

## INFECTION

Class I Indications <sup>1</sup>	Comments
1. Complete device and lead removal is recommended in all patients with definite CIED system infection, as evidenced by valvular endocarditis, lead endocarditis or sepsis. (Level of evidence: B)	Same as NASPE 2000 <sup>2</sup>
2. Complete device and lead removal is recommended in all patients with CIED pocket infection as evidenced by pocket abscess, device erosion, skin adherence, or chronic draining sinus without clinically evident involvement of the transvenous portion of the lead system. (Level of evidence: B)	<b>Classified Class I Instead of Class II</b>
3. Complete device and lead removal is recommended in all patients with valvular endocarditis without definite involvement of the lead(s) and/or device. (Level of evidence: B)	<b>New</b>
4. Complete device and lead removal is recommended in patients with occult gram-positive bacteremia (not contaminant). (Level of evidence: B)	<b>New</b>
Class IIa Indications <sup>1</sup>	Comments
1. Complete device and lead removal is reasonable in patients with persistent occult gram-negative bacteremia. (Level of evidence: B)	<b>New</b>
Class III Indications <sup>1</sup>	Comments
1. CIED removal is not indicated for a superficial or incisional infection without involvement of the device and/or leads. (Level of evidence: C)	<b>New</b>
2. CIED removal is not indicated to treat chronic bacteremia due to a source other than the CIED, when long-term suppressive antibiotics are required. (Level of evidence: C)	<b>New</b>

## CHRONIC PAIN

Class IIa Indications <sup>1</sup>	Comments
1. Device and/or lead removal is reasonable in patients with severe chronic pain, at the device or lead insertion site, that causes significant discomfort for the patient, is not manageable by medical or surgical techniques and for which there is no acceptable alternative. (Level of evidence: C)	Previously Class II

## SUMMARY OF SIGNIFICANT INDICATION CHANGES

Category	Indications	Class
<b>Infection</b>	Pocket infection	<b>I</b>
	Occult gram-positive bacteremia	<b>I</b>
	Occult gram-negative bacteremia	<b>IIa</b>
<b>Chronic Pain</b>	Severe chronic pain	<b>IIa</b>
<b>Thrombosis or Venous Stenosis</b>	Ipsilateral occlusion w/o contralateral contraindication	<b>IIa</b>
<b>Functional Leads</b>	Due to design or failure, may pose immediate threat	<b>I</b>
	Risk of interference with device operation	<b>IIb</b>
	Due to design or failure poses potential future threat	<b>IIb</b>
	Functional leads not being used (ICD upgrade)	<b>IIb</b>
	Need MRI with no other imaging options	<b>IIb</b>
<b>Non-Functional Leads</b>	Implant would require > 4 leads on one side or > 5 leads through SVC	<b>IIa</b>
	Need MRI with no other imaging options	<b>IIa</b>
	Non-functional lead at device/lead procedure	<b>IIb</b>

1. Wilkoff, B.L., Love, C.J., Byrd, G.H., et al. (2009). Transvenous lead extraction: Heart Rhythm Society expert consensus on facilities, training, indications, and patient management. *Heart Rhythm*, 6(7), 1085-1104.
2. Love, C.J., et al. (2000). NASPE policy statement - Recommendations for extraction of chronically implanted transvenous pacing and defibrillator leads: Indications, facilities, training. *PACE*, 23.

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## 2009 HEART RHYTHM SOCIETY INDICATIONS FOR TRANSVENOUS LEAD EXTRACTION



## NON-FUNCTIONAL LEADS

Class I Indications <sup>1</sup>	Comments
1. Lead removal is recommended in patients with life-threatening arrhythmias secondary to retained leads or lead fragments. (Level of evidence: B)	Same as NASPE 2000 <sup>2</sup>
2. Lead removal is recommended in patients with leads that, due to their design or their failure, may pose an immediate threat to the patients if left in place (e.g. Telectronics ACCUFIX J wire fracture with protrusion). (Level of evidence: B)	Same as NASPE 2000 <sup>2</sup>
3. Lead removal is recommended in patients with leads that interfere with the operation of implanted cardiac devices. (Level of evidence: B)	Same as NASPE 2000 <sup>2</sup>
4. Lead removal is recommended in patients with leads that interfere with the treatment of a malignancy (radiation/reconstructive surgery). (Level of evidence: B)	<b>Previously Class II</b>
Class IIa Indications <sup>1</sup>	Comments
1. Lead removal is reasonable in patients with leads that due to their design or their failure pose a threat to the patient, that is not immediate or imminent if left in place (e.g. Telectronics ACCUFIX without protrusion). (Level of evidence: C)	Previously Class II
2. Lead removal is reasonable in patients if a CIED implantation would require more than 4 leads on one side or more than 5 leads through the SVC. (Level of evidence: C)	<b>New</b>
3. Lead removal is reasonable in patients that require specific imaging techniques (e.g. MRI) and can not be imaged due to the presence of the CIED system for which there is no other available imaging alternative for the diagnosis. (Level of evidence: C)	<b>New</b>
Class IIb Indications <sup>1</sup>	Comments
1. Lead removal may be considered at the time of an indicated CIED procedure, in patients with non-functional leads, if contraindications are absent. (Level of evidence: C)	<b>New</b>
2. Lead removal may be considered in order to permit the implantation of an MRI conditional CIED system. (Level of evidence: C)	<b>New</b>
Class III Indications <sup>1</sup>	Comments
1. Lead removal is not indicated in patients with non-functional leads if patients have a life expectancy of less than one year. (Level of evidence: C)	Similar to NASPE 2000 <sup>2</sup>
2. Lead removal is not indicated in patients with known anomalous placement of leads through structures other than normal venous and cardiac structures, (e.g. subclavian artery, aorta, pleura, atrial or ventricular wall or mediastinum) or through a systemic venous atrium or systemic ventricle. Additional techniques including surgical backup may be used if the clinical scenario is compelling. (Level of evidence: C)	Similar to NASPE 2000 <sup>2</sup>

## FUNCTIONAL LEADS

Class I Indications <sup>1</sup>	Comments
1. Lead removal is recommended in patients with life-threatening arrhythmias secondary to retained leads. (Level of evidence: B)	Similar to NASPE 2000 <sup>2</sup>
2. Lead removal is recommended in patients with leads that, due to their design or their failure, may pose an immediate threat to the patients if left in place (e.g. Telectronics ACCUFIX J wire fracture with protrusion). (Level of evidence: B)	<b>Similar to NASPE 2000<sup>2</sup></b>
3. Lead removal is recommended in patients with leads that interfere with the operation of implanted cardiac devices. (Level of evidence: B)	Same as NASPE 2000 <sup>2</sup>
4. Lead removal is recommended in patients with leads that interfere with the treatment of a malignancy (radiation/reconstructive surgery). (Level of evidence: C)	<b>Previously Class II</b>
Class IIb Indications <sup>1</sup>	Comments
1. Lead removal may be considered in patients with an abandoned functional lead that poses a risk of interference with the operation of the active CIED system. (Level of evidence: C)	<b>New</b>
2. Lead removal may be considered in patients with functioning leads that due to their design or their failure pose a potential future threat to the patient if left in place (e.g. Telectronics ACCUFIX without protrusion). (Level of evidence: C)	<b>New</b>
3. Lead removal may be considered in patients with leads that are functional but not being used (i.e. RV pacing lead after upgrade to ICD). (Level of evidence: C)	<b>New</b>
4. Lead removal may be considered in patients who require specific imaging techniques (e.g. MRI) that can not be imaged due to the presence of the CIED system for which there is no other available imaging alternative for the diagnosis. (Level of evidence: C)	<b>New</b>
5. Lead removal may be considered in patients in order to permit the implantation of an MRI conditional CIED system. (Level of evidence: C)	<b>New</b>
Class III Indications <sup>1</sup>	Comments
1. Lead removal is not indicated in patients with functional but redundant leads if patients have a life expectancy of less than one year. (Level of evidence: C)	Similar to NASPE 2000 <sup>2</sup>
2. Lead removal is not indicated in patients with known anomalous placement of leads through structures other than normal venous and cardiac structures, (e.g. subclavian artery, aorta, pleura, atrial or ventricular wall or mediastinum) or through a systemic venous atrium or systemic ventricle. Additional techniques including surgical backup may be used if the clinical scenario is compelling. (Level of evidence: C)	Similar to NASPE 2000 <sup>2</sup>

## THROMBOSIS AND VENOUS STENOSIS

Class I Indications <sup>1</sup>	Comments
1. Lead removal is recommended in patients with clinically significant thromboembolic events associated with thrombus on a lead or a lead fragment. (Level of evidence: C)	Same as NASPE 2000 <sup>2</sup>
2. Lead removal is recommended in patients with bilateral subclavian vein or SVC occlusion precluding implantation of a needed transvenous lead. (Level of evidence: C)	Same as NASPE 2000 <sup>2</sup>
3. Lead removal is recommended in patients with planned stent deployment in a vein already containing a transvenous lead, to avoid entrapment of the lead. (Level of evidence: C)	<b>New</b>
4. Lead removal is recommended in patients with superior vena cava stenosis or occlusion with limiting symptoms. (Level of evidence: C)	<b>New</b>
5. Lead removal is recommended in patients with ipsilateral venous occlusion preventing access to the venous circulation for required placement of an additional lead when there is a contraindication for using the contralateral side (e.g. contralateral AV fistula, shunt or vascular access port, mastectomy). (Level of evidence: C)	<b>New</b>
Class IIa Indications <sup>1</sup>	Comments
1. Lead removal is reasonable in patients with ipsilateral venous occlusion preventing access to the venous circulation for required placement of an additional lead, when there is no contraindication for using the contralateral side. (Level of evidence: C)	Previously Class II

## CLASS DEFINITIONS

**Class I:** Conditions for which there is evidence and/or general agreement that a given procedure or treatment is useful and effective.

**Class II:** Conditions for which there is conflicting evidence and/or a divergence of opinion about the usefulness/efficacy of a procedure or treatment.

- **IIa:** Weight of evidence/opinion is in favor of usefulness/efficacy.
- **IIb:** Usefulness/efficacy is less well established by evidence/opinion.

**Class III:** Conditions for which there is evidence and/or general agreement that the procedure/treatment is not useful or effective, and in some cases may be harmful

Recommendations for lead extraction apply only to those patients in whom the benefits of lead removal outweigh the risks when assessed based on individualized patient factors and operator specific experience and outcomes.