

Common Mode Inhibition at Implant

Nearly all current pacemakers employ programmable polarity, either unipolar or bipolar, whereas the polarity for current ICDs is fixed in the bipolar setting. In the bipolar pacing/sensing configuration, the user would expect the case of the device to be electrically inactive and therefore handling of the device would never inhibit pacing support. However, in certain implant scenarios where a gloved physician either “taps” or touches the case of the device prior to placing it in the pocket, it has been observed that intermittent pacing output can occur. This phenomenon is commonly referred to as “Common Mode” noise.

Common Mode noise is a type of output inhibition caused by the detection of noise signals from the environment. In the bipolar sensing configuration, the anodal ring electrodes are electrically referenced to the case of the device through a very high impedance. During an implant or explant procedure when the pacemaker or ICD is sitting on the patient’s sterile sheet without direct contact to subcutaneous tissue, the metallic case is an electrically “floating” reference acting like an antenna. Occasionally, through the direct handling of the device, a gloved physician may inadvertently capacitively couple noise into the unit simulating a cardiac signal. This signal may then lead to inhibition or asynchronous/noise reversion pacing.

This type of environmental interference can best be observed when a clinician attempts to record an ordinary ECG on a patient. If only two of the three leads are attached, a 60 Hz noise signal can commonly be seen on the electrograms until the third reference lead has been connected.

We expect that all ICDs and polarity programmable pacemakers made by all manufacturers to be susceptible to this phenomenon. Once the pacemaker or ICD is implanted and the metallic case comes in contact with subcutaneous tissue, a proper electrical reference point is established and normal sensing characteristics will be observed.

If you have any questions or would like to discuss this topic in greater detail, please do not hesitate to contact Technical Services at 800-722-3774.