

Guidelines for Lead Extraction

CATEGORY	INDICATION	CLASS
INFECTION	Pocket infection	I
	Occult gram-Positive Bacteremia	I
	Occult gram-Negative Bacteremia	IIa
CHRONIC PAIN	Severe chronic pain	IIa
OCCLUSION	Ipsilateral occlusion w/o contralateral contraindication	IIa
FUNCTIONAL LEAD	Due to design or failure, may pose immediate threat	I
	Risk of interference with device operation	IIb
	Due to design or failure poses potential future threat	IIb
	Functional leads not being used (ICD upgrade)	IIb
	Need MRI with no other imaging options	IIb
NON-FUNCTIONAL LEAD	Implant would require > 4 leads on one side or >5 leads through SVC	IIa
	Need MRI with no other imaging options	IIa
	Non-functional lead at device/lead procedure	IIb

St. Luke's
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St. Luke's-Roosevelt Hospital Center
1111 Amsterdam Avenue
New York, NY 10025

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The Al-Sabah
Arrhythmia Institute
at St. Luke's-Roosevelt
Hospital Center

Jonathan Steinberg, MD
Endowed Director

Suneet Mittal, MD
Director, EP Lab

Aysha Arshad, MD

Dan Musat, MD

Walter Pierce, MD

Mark Preminger, MD

Tina Sichrovsky, MD

NYC Private Office:
(212) 492-5550

NYC Hospital Office:
(212) 523-4007

FAX:
(212) 523-3915

Ridgewood, NJ:
(201) 251-9080

Montclair, NJ:
(201) 251-9080

Staten Island:
(718) 981-0396

Middletown, NY:
(845) 373-7400

Goshen, NY:
(845) 373-7400

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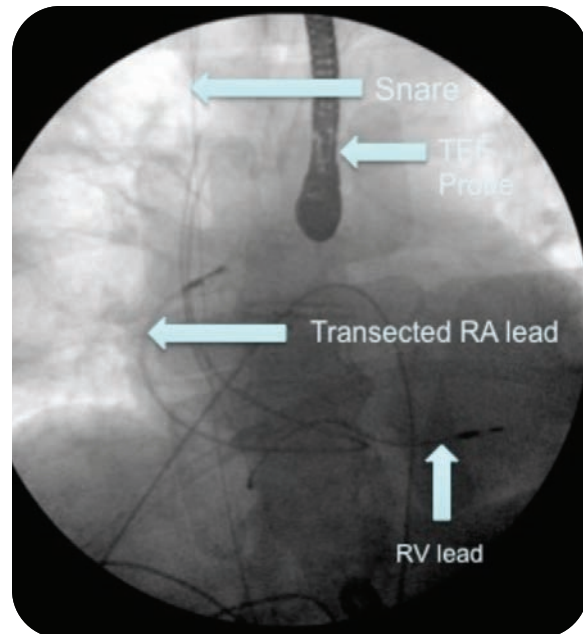
Update in Cardiac Lead Management

Over the past decade, there has been dramatic growth in the number of patients being implanted with a permanent pacemaker or cardioverter-defibrillator (ICD). The former is being driven by an increasingly older patient population; the latter by numerous randomized clinical trials showing conclusively the benefit of ICD therapy in patients at high risk for sudden death, and when combined with cardiac resynchronization therapy, for management of patients with advanced heart failure. However, amidst this rapid growth in implantation rates, there have been concerns about device and lead reliability, performance, and overall complications.

An important recent development has been the importance of extraction procedures to manage malfunctioning, abandoned, and infected leads. This past year, for the first time since 2000, the Heart Rhythm Society updated practice guidelines for transvenous lead extraction procedures. Although it has long been accepted that overtly infected leads can be managed only with extraction of all implanted hardware, the new guidelines emphasize that leads may need to be removed for the management of patients with chronic pocket pain, occult bacteremia, malfunctions, and to prevent abandonment when system revisions are necessary. While lead extraction has historically been thought of as a procedure with significant morbidity and mortality, the development of new technologies is allowing the procedure to be performed with a very low complication rate. For example, the LExICon (Lead Extraction in Contemporary Settings) study (1,449 patients at 13 centers) demonstrated that extraction using a laser sheath had a 98% clinical success rate with only 0.3% procedural mortality rate.

Lead Extraction Case Studies

As tools and technology evolve, a common question remains, when is it appropriate to refer for lead extraction? We present four common case scenarios and then summarize the guidelines of the Heart Rhythm Society for transvenous lead extraction procedures.



1. Sepsis or Endocarditis

82 year old with sick sinus syndrome referred with transected RA and RV pacing leads due to recurrent pacemaker pocket infection with polymicrobial bacteremia and sepsis. Both leads were removed via transfemoral snaring.

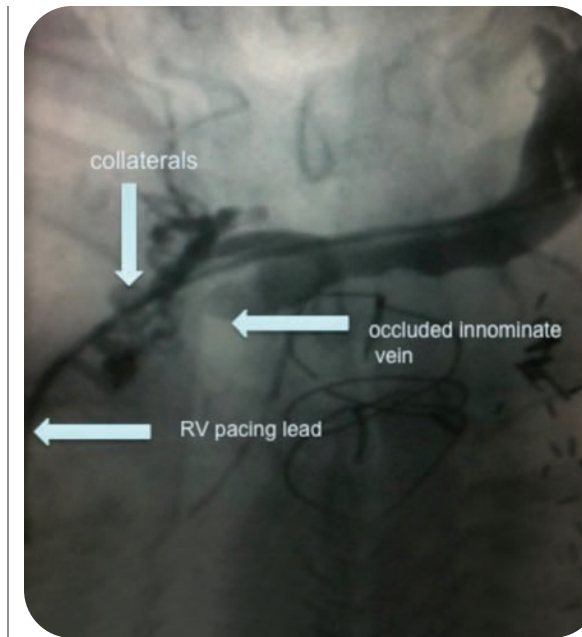
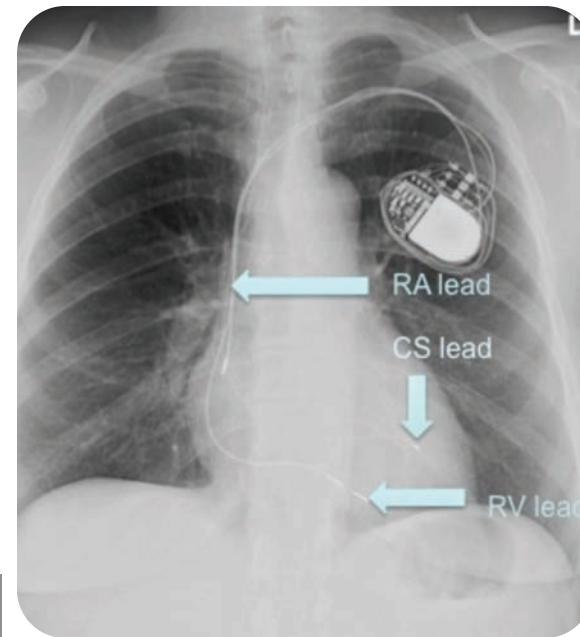
Fig. Two transected leads seen during transfemoral snaring procedure.



2. Localized device pocket infection

62 year old with diabetes, one month after elective generator change referred with swelling and erythema of ICD pocket on antibiotics. A single coil RV ICD lead was extracted.

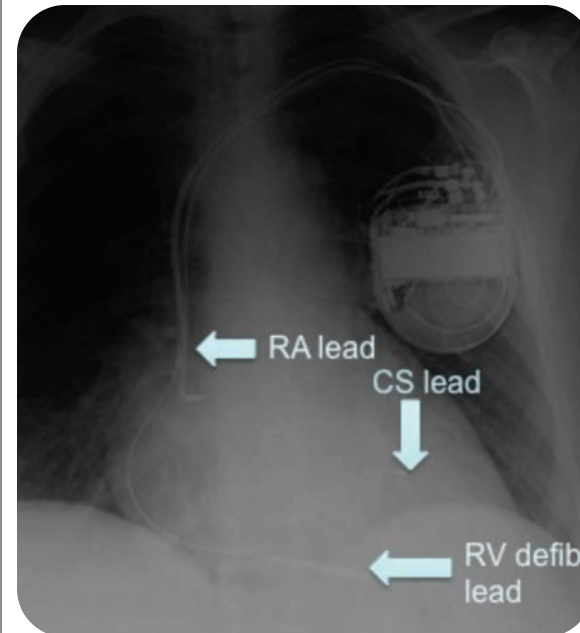
Fig. Indurated and erythematous ICD pocket.



4. Leads preventing access to ipsilateral venous circulation at the time of an upgrade.

66 year old pacemaker-dependent patient with progressive LV dysfunction and class 3 CHF referred for BIV-ICD upgrade and found to have ipsilateral innominate stenosis. The RV pacing lead was extracted and via laser sheath, venous access was retained and BIV-ICD upgrade was performed.

Fig. Complete occlusion of innominate vein with collaterals.



3. Non-functional leads in young patients (including damaged or malfunctioning leads or redundant leads at device upgrade)

40 year old with NICM, BIV-PPM referred due to ventricular tachycardia with syncope for BIV-ICD upgrade. RV pacing lead was extracted and RV defibrillation lead was implanted via the laser sheath.

Fig. RV pacing lead in RV apex. After laser extraction of this lead, an RV defibrillation lead was implanted.

In summary, lead extraction is a critical component of management of device complications and in expert hands, this procedure is both safe and highly effective in properly selected patients.

Please feel free to contact us if you have any questions or a referral for our lead extraction program.

*Transvenous Lead Extraction: Heart Rhythm Society Expert Consensus on Facilities, Training, Indications, and Patient Management. Wilkoff, B, Love CJ, Byrd C et al. Heart Rhythm 2009; 6:1085-1104

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