Temporary Pacers

Objectives:

1. Understanding the indications for temporary pacemakers
2. Understanding the types of temporary pacemakers available and their limitations
3. Understanding how to troubleshoot the temporary pacemaker

The indications for placement of a temporary pacemaker are similar to the indications for patients requiring a permanent pacemaker. These indications include: asystole, 3rd degree AV block, symptomatic bradycardia (not medically responsive), new onset bifascicular block, Mobitz II AV block with acute myocardial infarction, overdrive pacing to suppress aberrant rhythm (SVT/VT), and prophylactic treatment for procedures which potentially produce significant bradycardia and heart block. In patients who require temporary pacing the procedure is often performed in an unstable patient and the need to provide pacing must occur promptly. In order for the procedure to be performed quickly it requires that the physician be knowledgeable with the pacing options and placement techniques. During this workshop we will consider the different pacing alternatives and their indications in a clinical setting.

Atrial-ventricular synchronized pacing is an efficient way to provide cardiac support. It allows for the benefit of atrial contraction and improvement in hemodynamic parameters. However, the time it takes to place transvenous atrial and ventricular leads may be a rate limiting factor when choosing the type of temporary pacemaker. The different options available for providing temporary pacing are: transcutaneous, transesophageal, epicardial, and transvenous. Transcutaneous pacing has the benefit of being readily available and easy to place. The two gel electrodes are placed in an anterior-posterior orientation. The anterior electrode should be positioned at the left anterior chest and the posterior electrode is placed left of the spine and inferior to the scapula. This position provides the least impedance to electrical conduction and increases ventricular capture. Transcutaneous pacing has the disadvantage of being uncomfortable for an awake patient and it does not provide for A-V synchronized pacing. This technique has been removed from the ACLS algorithm for treatment of asystole because of its inability to show an outcome benefit. Transesophageal pacing has become a frequent way for an anesthesiologist to provide temporary pacing. It is a relatively simple procedure with the probe being placed similarly to an esophageal temperature monitor. The device takes advantage of the intimate relationship between the esophagus and the left atrium. The transesophageal pacing probe uses a different generator than any of the other pacing modalities. The probe allows for atrial pacing which can be useful in patients with severe bradycardia and an intact AV node. Pacing of the ventricle with a transesophageal probe is highly variable and unreliable. Therefore, the device is limited to atrial pacing and it is uncomfortable for the patient. Transvenous pacing is considered a reliable way to provide atrial, ventricular, or A-V pacing. There are a number of catheters available to provide transvenous pacing. Most commonly in the operating room there are pulmonary artery catheters available with the option of providing atrial, ventricular, or A-V pacing. These catheters have a few variations with the pacing mechanism being available either through ring-like electrodes or separate pacing lead ports. These catheters have the benefit of providing AV synchronized pacing and is tolerated in the awake patient. Transvenous pacing, however, does have complications related to obtaining venous access and lead placement resulting in cardiac damage (i.e. perforation). In addition, transvenous pacing is technically more difficult to perform compared to other pacing methods. Epicardial pacing is the final technique utilized for temporary pacing of the heart. The leads are frequently placed following cardiac
surgery and have similar thresholds compared with transvenous pacing. The leads require surgical placement and are removed when they are no longer required for post operative care. The removal of epicardial leads have the potential to result in cardiac bleeding.

Troubleshooting these temporary devices is often secondary to failure of atrial or ventricular capture. The position of the leads must be considered and adjusted to provide ideal capture. Consider the least amount of current needed to provide capture (threshold) and then increase the current to approximately 2times the threshold capture. Loss of capture can also be related to interference from the electrocautery and the generator should be adjusted to a fixed mode during intraoperative care. The patient requiring temporary pacing presents multiple challenges to the team providing care, however, by understanding the different devices and their function it can be a life saving maneuver.