Effects of Nerve Conduction Tests on St. Jude Medical Implantable Cardiac Rhythm Devices

Background
Neurologists commonly perform three types of tests to examine nerve and muscle function: Nerve conduction studies (NCS), needle electromyography (EMG), and evoked potentials testing. Nerve conduction studies record the nerve’s response when small electrical shocks are applied. Needle EMG examines the electrical signals traveling through muscle by inserting a needle into several muscles. Finally, the evoked potentials test examines the nerve pathways of the spinal cord and from the eyes and ears by recording nerve responses from the small electrical shocks, light pulses, or sound stimuli.

Potential Effects

Pacemakers
Nerve conduction testing should not damage or reprogram pacemakers. Nerve conduction testing has not been reported to cause interference in pacemaker operation. If interference were to occur, oversensing/inhibition may be possible.

ICDs
Interference in ICDs has not been reported from the field. If interference should occur, the electric impulses from the small electric shocks may be interpreted by implantable cardioverter defibrillators (ICDs) as “electrical noise,” which could mask the underlying rhythm of the heart and cause a noise reversion. During a noise reversion, the device will not deliver therapy (therapy includes ATP pacing, cardioversion and defibrillation) and will revert to the programmed Noise Reversion Mode, which is programmable to Pacer Off or an asynchronous pacing mode. More importantly, the impulses may be misinterpreted as cardiac events, causing bradycardia pacing inhibition or resulting in inappropriate arrhythmia detection and therapy delivery.

A summary of potential effects is provided in the table below and is based on device testing at St. Jude Medical, clinical experience and/or a review of the scientific literature.

<table>
<thead>
<tr>
<th>Potential Effect</th>
<th>Estimated Frequency Pacemakers</th>
<th>Estimated Frequency ICDs</th>
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<tbody>
<tr>
<td>Temporary inhibition of pacing</td>
<td>Rare</td>
<td>Rare</td>
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<tr>
<td>Asynchronous pacing/noise reversion</td>
<td>Rare</td>
<td>Rare</td>
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<tr>
<td>Inappropriate therapy delivery</td>
<td>Not applicable</td>
<td>Rare</td>
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Recommendations

- If inhibition should occur, switching the test equipment to “Off” will stop the interference and the device will automatically pace as usual. The patient should be alert for symptoms like those before the device was implanted (e.g. dizziness, light-headedness, etc.).
- ECG monitoring may be useful if interference is suspected.

ICDs

- For ICDs, a magnet can be placed over the device during EMG testing to prevent inappropriate therapy in most devices. Once the treatment session is completed, the magnet should be removed.

If you have any questions on this topic, please contact St. Jude Medical Technical Services at 800-722-3774.