

**The Royal College of Anaesthetists
Professional Standards Directorate**

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Title	Brachial plexus block for arm, hand or shoulder surgery
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Description	A text only leaflet which defines the brachial plexus and describes the benefits, procedure and risks of a brachial plexus block. Interscalene, infra-clavicular and axillary approaches are briefly described. There is a detailed section on risk, including mechanisms, treatment and likely outcomes.

Brachial plexus block for arm, hand or shoulder surgery

What is the brachial plexus?

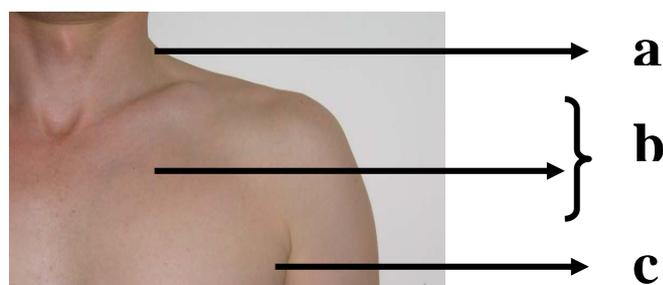
This is the name given to the bundle of nerves that supply your shoulder, arm and hand with feeling and power. These nerves start in the neck and travel via the armpit, eventually reaching the hand.

What is a brachial plexus block?

Brachial plexus blocks may be used for surgery to the shoulder, arm or hand. The feeling and power of the shoulder, arm or hand can be blocked by placing an injection of local anaesthetic near to the nerves of the brachial plexus.

The injection may be placed in one of the following, depending on exactly what operation you are having:

- in the side of your neck
- above or below your collar bone
- in your armpit



Your anaesthetist will discuss the benefits and risks of the procedure with you. Together, you can decide whether a brachial plexus block is best for you.

Benefits

Your anaesthetist may suggest performing a brachial plexus block for a number of reasons:

1. To avoid the risks of a general anaesthetic

It may be possible to have your operation performed with a brachial plexus block alone. This may be particularly important if you have heart or breathing problems. You will be awake and pain free, although you may still be able to feel pressure and movement in the area.

2. For pain relief after your operation

The brachial plexus block can be given as well as a general anaesthetic. It provides pain relief after the operation. This reduces the need for strong pain relief medicine after your surgery, which can make you feel sick and drowsy. It can also help the physiotherapists to start moving the arm, which aids recovery.

3. To increase blood flow to the area

A brachial plexus block also increases the blood flow to the area. In certain situations, this may be improve healing and speed up your recovery.

How is a brachial plexus block performed?

You will be asked to stop eating and drinking as for a general anaesthetic. Your hospital should give you clear instructions about fasting. This is important if you are having a general anaesthetic as well, or if a general anaesthetic is unexpectedly needed.

When you arrive in theatre, your anaesthetist will attach you to equipment which monitors your heart rate, blood pressure and oxygen levels. He or she will also use a needle to place a cannula (a thin plastic tube) in a vein on the back of your hand or in your arm.

The brachial plexus block can be performed with you awake, sedated or anaesthetised. Firstly, the site of the injection is cleaned and an injection of local anaesthetic is used to numb the skin. Then, a needle is used to inject local anaesthetic around the nerves. Initially your arm will feel warm and tingly. Within 40 minutes, it will become numb and heavy.

Your anaesthetist may also use a small electric current, which runs through the needle to help find the nerves accurately. This will make your arm twitch. This is a strange feeling but should not be painful. Alternatively, he or she may use an ultrasound machine to place the needle correctly.

Occasionally your anaesthetist may suggest placing a catheter (a very thin tube) through the needle at the same time. This remains in place next to the nerves after the needle has been removed, allowing more local anaesthetic to be given later - perhaps for up to a few days after your operation.

Recovery

The effects of the local anaesthetic will last between 4 and 24 hours – on average about 10-12 hours. Your arm will be held in a sling until the strength has returned. Please ensure that the strength and feeling has fully returned to your arm before trying to use it normally.

Are there any risks to having a brachial plexus block?^{1,2,3}

These procedures are routine and are performed with maximum regard for your safety. However, all medical treatments carry a risk. Your anaesthetist may suggest performing this block to spare you the risks of a general anaesthetic.

Brachial plexus blocks are not always completely effective. Sometimes the local anaesthetic does not spread to all the nerves. The operation you are having and your general body shape also affect the success rate. Your anaesthetist will be able to tell you how likely the block is to work fully. If the block does not work sufficiently for your operation, your anaesthetist will use another form of anaesthetic and/or pain relief.

1. Risk due to local anaesthetic

- Allergy to local anaesthetics can happen. It is very rare – less likely than allergic reactions caused by general anaesthetics. .
- Overdose of the local anaesthetic should not happen because your weight is taken into account when choosing how much local anaesthetic you need.
- Serious problems including fits, heart or breathing problems can happen but they are very rare. Your anaesthetist is trained to deal with these emergencies.

2. Risk to nearby structures

If the injection is placed in the side of your neck, side effects include a hoarse voice, a droopy upper eyelid and feeling faint, especially on sitting up. Rarely, you may find breathing a bit more of an effort than normal. All these are temporary and should get better when the block wears off.

If the injection is placed around the collarbone, there is a small risk of damage to the lung (1 in 1000 patients). This can usually be managed to keep you safe and serious permanent harm is very rare. Your anaesthetist can tell you more about this.

For all injection sites, there is a small risk of bleeding due to damage to a blood vessel. This can be treated by direct compression and/or extra fluids given into a vein.

3. Nerve damage

Nerve damage can occur because of direct injection into the nerve or because of bleeding or infection. The risk of permanent nerve damage is rare. It is the same for all injection sites. An exact measure of the risk is not available, but the best studies we have suggest that it is between 1 in 15 000 and 1 in 30 000 patients having a brachial plexus block. All human activities carry an element of risk. For example, 1 in 15 000 of us will die on the UK roads every year.⁴

Patients commonly notice areas of tingling and/or numbness in the arm, shoulder or hand. This occurs in around 1 in 20 patients and usually resolves within 3 weeks, or occasionally up to 3 months.

There are other causes of nerve damage that are not caused by the brachial plexus block. These include:-

- Damage caused by the surgery.
- Pressure on the nerves while they are anaesthetised due to your arm being placed in an awkward position necessary for the operation. Surgeons and anaesthetists take care to avoid very awkward positions.
- Use of a tourniquet on your arm (used for many hand and forearm operations). This compresses nerves and can occasionally damage them. For this reason the tourniquet pressure is measured and carefully adjusted.
- Swelling of the area after your operation – this can place pressure on nerves and damage them. This is why we may ask you to keep your arm elevated after the operation.
- Other pre-existing medical problems eg. diabetes

You can find more information in the leaflet “*Nerve damage associated with peripheral nerve blockade*” (see www.rcoa.ac.uk , *Information for Patients: Royal College of Anaesthetists*)³

If you have any questions please ask your anaesthetist, your surgeon or your nurses on the ward. They may be able to arrange for you to talk to another patient on the ward who has had a brachial plexus block.

Other helpful leaflets in the *Information for Patient* series include:

- *Anaesthesia explained*
- *You and your anaesthetic*

References

1. Neal JM et al Brachial Plexus Anaesthesia: Essentials of our current understanding. *Regional Anaesthesia and Pain Medicine* 2002; 27(4): 402-8
2. Borgeat A, Ekatodramis G, Kalberer F, Benz C. Acute and non-acute complications associated with inter-scalene brachial plexus block and shoulder surgery; a prospective study. *Anesthesiology* 2001; 95: 875-880
3. Saha S, Turner J. Nerve damage associated with peripheral nerve blockade. Royal College of Anaesthetists, patient information leaflets. Section 12. www.rcoa.ac.uk
4. Road Casualties Great Britain 2002: Dept of Transport (2003)

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