Complications reported have included bleeding from ventricular or atrial laceration, tamponade, side branch or graft avulsion, superior epigastric artery laceration, and in considerations for removal. Predictors of necessity for TEPW include diabetes, preoperative arrhythmia, pacing required to separate from bypass advanced age, cardiomegaly, preoperative antithrombotic therapy, inotropic agents upon leaving the operating room, decalcification of the aortic annulus and/or the dynamics of myocardial functional recovery. Complications of TEPW can be reduced by attention to certain details involved in both technical aspects of placement of wires and in considerations for removal.

Placement of TEPW:
1. Keep electrodes at least 1.5 – 2.0 cm apart on the epicardium to maximize efficacy.
   - Elctively, test and record threshold function for wires.
   - Secure the TEPW at the exit site with a suture.
2. Carefully select locations.
   - Avoid arterioles/venules on the right ventricle.
   - Pick ‘thicker’ spots on the right atrium on the mid and lower right atrial wall; consider Waterston’s groove, left atrium.
   - If right atrial appendage used, be certain bare wire does not inadvertently also contact right ventricle, as simultaneous atrial and ventricular contraction could occur with resultant hemodynamic compromise.
   - Be ever mindful of the exit course of the wire and its relationship to nearby graft(s) – avoid “clothes lining.”
   - Keep exit direction of pacing wire from epicardium in as straight a line as possible to epigastric exit site, to avoid Gigli saw effect or tearing upon removal.
3. If repair suture for bleeding required, use smallest suture possible (e.g. 4-0, 5-0, or even 6-0).
   - Consider mattress suture with or without pledgets rather than figure-of-8 sutures, in order to facilitate removal.
   - Don’t over tighten/strangulate the hemostatic suture, as the TEPW needs to be removed.
4. Avoid long redundant loops of wire; prevent conduit ensnaring or lassoing which could occur at removal.
   - Be especially cognizant of conduit side branch clips and their relationship to the TEPW course to avoid avulsion of clip at removal.
   - Be certain both ventricular and/or both atrial wires are on the same side of a graft to prevent constriction at removal.
5. Keep epigastric exit sites near the midline on each side with intra-institutional standardization for ventricular wires to the left of midline and atrial to the right. This avoids confusion for critical care/nursing staffs.
   - Check intrathoracic epigastric exit site carefully to avoid exit of the needle through the colon, stomach, liver or lung.
   - Check for epigastric artery and rectus muscle bleeding after TEPW needles passage.
6. Keep electrode ends of TEPW electrically isolated in some fashion.

Correct Placement of Pacing Wires (Heart Only)

Correct Placement of Pacing Wires (In Situ)

These considerations are indicative of a strategy for safety as regards TEPW. There are many ways to achieve similar results and these considerations are by no means immutable.

References