Lead extraction

A system allowing reasonably safe lead extraction without surgery has now been developed. Stephen Thomas outlines the procedures involved.

**Fig. 1. Scar tissue along pacing lead.**

**Fig. 2. Lead extraction approaches.**

Failure of a permanent pacemaker to pace the heart correctly may be due to displacement or fracture of the lead or failure of the pacing box. If a displaced lead has been in the patient's body for some time, it may not be possible to reposition it satisfactorily.

If a lead has failed for some reason, the usual practice in this country is to cap it at the connector terminal so that it is sealed, leaving it buried under the patient's skin. Patients have been known to have up to six leads left in situ without apparent harm.

The leads are generally left in because they are not very easy to remove from the myocardium, partly due to the adhesion on the tines at the tip of the lead and partly to the adhesion along the length of the lead (Fig. 1). However, if the lead becomes infected, removal is essential.

Removal could in some instances be achieved by continuously pulling on the lead, sometimes with the use of weights, until it comes away from the myocardium; this can be a very unsatisfactory method of removal as it could cause myocardial avulsion. The alternative and more complex option for removing an infected lead is via a thoracotomy.

**Byrd system**

After lengthy research, a system that enables lead extraction to be performed reasonably safely without the need for surgery has now been developed (1).

Doctors Byrd and Melbourn of the USA published their initial results on lead extraction in 1986 (2) and a complete system of specially designed tools was fully developed some years later, providing the means for extraction of the lead via the superior approach (subclavian or cephalic vein) and/or the femoral approach (femoral vein) (Fig. 2).

The procedure is carried out either in the cardiac pacing laboratory or theatres under X-ray control and despite the advent of a purpose-made lead extraction system, lead extraction should not be taken lightly as major complications could occur (see Table 1).

**Superior approach** The patient is prepared as for any routine permanent pacemaker implant. The procedure can be performed under local or general anaesthetic. If local anaesthesia is used, the patient will require sedation and pain relief. ECG and blood pressure monitoring is vital during this procedure to check for potential complications.

Using routine surgical aseptic technique, the pacemaker pocket site and/or groin region is cleaned and draped. Surgical cutdown to the pacing box with removal of the pacing box is performed, the terminal connector of the lead to the box is cut off the lead and a locking stylet, which stiffens the lead so that it becomes a more rigid structure, is passed down through the lead. The size of locking stylet is selected beforehand.

A special system of sheath dilators is now passed over the protruding end of the lead and manipulated along its length via the subclavian vein and on into the heart thus disrupting the scar tissue along the lead. If necessary the outer sheath dilator is advanced to the myocardium and with countertraction on the lead, the lead is pulled within the sheath (Figs 3, 4). If required, a new lead can now be inserted through the outer sheath.

A pericardiocentesis set should be on hand throughout the procedure in case pericardial effusion occurs, which could lead to a tamponade. In extreme cases sur-

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gical intervention may be required to relieve the tamponade. A temporary pacing wire may also need to be inserted if the lead being removed is the one pacing the heart.

Lead removal using this system may not be possible because of excessive scar tissue on the length of the lead or because a locking stylet will not pass through a damaged lead. It may therefore be necessary to use the femoral approach.

Femoral approach

The basic femoral system comprises a long sheath with a Dotter retrieval basket and a tip-deflecting guidewire (Fig. 5). The long sheath system is inserted into the patient's body via the femoral vein using routine Seldinger technique and passed on up to the right atrium. The tip-deflecting wire is lassoed around the lead, pulling it into the Dotter retrieval basket. The large sheath is then advanced over the lead in a similar manner to the superior approach, thus removing the lead from the scar tissue and the myocardium.

The femoral system with the lead attached is then removed from the body and digital pressure applied to the puncture site at the groin until haemostasis is achieved in approximately ten minutes.

Stephen Thomas RGN

References


Heartlines

The French paradox

Regular readers of Heartlines will know that the low incidence of heart disease among French people in comparison to the British could be due in part to a compound found in red wines, according to research. Now Arkopharma Laboratories have produced capsules made from red wine marc (the wine pressings). Called French Paradox, the capsules are said to contain the same active antioxidants which help to prevent cholesterol deposits in the blood, thus helping to maintain a healthy heart without resorting to alcohol.

Cot death link to smoking

A study from St Michael's Hospital in Bristol has demonstrated a link with mothers smoking during pregnancy and after childbirth to cot deaths. Professor Peter Fleming of St Michael's has advised mothers who smoke to stop immediately after conception and if they start again, not to do so for at least a year after the child is born. He reiterated that babies should sleep on their backs in a smoke-free environment.

Centenary celebrations

In 1895, the German physicist Wilhelm Röntgen discovered the existence of rays which could produce pictures of bones. He wrote: 'I will call the rays for the sake of brevity 'X'-rays.' An international conference featuring the past, present and future of all forms of radiology will commemorate the 100th birthday of X-rays at Birmingham's International Convention Centre from June 12-16, 1995. There is a specific programme for nurses on Friday June 16. Contact Sally Goodhead, College of Radiographers on 0171-935 5726, ext 2140.

Time to give up the weed

Of the estimated 28 per cent of the population who still smoke, 65 per cent say they would like to stop. Their time is to come: Wednesday March 8, 1995, is National No Smoking Day.

I would be delighted to hear comments about this issue of Cardiology Update, suggestions for articles, or contributions to Heartlines. Write to Stephen Thomas RGN, Cardiology Update Editor, Nursing Standard, 17-19 Peterborough Road, Harrow, Middlesex HA1 2AX.