Figure 1. Shown are recordings from the left superior pulmonary vein (LSPV) during distal coronary sinus pacing at 200 mm/s paper speed. Panel A. When the small caliber circular mapping catheter (CMC) is positioned proximal near the LSPV ostium there is significant overlap between the near-field PV electrograms (PVP) and the far-field atrial electrograms (A). As the CMC is advanced progressively more distal within the PV (Panels B and C) the PVPs exhibit progressive temporal delay without losing their near-field characteristics. Conversely the non-PV potentials (A) progressively reduce in amplitude without changing their activation timing. CS: Coronary sinus; p: proximal, d: distal.
Supplemental Figure 2. This tracing (100 mm/s) illustrates the effect of modifying the differential pacing site on local activation timing of left superior pulmonary vein (LSPV) potentials (PVP) relative to the far-field source (A) on the ostially positioned small caliber circular mapping catheter. As the atrial activation is shifted progressively leftward, from sinus rhythm (left panel) to a proximal (pCS), mid and finally distal (dCS) coronary sinus (CS) pacing site the far-field atrial and near-field LSPV PVP become increasingly separated due to progressively dysynchronous activation. The resultant increased separation in far-field (A) and PVP is best seen on bipole 3,4 and 4,5.
Supplemental Figure 3. These tracings (100 mm/s) illustrate the utility of pulmonary vein (PV) pacing to confirm PV potentials (PVP) and PV exit conduction. During sinus rhythm (left panel, first beat) a single potential is observed on the small caliber circular mapping catheter positioned at the ostium of the left superior PV (LSPV). With the onset of PV pacing from bipolar 3,4 (left panel, second beat) there is evidence of local PV capture (PVP) followed by far-field atrial activation (A) and far-field ventricular activation (V). Note the concurrent change in P wave morphology and CS activation sequence. The right panel demonstrates the utility of decremental pacing from the PV to unmask PVPs. During the drive train (450 msec) there is evidence of conduction from the PV to the atrium (A). After an extrasystole at a coupling interval of 210 msec there is an increased separation between the pacing artifact, PVP, and subsequent far-field atrial activation (A). LEGEND: pCS: proximal coronary sinus. dCS: distal coronary sinus.
Supplemental Figure 4. This tracing demonstrates the initiation of AF. In sinus rhythm (first beat) an atrial far-field potential (A) is noted to precede local pulmonary vein activation (PVP) on a small caliber circular mapping catheter positioned at the ostium of the left inferior PV (LIPV). During the initiation of AF a reversal of the PV activation sequence is observed with the PVP preceding the atrial electrogram. LEGEND: pCS: proximal coronary sinus. dCS: distal coronary sinus.
Supplemental Figure 5. This tracing demonstrates the utility of pulmonary vein (PV) pacing during cryoballoon ablation of the left inferior pulmonary vein (LIPV). At the onset of the tracing reliable PV to left atrial exit conduction is demonstrated during pacing from LIPV 2-3 (first four beats). The first sinus beat following the onset of exit conduction block demonstrates intact entrance (LA-PV) conduction (pulmonary vein potential; PVP). Subsequent PV potentials are not visualized during continued PV pacing due to short coupling intervals or overlying pacing artefact. Following the cessation of PV pacing entrance conduction is noted (PVP) on a single beat, followed by sustained PV isolation (entrance block). LEGEND: CS: Coronary Sinus. Adapted from Andrade et al.1
**Supplemental Figure 6.** These tracings (100 mm/s) demonstrate examples of exit conduction block. **Left Panel:** After isolation of the left inferior pulmonary vein (LIPV) a spontaneous pulmonary vein discharge (PVP) that has no relation to atrial (A) activation (dissociated PVP) is observed during sinus rhythm. **Right Panel:** After isolation of the LIPV pacing is performed from the small caliber circular mapping catheter positioned at the ostium of the LIPV (bipoles 1-2). Despite evidence of local PV capture (PVP; best seen on LIPV 4, 5-6, and 6,7) there is no evidence of conduction from the PV to the left atrium. **LEGEND:** pCS: proximal coronary sinus. dCS: distal coronary sinus.
Supplemental Figure 7. This tracing demonstrates the endpoint pulmonary vein (PV) entrance block when cryoablation is performed during AF. Note the progressive slowing of the left superior PV (LSPV) electrograms (PVP) followed by high-degree left atrium-PV block, and finally PV disconnection (entrance block). LEGEND: A: farfield atrial activation, pCS: proximal coronary sinus, dCS: distal coronary sinus.
Supplemental Figure 8. This tracing demonstrates the utility of pacing from the small caliber circular mapping catheter when cryoablation is performed during AF. On this tracing pacing is performed from the small caliber circular mapping catheter positioned at the ostium of the left superior pulmonary vein (LSPV), demonstrating evidence of local PV capture (PVP). In contrast to procedures in performed in sinus rhythm, PV pacing during AF confirms the presence of entrance block, since the ability to capture the local PV myocardium during AF is only possible once entrance block is achieved. In other words dissociated PV potentials and local PV capture can only occur once the PV is no longer inhibited by the ongoing conduction of LA activity into the PV. LEGEND: pCS: proximal coronary sinus, dCS: distal coronary sinus.