overdrive pacing [created by Paul Young 02/10/07]

atrial flutter

- Overdrive pacing is effective in type I atrial flutter (< 320–340 bpm), but not in type II with rates in excess of this.
- The pacemaker is set to just above the flutter rate and then gradually increased until the atrial complexes on the surface ECG change morphology. Typically, this will be 10–20 beats/min faster than the flutter rate and indicates the flutter has been terminated.
- The pacemaker is then slowed to an acceptable rate,or below the endogenous sinus rate.
- Failure of this technique is usually attributable to insufficiently rapid pacing rates, insufficient duration of atrial pacing, or insufficient stimulus strength.

SVT with rapid ventricular response that fails to revert

- Occasionally after attaining 1:1 capture with overdrive pacing, sinus rhythm is not re-established on turning down the rate and the SVT with rapid ventricular response persists.
-In this situation it may be preferable to induce atrial fibrillation by rapid atrial pacing (up to 800 beats/min), depending on the pulse generator). Termination of rapid atrial pacing will sometimes lead to sinus rhythm where other techniques have not. If not, remaining in electrically induced rapid atrial fibrillation may be preferable if the AV block is sufficiently high to make the ventricular rate slower than that when in SVT.

ventricular tachycardia

- There is some suggestion that either underdrive or overdrive ventricular pacing can terminate ventricular tachycardia, but there is a risk of precipitating VF by doing this. DC cardioversion remains the accepted standard of care for VT.

overdrive pacing vs cardioversion

- Pacing may assist in rhythm diagnosis
- Pacing may be used (cautiously) in digitalis intoxication
- Pacing does not require a general anaesthetic
- Pacing avoids complications of DC shock, especially myocardial depression
- Repeated reversions are easier with pacing
- Standby pacing is immediately available should bradycardia or asystole occur after electrical reversion

overdrive pacing vs drugs

- Pacing may aid in arrhythmia diagnosis
- Pacing avoids drug induced cardiac depression and other drug side effects
- Pacing can be used when drug therapy has failed
- Termination of the tachycardia with pacing is often immediate
- Standby pacing is immediately available

General

- Tachyarrhythmias are common following cardiac surgery.
- The presence of epicardial pacing wires allows many of these to be effectively treated by means other than pharmacotherapy or DC cardioversion.
- The exceptions are ventricular and atrial fibrillation and sinus tachycardia, which cannot be controlled by pacing.
- When attempting overdrive pacing, VT or VF may result and so DC cardioversion must be immediately available.

Indications

- Failure of drug therapy
- Recurrent arrhythmias
- Contraindication for cardioversion (e.g. digitalis intoxication)
- Aid to arrhythmia diagnosis (e.g. wide complex tachycardia to differentiate ventricular tachycardia from supraventricular tachycardia).

AV junctional tachycardia

- AV junctional tachycardia (with rates around 100–120) is common following cardiac surgery, and is effectively managed using atrial (AOO or AAI) or AV sequential overdrive pacing (DOO or DDD).
- The pacing rate is increased to around 120% of the endogenous rate. Once 1 : 1 capture of the myocardium is achieved, the pacemaker rate is gradually reduced. As the pacemaker rate falls below the endogenous sinus rate, a stable sinus rhythm is often established.

paroxysmal re-entrant SVT

- Paroxysmal re-entrant supraventricular tachycardia can also be terminated by atrial pacing: either ‘underdrive’ pacing (at less than the SVT rate) if the pacing spike induces a refractory period in the segment of the myocardium forming the re-entrant loop; or ‘overdrive’, where the atrial pacemaker is set above the SVT rate in a manner similar to that described for AV junctional tachycardia.
- The myocardium in the re-entrant limb is depolarised by an anterograde pacing spike before re-entrant depolarisation of the preceding beat arrives; when it does arrive, the myocardium is in its refractory state, so the re-entrant pathway is effectively blocked.
- After capture, the rate can be gradually reduced to the desired target