hours after the procedure.

On return to the ward

You will be required to stay in bed for approximately two hours after the groin approach: one of these hours will be lying flat. After this you will be assisted to sit up and then mobilised.

Your blood pressure and pulse will be taken regularly after the procedure and you will have a chest x-ray.

You will be offered something to eat and drink after your procedure and you will be encouraged to drink plenty of water to flush the contrast dye from your body.

Delay

Sometimes your procedure may be unavoidably delayed due to emergency cases and, on rare occasions this may lead to your procedure being cancelled.

Results

Your results and the planned treatment will be discussed with you before you go home by both the doctor and the nurse. The nurse will give you a letter for your GP.

Research

Royal Papworth Hospital is a teaching hospital, and as such, you may be approached to participate in research.

Contact numbers

If you have queries please contact our pulmonary hypertension specialist nurses on 01223 638826 or via the Royal Papworth Hospital switchboard on 01223 638000 and ask for bleep 343.

A pulmonary hypertension consultant is available via the Royal Papworth Hospital switchboard for medical advice if the pulmonary hypertension specialist nurse is unable to answer your query.

Discharge information

If this was your first BPA, you are likely to remain in hospital for one or two nights following the procedure. You will be discharged when the pulmonary hypertension team think you are well enough.

If this was a follow up BPA procedure you may be discharged the same evening, but more likely the following day. Again, you will be discharged when the pulmonary hypertension team think you are well enough.

Remember – your anticoagulation is life-long.

Potential Complications following BPA

Please note that complications following BPA are extremely rare. However, it is important that you know what to look for, and what to do if a problem does arise.

Increasing breathlessness

If you find that you are getting more breathless when you go home please seek medical attention (see your GP straight away, or attend an A&E Department), especially if you have any of the following symptoms:

- Fast irregular heartbeat (new)
- Feeling faint or dizzy
- New chest pain
- Worsening shortness of breath
- Coughing up blood
- Worsening ankle swelling or swelling of the tummy
- Worsening pain, and/or new bruise in the groin (femoral puncture site)

Bruising at the femoral puncture site

It is common to have bruising to your groin and leg; sometimes this can spread to your abdomen.

Care of your femoral puncture site

- Do not drive for 48 hours following the procedure
- Apply pressure to the wound site when you climb a flight of stairs for 48 hours after your procedure
- Apply pressure to the wound site when you cough or sneeze for 48 hours after your procedure
- Avoid heavy lifting and strenuous exercise for 48 hours following your procedure.
- If your groin bleeds, please do not panic, lie down flat and get someone to apply pressure to your groin until the bleeding stops, this can take up to 10-15 minutes.
- You will have a small plaster over the incision site; this should be removed the day after your procedure. You may bath or shower the day after your procedure but avoid putting talcum powder on or around the wound site until the wound has healed.
- Two to three days following the procedure, for up to about a fortnight, you may notice a small pea or marble sized lump at the incision site, this is normal healing. If the lump is bigger than this, or if you experience pain or redness around the area, please contact your GP

Medication

- If you take Warfarin and it has been interrupted prior to your procedure it is common to take higher doses for a few days to "reload" before continuing on your usual maintenance dose. You should have your INR checked approximately 5 days after your procedure at your usual anticoagulant clinic. You will probably be discharged with Tinzaparin injections to self-administer until your INR is above 2
- If you take another type of anti-coagulation: take your usual dose this evening.
- If you take Metformin; recommence this 48 hours after the procedure

Travel to Royal Papworth Hospital

You will have to make your own way to Royal Papworth Hospital NHS Foundation Trust for BPA procedures or follow up visits. If you need assistance with transport please contact your GP to arrange this. If you are receiving certain low-income allowances, e.g Income Support or Family Credit, you may be entitled to help with you travel costs. If you need someone to travel with you for medical reasons, you may also get help with their travel costs. Travel costs payable are those "necessarily incurred". This means travel by the cheapest means of transport available at the time you need to travel.

Follow-up visits

After you first BPA procedure you may be invited back to Royal Papworth for further procedures.

The cardiologist who performs your BPA procedure will normally let you know if further BPA procedures are required.

Once the cardiologist and PH team at Royal Papworth are satisfied that your BPA series is completed you will be invited back to Royal Papworth after about three months for a re-evaluation including pulmonary angiogram and right heart catheter. The purpose of this is to see what kind of a difference the BPA procedures have made to the pressures in your lungs and your symptoms and to check for any further targets for BPA.

If you have been referred to Royal Papworth from one of the other PH specialist centres in the UK, once you have completed your BPA procedures and had your follow up review you would not need to return to Royal Papworth Hospital.

PVDU contact details

If you have any queries or questions after your discharge do not hesitate to contact the PVDU nursing team:

- Monday-Friday 09:00-17:00 on 01223 638826.
- Any other time via the Royal Papworth Hospital switchboard on 01223 638000 and ask for bleep 343 (NB: out of office hours this will be answered by a ward nurse)

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