Is preoperative pacing for bifascicular and trifascicular heart block necessary?

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Whether to place a temporary pacing wire in patients with bi- or trifascicular block before anaesthesia is a dilemma because of concerns about progression to complete heart block (CHB). CHB usually occurs in patients with acute myocardial infarction, more commonly if there is pre-existing or new bundle–branch block. The cumulative incidence of chronic bi- and trifascicular heart block progressing to CHB in the general population at 5 years is 4.9%, or 1% per year (McAnulty et al, 1982).

The heart's conducting system may be blocked at any point. The impulse originates at the sinoatrial node and depolarization continues to the atrioventricular (AV) node in the right atrium. This continues as the His bundle, which conducts the cardiac impulse rapidly on to the ventricles. The intraventricular conducting system is the His Purkinje system and consists of right and left bundles. The left bundle further divides into the anterior and posterior fascicles.

Bifascicular heart block is a delay in two of the three fascicles; right bundle–branch block (RBBB) with block in either the left anterior or posterior hemifascicle, or left bundle–branch block. Trifascicular block is bifascicular heart block associated with a PR interval >0.21 s. RBBB can be a normal finding in 1% of young adults and 5% of older people. Ischaemic heart disease, valvular heart disease, valve surgery, cardiomyopathy, and calcification or fibrosis of the conducting system can cause intraventricular conduction delays.

Preoperative electrocardiograph changes of bi- or trifascicular block indicate that the patient is at risk of developing a life-threatening bradyarrhythmia. Drugs used regularly in anaesthesia can cause bradycardias, e.g. propofol, suxamethonium, halothane, and opiates such as fentanyl or morphine.

Surgical procedures also cause reflex bradycardias, e.g. manipulation of the peritoneum, dilation of the cervix or traction on the orbit, as they are parasympathetically-mediated reflexes. The AV node is innervated by vagal fibres, thus is sensitive to parasympathetic changes. The His Purkinje system is less affected by vagal tone.

Anaesthetic procedures can also cause a profound drop in heart rate, e.g. endotracheal intubation and regional anaesthetic techniques, central venous and pulmonary artery catheter placement. Intraoperative myocardial ischaemia, electrolyte abnormalities and hypothermia can all contribute to conduction defects. Preoperative placement of a temporary pacing wire therefore seems advisable in the patient with a pre-existing intraventricular conduction defect.

TEMPORARY PACEMAKERS

Placing a temporary transvenous pacemaker (TPM) is not without complications, including local trauma, carotid puncture, pneumothorax and infection. Intracardiac placement of the pacing wire can lead to cardiac perforation and tamponade. Transcutaneous external pacing is easier and should be available in all theatres. Atropine and isoprenaline terminate compromising bradycardias.

Gauss et al (1998) studied 103 patients, of whom 56 had bifascicular block and 47 had trifascicular block, scheduled for surgery under general or regional anaesthesia. Significant bradycardias occurred in 8 patients. No cases of CHB were reported. All responded to pharmacotherapy. Mikell et al (1981) studied 76 surgical patients among whom there were four cases of sinus bradycardia and no CHB. Atropine and isoprenaline were used. Pastore et al (1978) analysed 44 patients for 52 operations. There was one case of transient CHB at intubation, explained by parasympathetic discharge. A TPM was placed and surgery proceeded uneventfully. Rooney et al (1976) found no instance of CHB during 44 anaesthetics.

The risk of CHB developing in patients with bi- or trifascicular block is low and prophylactic temporary pacing is not justified in asymptomatic patients, except those with recent myocardial infarction. Access to the patient's chest during surgery to facilitate pacing is essential and transvenous and transcutaneous pacing equipment must be available. HM

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Anaesthetic and critical care dilemmas are coordinated by **Dr Robert Self** and **Dr Pete Bishop**, Research Fellows at the Centre for Anaesthesia, UCL, London

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