

Device lead extraction: Laser envy

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What we will learn

- Why we extract leads
- Techniques
- Indications
- Contraindications

Need for lead extraction

- Implantations of pacemakers, defibrillators are increasing.
- About 3 million Americans have cardiomyopathy
- 1 million have tachy therapy devices
- Over 2 million pacemakers implanted since 1960.



Symptoms of presentation

Incidence
-0.9-2.4%

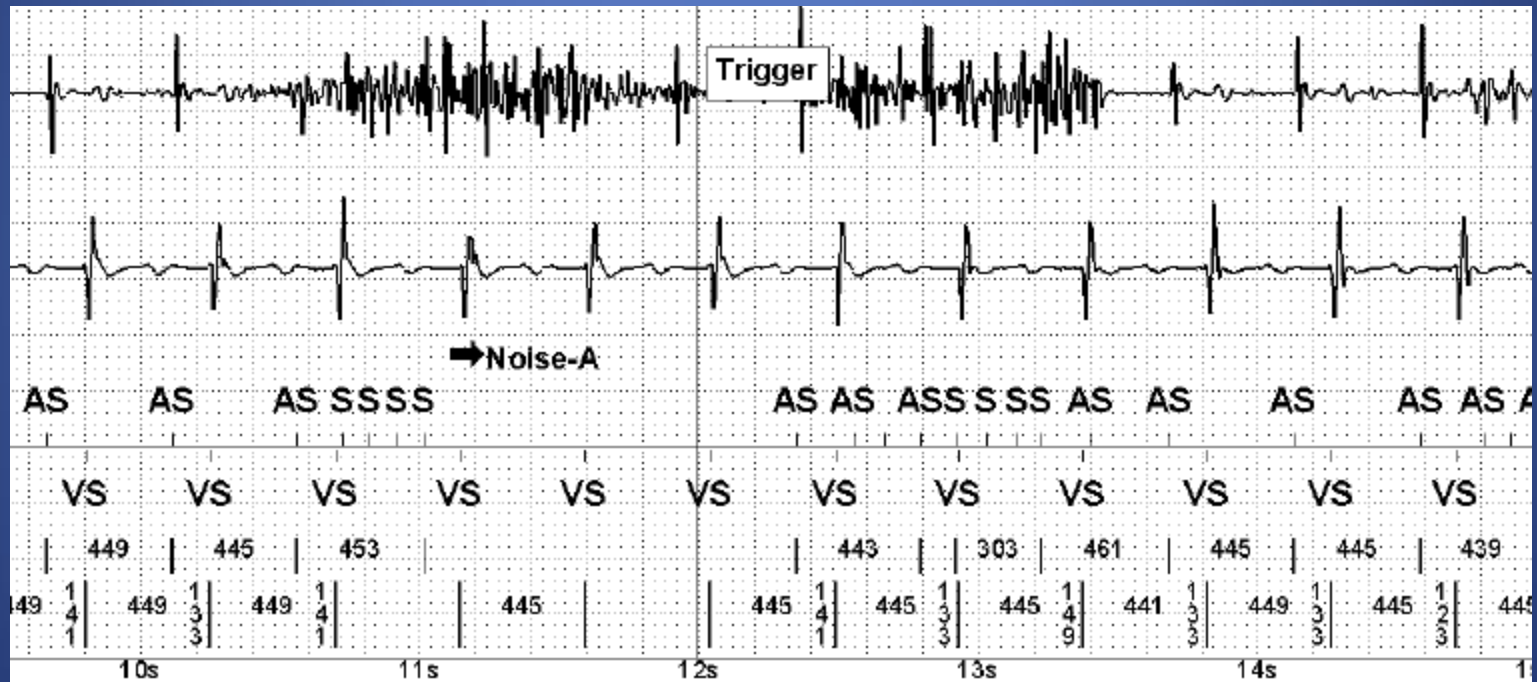
| Symptom | Pocket Infection (n = 47) | Systemic Infection (n = 10) |
|---------------------------|------------------------------|--------------------------------|
| Erythema, n (%) | 44 (93) | 3 (30) |
| Swelling, n (%) | 42 (89) | 3 (30) |
| Increased warmth, n (%) | 43 (85) | 3 (30) |
| Fever, n (%) | 37 (79) | 5 (50) |
| Skin ulceration, n (%) | 24 (51) | 2 (20) |
| Tenderness, n (%) | 24 (51) | 2 (20) |
| Fatigue, n (%) | 22 (47) | 5 (50) |
| Purulent discharge, n (%) | 20 (43) | 0 (0) |
| Chills, n (%) | 17 (36) | 4 (40) |
| Loss of appetite, n (%) | 16 (25) | 4 (40) |
| Nausea, n (%) | 5 (11) | 3 (30) |

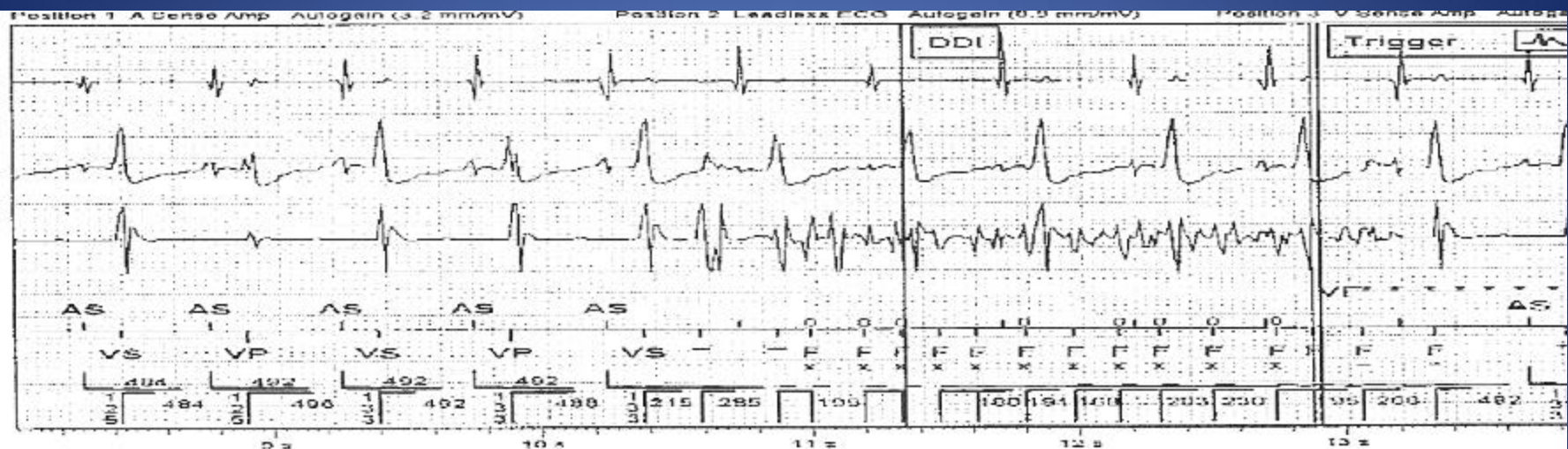
Abbreviations: ICD, implantable cardioverter defibrillator; n, number of patients; PM, permanent pacemaker.

Cabel et al AHA 2004

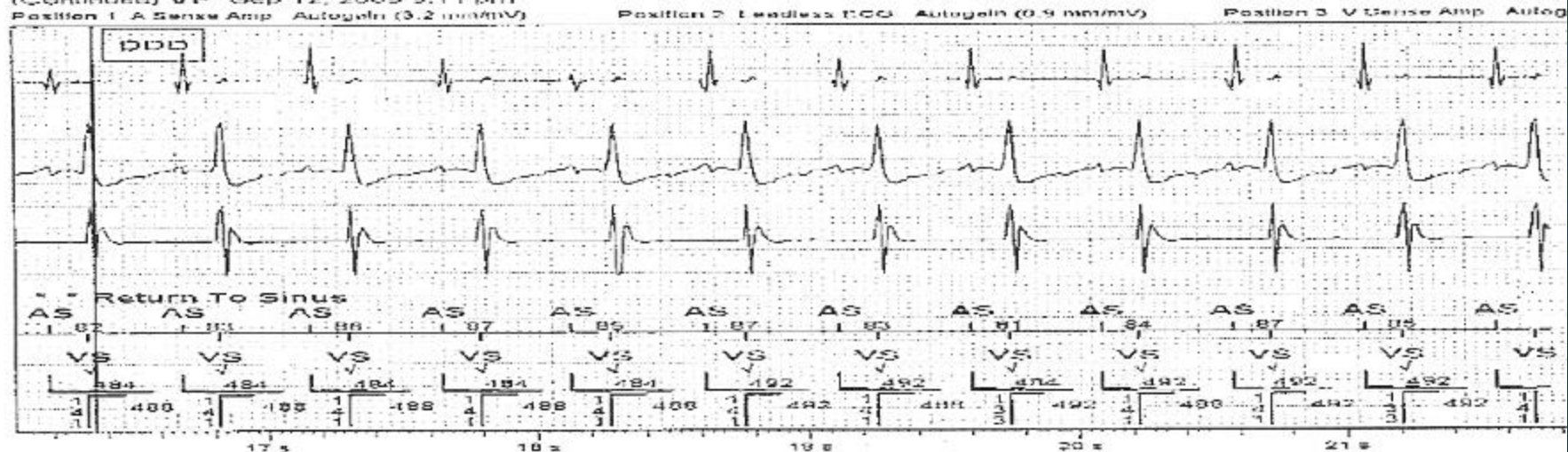
Cengiz et al Clinical cardiology 2010

30 yr old male with DCM





(Continued) VF Sep 12, 2009 9:11 pm



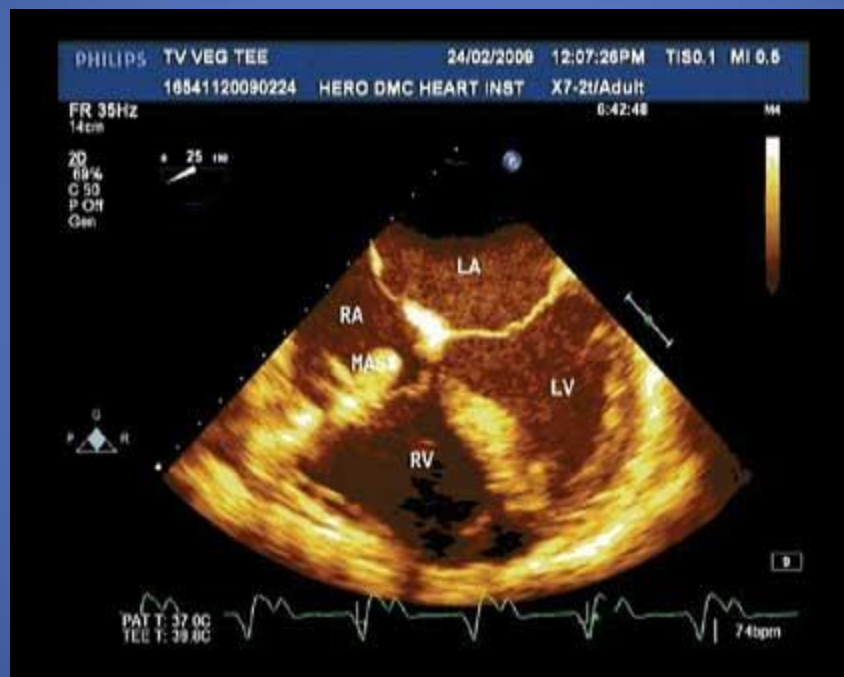
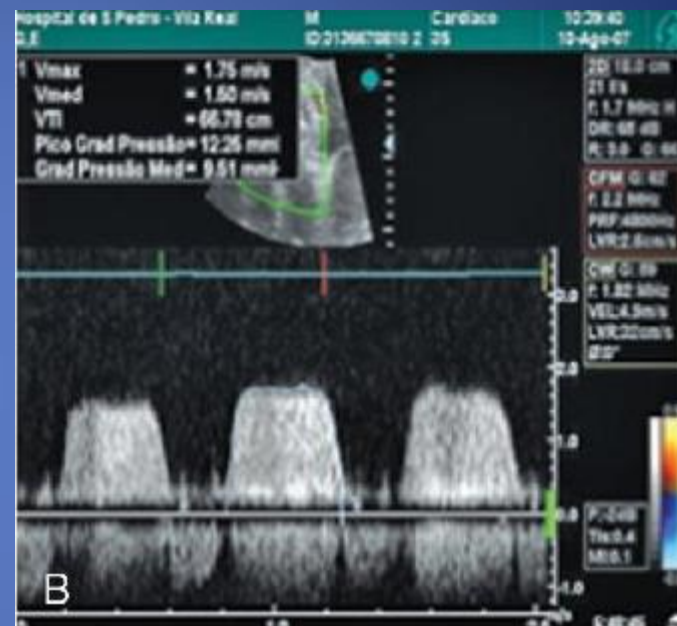
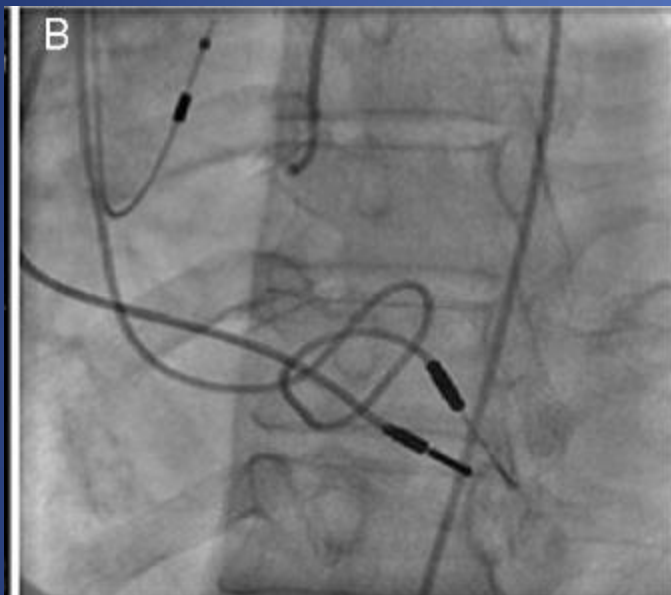
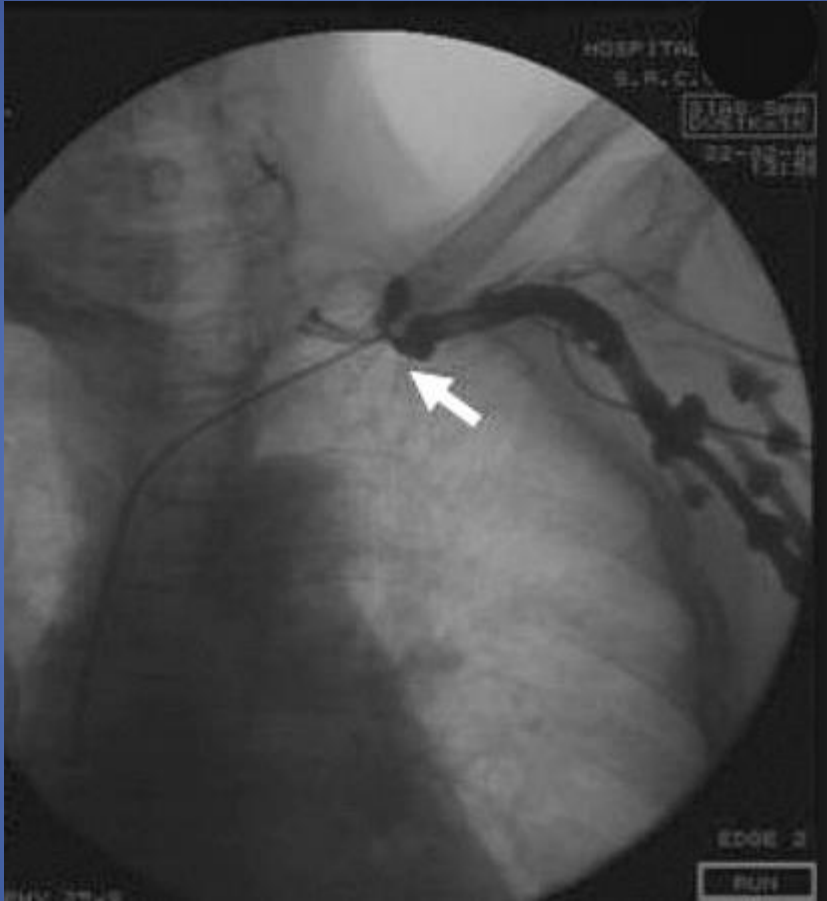


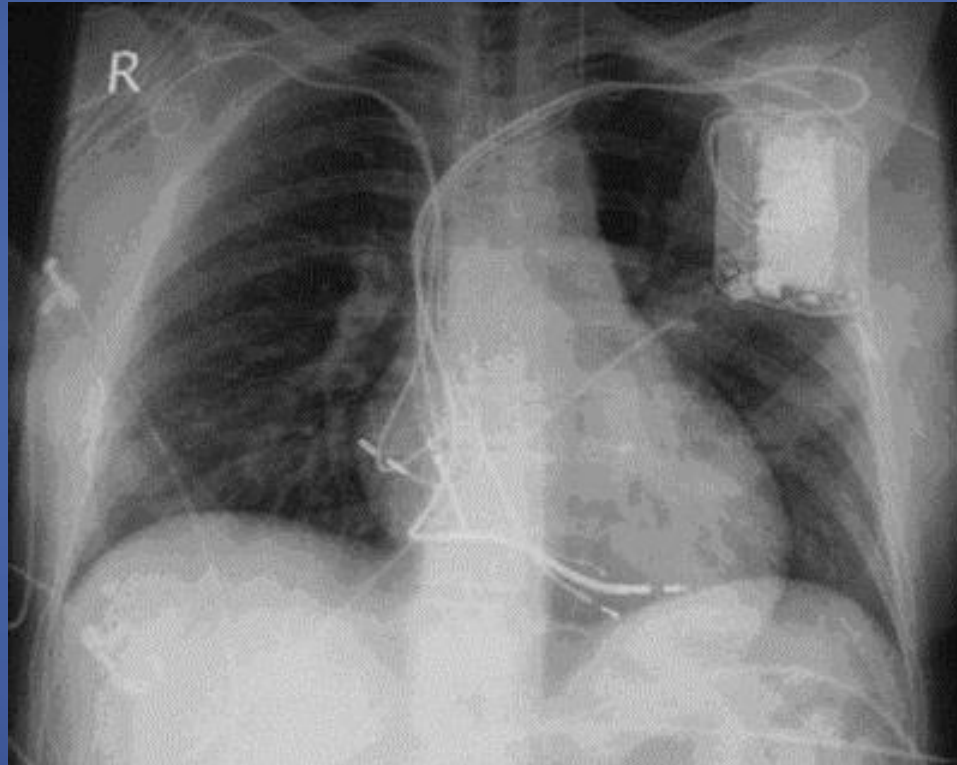
Fig. 3 : TEE 4 chamber view showing vegetation (Labelled as mass)

Valve interference



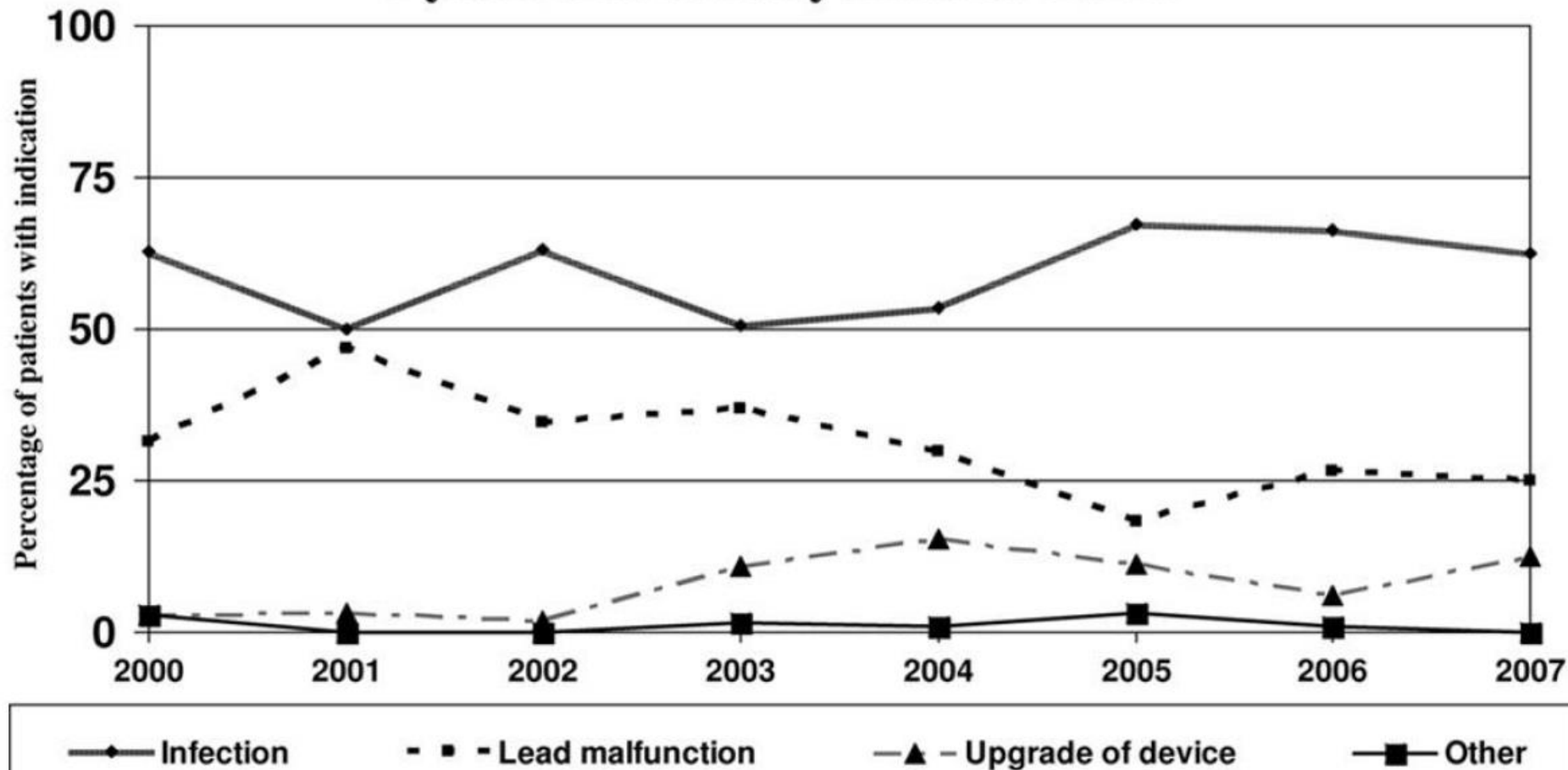


Multiple leads



Problems after implantation

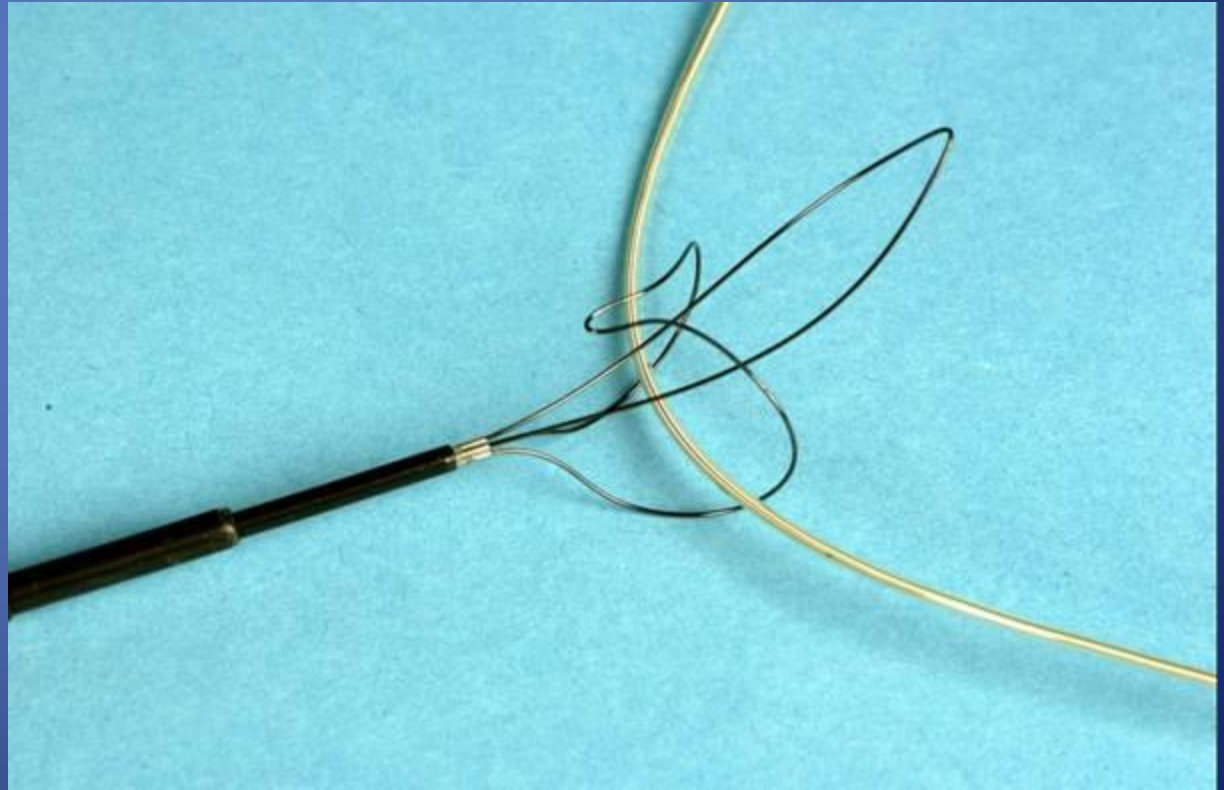
- Infection
- Lead malfunction
- Lead interference
- Mechanical obstruction



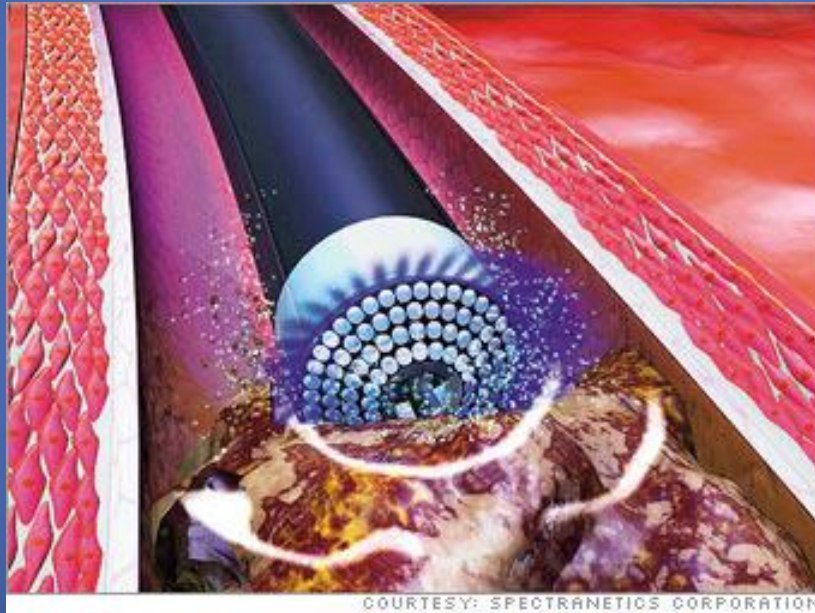


Lead extraction

- Mechanical traction
- Locking stylet
- Support sheaths – for counter-traction



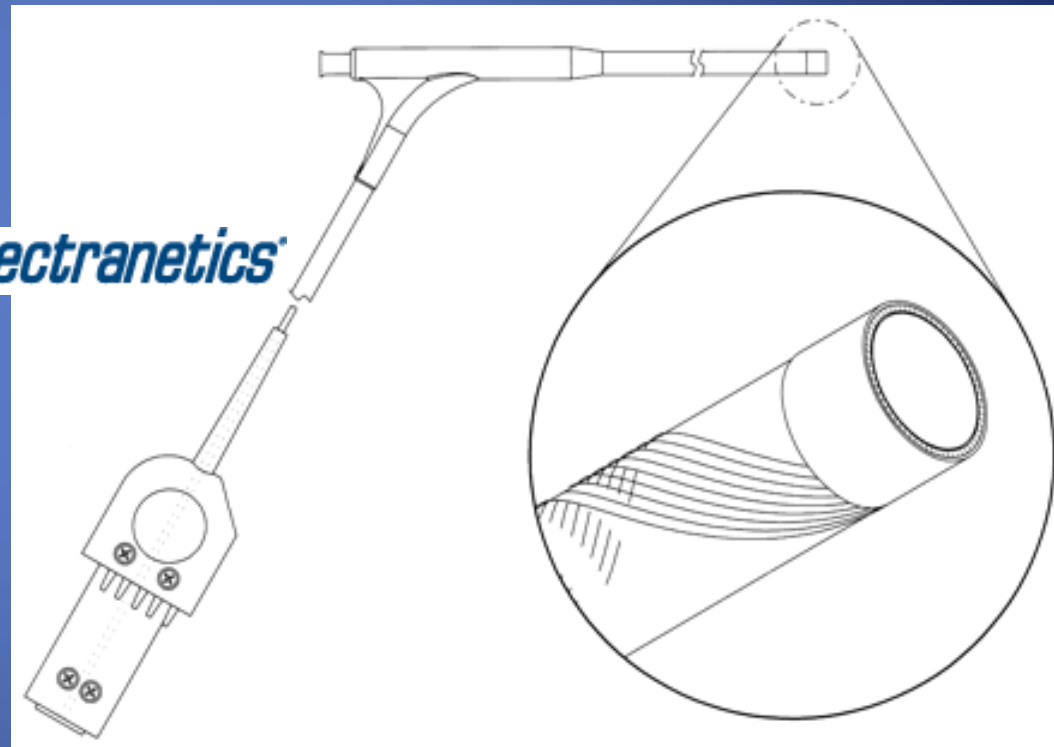
Laser lead extraction- exhimer laser



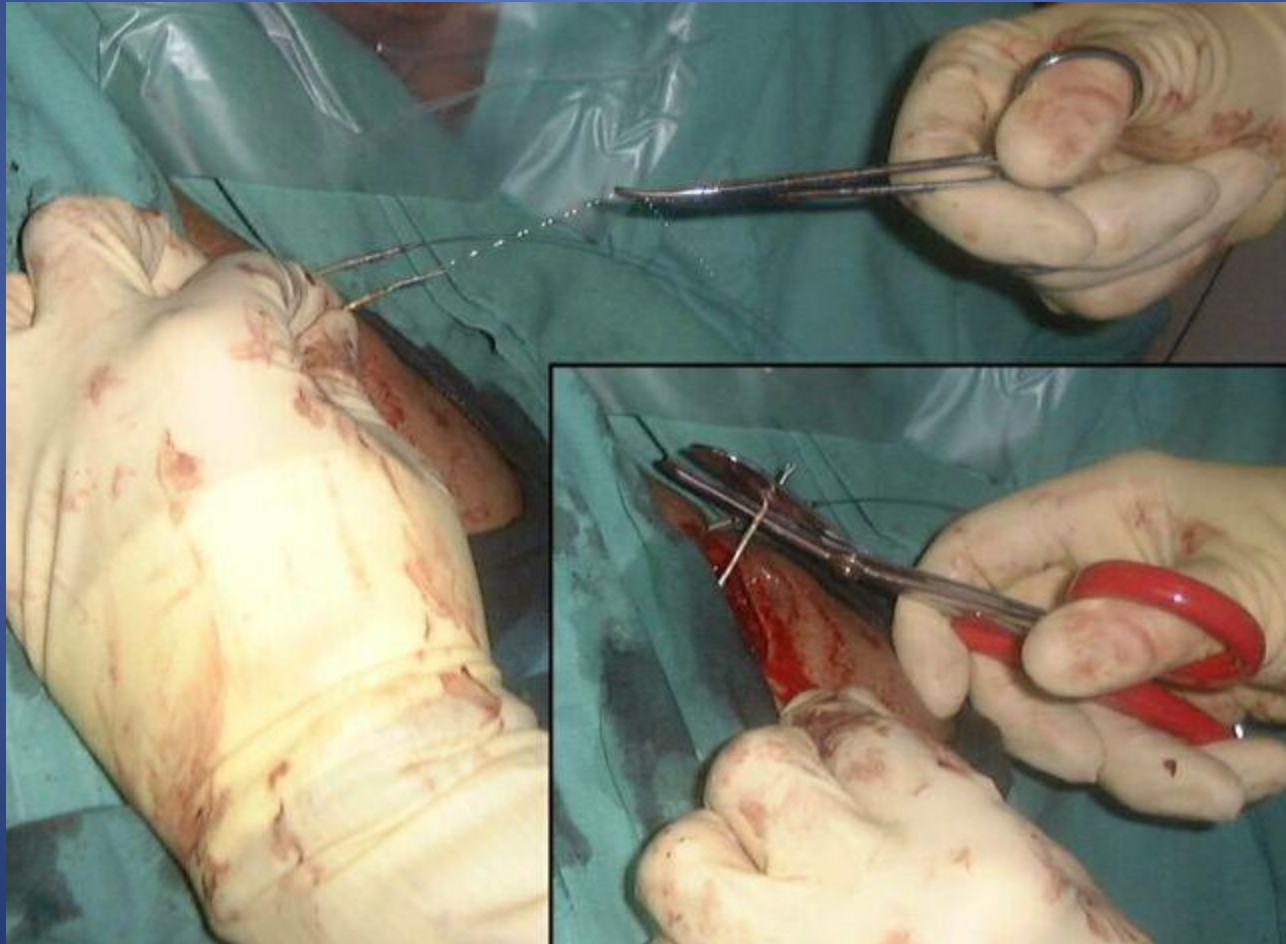
Extraction system



Spectranetics

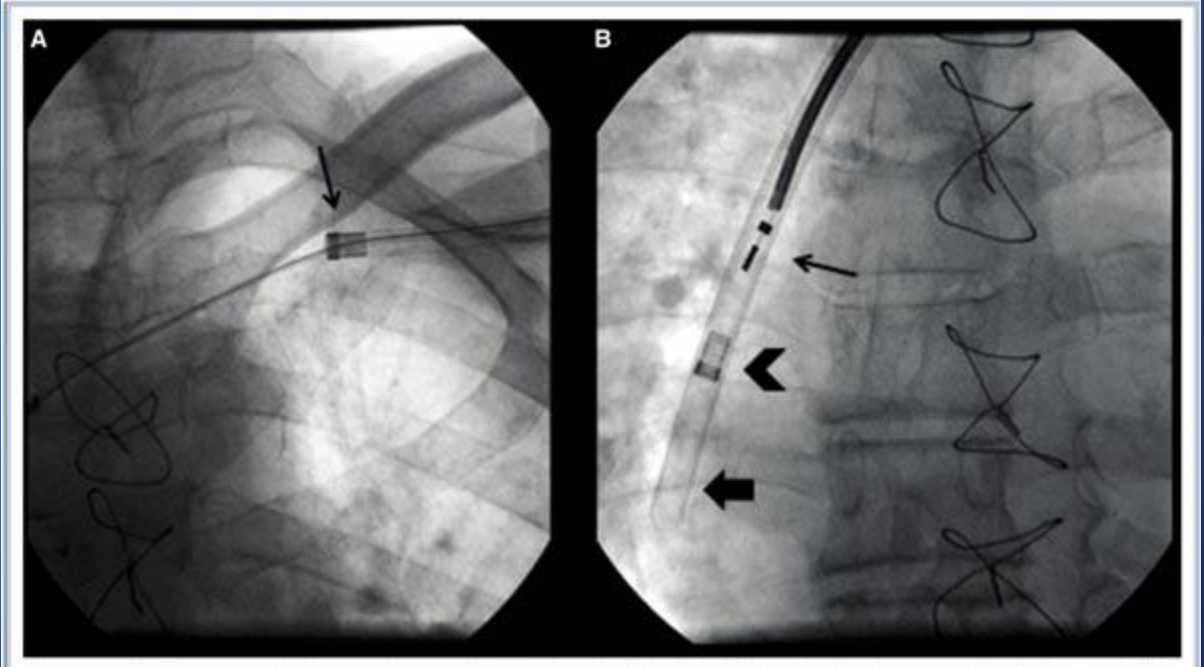


Shared with vascular



Liberator





Lead Extraction video

- [Lead Extraction](#)

PLEXES trial n= 465

- 94% w/laser vs 64% without laser
- 33% cross over to laser technique
- Mean 10.1 min vs 14.1 min
- Including cross over 23.7 ± 29 min

Complications

- Overall no difference between 2 arms
- Tamponade, Hemothorax, need for surgery, Death (2%/ 0.4%)
- Surgical extraction (4-5% mortality)
- Other potential problems – embolization of vegetations (uniform to all extraction)

Managing complications

- Simple mechanical traction with locking stylet (ref HR 2008 Jones et al)
- Leads 1-2 years old vs older leads
- Schedule in OR with surgical back up
- Plan for re-implantation –wiring ahead of time
- Keeping laser sheath parallel to vein

Mayo experience

- N=189
- 90% complete perc removal
- 10%- surgical
- 94% complete removal
- Complications: 20
- Valve damage, subclavian vein laceration, hemothorax, hematoma, fracture elad tip, massive bleed requiring surgery, death (1)
- 95% free of infection- 3 incomplete; 2 transvenous pacer

Indications

- Infective endocarditis
- Pocket infection as evidenced by pocket abscess, device erosion, skin adherence, or chronic draining sinus
- Gm positive bacteremia
- Gram neg bacteremia

CLASS III- when not to do-Infections

- CIED removal is not indicated for a superficial or incisional infection without involvement of the device and/or leads.
- CIED removal is not indicated to treat chronic bacteremia due to a source other than the CIED, when long-term suppressive antibiotics are required.

Other indications

- Chronic pain
- Venous occlusions
- SVC stenosis
- Contraindication in other side (shunts)
- Planned radiation
- Lead interference/ life threatening complications
- During upgrade
- To implant MRI compatible device

Contraindications

- Life expectancy < 1 year
- Leads through abnormal structures

When should I refer?

- Tenting of device
- Superficial erythema
- Infections
- Need for upgrade
- Device replacements
- Lead recalls/advisories
- Inappropriate shocks from lead malfunction

Summary

- Need for lead extractions- indications
- Contraindications
- Techniques
- Tertiary care center with experience