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Effects of Electrocautery on St. Jude Medical Implantable Cardioverter Defibrillators (ICDs)

Background

The use of electrocautery can affect the operation of implantable cardioverter defibrillators (ICDs). While all St. Jude Medical devices incorporate circuits and designs intended to prevent or minimize such effects, the high energy levels used in electrocautery can produce electromagnetic interference (EMI) that can be sensed by the implanted device. When such signals are erroneously interpreted as cardiac activity by the implanted device, inappropriate therapy delivery or inhibition of pacing may occur. For this reason, the use of electrocautery is contraindicated when the automatic tachycardia response of the patient's ICD is enabled.

Potential Effects

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

Potential Effect	Estimated Frequency
Inappropriate delivery of therapy	Uncommon
Inhibition of pacing	Rare
Failure to deliver antitachycardia therapy as a result of noise reversion	Rare
Circuit damage leading to erratic function or loss of therapy or pacing	Rare

Recommendations

If electrocautery is necessary, the following recommendations will help minimize potential complications.,

Before the procedure

The device's tachycardia detection and response features can be deactivated by:

- Placing a magnet over the device, positioned off-center so that the hole of the "donut" magnet is over the top or bottom end of the device as shown below. This suspends tachyarrhythmia detection and response as long as the magnet is held in place over the device.

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Magnet application will not affect the bradycardia pacing function – bradycardia pacing will continue as programmed. Unlike the function of a pacemaker, the bradycardia pacing operation of an ICD is not forced to pace asynchronously when exposed to a magnet. Pacemaker-dependent patients should have their devices programmed to an asynchronous pacing mode, with the device's sensor programmed to Off or Passive.

It should be noted that ICDs can have their magnet response programmed to IGNORE the placement of a magnet and therefore continue to deliver therapy even if a magnet is properly positioned over the device. Be sure to verify that this feature is programmed as required to ensure the desired magnet response.

- Programming the device to a non-tachyarrhythmia configuration using the appropriate St. Jude Medical programmer. Depending on the specific device, such programmable options are called "Tachy Therapy is Disabled" or "Zone Configuration Off". When antitachyarrhythmia therapies are disabled, monitor the patient and ensure that external defibrillation capabilities are available.

During the procedure
- Monitor the patient's pulse and/or ECG during electrocautery.
- Keep the electrosurgical tip more than 15 cm (6 inches) away from the ICD and leads.
- Use short-duration, intermittent and irregular bursts at the lowest feasible energy levels.
- Position the electrocautery system's ground plate so that the current pathway does not pass through or near the ICD and leads.
- Where possible, use a bipolar electrocautery system.

After the procedure
- If the device was programmed to an asynchronous pacing mode and/or Tachy Therapy Off, reprogram the device back to the desired settings.
- Electrocautery used in the direct vicinity (typically less than 6 inches) of an ICD could potentially damage the device and further evaluation of the ICD system by the patient's following physician may be considered.

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