What you need to know about...

**PACEMAKERS**

*What is it?*
- A pacemaker is a device that helps to regulate a patient’s heartbeat.
- The mechanism is battery powered and weighs about 20–50g (1–2oz).
- Pacemaker batteries last on average for six to seven years.

*Indications*
A patient may need to have a pacemaker fitted if she or he:
- Has an irregular heartbeat or a heart rate that is either faster or slower than normal;
- Has heart block.

*Mode of Action*
- Pacemakers are made up of two components: the power supply and the electrical circuitry.
- They emit electrical impulses that are powered by an inbuilt battery (usually lithium).
- These impulses cause the heart to contract to produce a heartbeat.
- Some pacemakers emit the electrical impulses at a static rate while others are able to sense when the heart rate falls below a certain value and then stimulate the heart (‘demand’ pacemakers).

*How it is implanted*
There are two methods of implantation: transvenous and epicardial.
- Transvenous implantation is carried out in 30–60 minutes under a local anaesthetic. Usually the patient will stay overnight after the procedure has been performed. The procedure involves inserting an electrode at the base of the neck or in a vein near the shoulder. The lead is guided to the appropriate part of the heart and the pacemaker is placed between the skin and the chest muscle.
- Epicardial implantation is usually performed only on patients who are undergoing heart surgery. The cardiologist attaches the electrode lead directly to the epicardium. The pacemaker box is positioned under the skin of the abdomen.
- To make sure that the pacemaker has been implanted correctly either an X-ray is taken of the mechanism or a magnet is held up to the body to tell the pacemaker to work at a set rate. It is then monitored and analysed to make sure it is working properly. The pacemaker returns to the correct rate when the magnet is removed.

*Different Types*
- Single-chamber pacemakers are used on patients who have problems with the sinoatrial node and only have problems in one part of the heart.
- Dual-chamber pacemakers are used on patients who have heart block but whose sinoatrial node is working well.

*Risks and Precautions*
- The risks associated with this procedure are small and depend on the patient’s level of fitness, age, and general health.
- There is a risk of infection near the site of the pacemaker.
- There is a risk of pneumothorax. This should be checked before leaving the hospital after the operation.
- The pacemaker lead can move and so require resiting.
- Bruising can be considerable if the patient is taking warfarin or aspirin.

*Life with a pacemaker*
- A week after the pacemaker has been implanted patients may drive, provided that they are in good health and have informed the Driver and Vehicle Licensing Agency.
- Exercise is permitted, although contact sports are not advised.
- The presence of a pacemaker should be clearly identified within medical and nursing notes and patients should always alert health care professionals to the fact that they have a pacemaker.
- Large magnetic fields (such as those used in magnetic resonance imaging) can temporarily affect a pacemaker.
- A pacemaker usually sets off the metal detectors at airport security. Therefore the patient should be given the proper documentation relating to her or his pacemaker.

**Websites**
- British Heart Foundation: www.bhf.org.uk
- Pacemakers and defibrillators: www.boe.ncsu.edu/boe/courses/boe465/1995_projects/scho