



Standard Letter
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LITHOTRIPSY CONSIDERATIONS
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PACEMAKER (IPG – IMPLANTABLE PULSE GENERATOR)
DEFIBRILLATOR (ICD – IMPLANTABLE CARDIOVERTER DEFIBRILLATOR)
INSERTABLE LOOP RECORDER (ILR)

Although there are concerns of potential system interaction, Medtronic pacemaker, defibrillator or internal loop recorder patients may receive lithotripsy treatment safely if the device and the target are separated by at least 18 cm. Medtronic pacemakers and ICDs have electronic filters that block electromagnetic interference (EMI) from reaching the sensing circuit; however, some types of EMI may exceed the capability of this filter to block them. Should the EMI get past this filter and reach the sensing circuit, an ICD may interpret it as a rapid heart rate and deliver a therapy. EMI may interrupt bradycardia timing and sensing in either IPGs or ICDs.

The following table is a summary of possible interactions related to the separation distance between the lithotripsy focal point and implanted IPG or ICD or ILR:

Distance	Oversensing	Damage To Device	Actions
>18 cm	unlikely	unlikely	Monitor patient
5-18 cm	possible	unlikely	Monitor patient. Consider magnet/asynchronous pacing/suspend detection (ICD)
<5 cm	possible	possible	Monitor patient. Consider magnet/asynchronous pacing/suspend detection (ICD). Interrogate device before and after treatment

Lithotripsy Considerations: IPG, ICD* or ILR

If the separation between the intended target and the implanted device is less than 5.0 cm, the device should be interrogated after the procedure to verify proper operation. Implanted Medtronic devices not separated by at least 5.0 cm from the lithotripsy target may be damaged by the procedure.

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If the intention is to operate the lithotripter in an R-wave synchronous mode, most lithotripsy amplifiers can be adjusted to synchronize on the R-waves rather than the pacing spikes. If unable to synchronize on R-waves consider programming dual chamber devices to single chamber mode for the procedure, e.g. AAI or VVI.

Stored data in an ILR may be affected by lithotripsy causing false episodes. Likewise, diagnostics may be affected in the IPG's or ICD's by the accumulation of over-sensed artifacts.

Asynchronous operation should only be used on those patients who can tolerate it. It can be pro-arrhythmic in patients with competing underlying rhythms. Patients should be monitored when operating in these modes.

ICD* (In addition to the above consideration, the following applies to ICD patients)

The tachyarrhythmia detection capability of a Medtronic ICD can be temporarily suspended by securing a magnet over it or turning Off detection with a programmer for the procedure. Medtronic ICDs will continue to sense and pace in the programmed bradycardia mode. Since placing a magnet over the device does not change any of the programmed parameters, normal functioning of the ICD is restored when the magnet is removed. If a spontaneous tachyarrhythmia should occur, removing the magnet will return the ICD to normal operation.