

## Intracardiac Short Circuit

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In the past few years many centres have tended to prefer the pervenous to the transthoracic approach when implanting permanent pacemakers because of the reduced hospital stay and the lower postoperative morbidity. The disadvantages of this approach, however, are an increased failure rate and a greater incidence of late complications associated with the electrode. It may change in position and may fail to "capture" the ventricles. In addition perforation of the catheter through the skin sometimes occurs, particularly with the neck approach. This latter complication was the first of a series of problems encountered in the patient described here.

### Case Report

An 83-year-old man was admitted to hospital for elective cholecystectomy because of gall stones. His pulse was noted to be 42/min and he had been under the supervision of another hospital for asymptomatic complete heart block. Preoperatively his heart rate dropped steadily to 22/min. Though he was asymptomatic permission for anaesthesia was withheld pending the insertion of a pacemaker. A permanent, on-demand unit was decided on (Devices, model No. 3821), and this was implanted uneventfully in the right breast using the percutaneous approach to the right subclavian vein and with a Desilets Hoffman No. 9 introducer (Macaulay and Wright, 1970). He was discharged one week later.

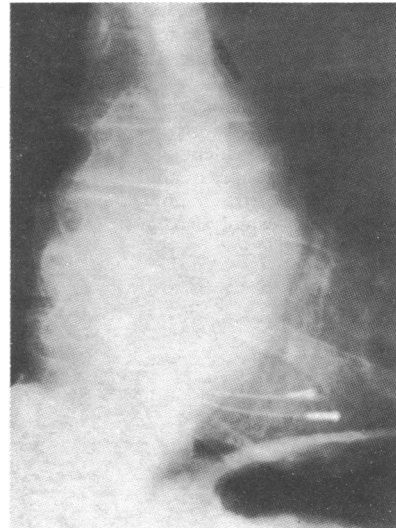
The curve of the electrode in the neck began to erode the skin, which broke down one year after implantation with a copious purulent discharge. It was thought advisable to replace the entire system, and this was undertaken using the left cephalic vein for electrode insertion. When the new unit was in place the old box was removed but it was found impossible to remove the old electrode, which had apparently become embedded in the heart tissue. The distal end of the electrode was therefore removed, leaving enough extending into the superior vena cava to prevent it turning on itself and becoming a source of ectopic rhythms in the right ventricle. The pacemaker was then noted to "capture" the heart intermittently and the patient became dizzy. Breathing and coughing etc. seemed to have no effect on the "arrhythmia" and it was concluded that contact was being made between the two electrode tips with a resulting short circuit. The new electrode was therefore repositioned and all seemed well.

A few days later the patient again complained of dizziness and was found to have an irregular pulse with intermittent failure to pace and bradycardia. The electrodes were found to be close together again (see fig.) and once more the electrode was repositioned. Owing to technical difficulties no lateral film was taken on this occasion to confirm the position of the electrode. For a few days all was well and then pacing failed again. Though the posteroanterior film showed good positioning the lateral film showed the old catheter to be in the right ventricle and the new catheter to be in the coronary sinus. It was therefore decided to implant a new epicardial system.

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Apart from postoperative subacute bacterial endocarditis the patient has remained well for one year and suffered no ill effects. The original electrode remained in position with one tip in the right ventricle and the other high in the superior vena cava.



Posteroanterior view of chest showing tips of pacing electrodes lying close together.

### Comment

The pervenous approach to permanent pacemaking offers many practical advantages. In our unit the entire operation is performed under local anaesthesia, the avoidance of general anaesthesia being an advantage in the age group usually presenting for such treatment. When the neck approach is used the distal end of the electrode must be brought down subcutaneously over the clavicle, and the loop in the neck so formed may have a tendency constantly to press against the skin and eventually perforate it, as in our case.

In two cases inactive pacemaker electrode interference has been reported with a temporary electrode during the insertion of a permanent system (Widman *et al.*, 1972). There was no difficulty in overcoming the problem once it was recognized as the temporary electrode can always be easily removed, and, in any case, it does not remain permanently in situ. With the increasing number of patients being referred for permanent pacemaker treatment and the high proportion of these with pervenous systems it seems inevitable that more and more of these cases will arise. The treatment of choice seems to be to implant an epicardial system when the original electrode cannot be removed.

The epicardial system in this patient was implanted by Dr. Y. Lieberman, of Tel Hashomer Hospital, Israel.

Requests for reprints should be sent to Dr. I. J. Copperman.

### References

- Brenner, A. S., *et al.* *Circulation*, 49, 407.  
Macaulay, M. B., and Wright, J. S. (1970). *British Medical Journal*, 4, 207.  
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