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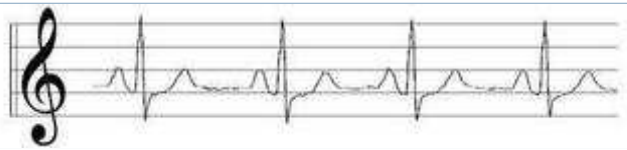
Extracció percutània de cables en dispositius cardíacs implantables. Què?, Qui?, Com?



Roger Villuendas Sabaté
Unitat d'Arítmies HUGTiP

- Què?
  - Magnitud de la tragèdia
  - Indicacions
- Qui?
  - Cirurgià o electrofisiòleg
  - Quiròfan o lab. electrofisiologia
  - Quins centres
- Com?
  - Tècniques

- Què?
  - Magnitud de la tragèdia
  -
-
  -
  -
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-
  -

L'epidemia de les infeccions de dispositius

Continued Rise in Rates of Cardiovascular Implantable Electronic Device Infections in the United States: Temporal Trends and Causative Insights

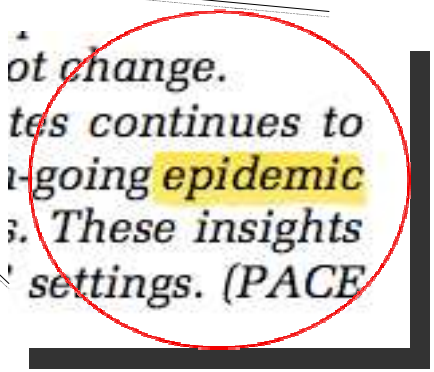
ANDREW VOIGT, M.D.,*,‡ ALAA SHALABY, M.D.,*,†,‡ and SAMIR SABA, M.D.*
From the *University of Pittsburgh and †Pittsburgh VA Health Care System, Pittsburgh, Pennsylvania

Background: *Cardiovascular implantable electronic device (CIED) infections have been increasing out of proportion to the number of devices implanted, based on data available through 2003. We investigated recent trends and possible causes of the increasing numbers of CIED infections.*

Methods: *We analyzed the occurrence of CIED infections and the associated changes in characteristics of CIED recipients, using the National Hospital Discharge Survey database from 1996 through 2006.*

Results: *The number of CIED implantations continued to increase after 2003 from 199,516 in 2004 to 222,940 in 2006, representing a 12% increment. In the same period, the number of CIED infections increased from 8,273 in 2004 to 12,979 in 2006, representing a 57% increment. From 1996 to 2006, comorbid illnesses in recipients of new CIED devices became more prevalent with an increasing percentage of patients with end-organ failures (6.5% in 1996 vs 8.0% in 2006, $P < 0.001$) and diabetes mellitus (14.5% in 1996 vs 16.5% in 2006, $P = 0.005$). The proportion of Caucasian recipients also decreased (65.6% in 1996 vs 57.6% in 2006, $P < 0.001$). During that same period, the number of implanted cardiac resynchronization devices increased dramatically while the age of CIED recipients did not change.*

Conclusion: *The number of patients with CIED-related infections in the United States continues to increase out of proportion to the increase in implantation rates. Possible causes for this on-going epidemic include sicker patients with varying racial backgrounds, and more complex procedures. These insights may help improve our ability to best select patients for CIED implantation in "real-life" settings. (PACE 2010; 33:414–419)*

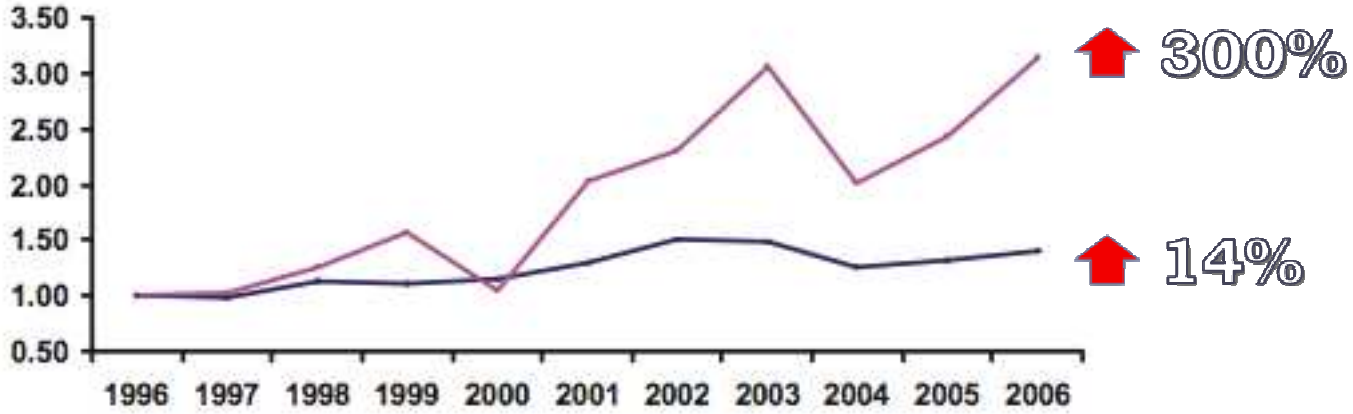


PACE 2010; 33:414–419)

Cada vegada hi ha més infeccions

Continued Rise in Rates of Cardiovascular Implantable Electronic Device Infections in the United States: Temporal Trends and Causative Insights

ANDREW VOIGT, M.D.,*,‡ ALAA SHALABY, M.D.,*,†,‡ and SAMIR SABA, M.D.*
From the *University of Pittsburgh and †Pittsburgh VA Health Care System, Pittsburgh, Pennsylvania



Year	Total CIED	Infected CIED	Percent Infected
2004	199,516	8,273	4.1%
2005	208,966	10,004	4.8%
2006	222,940	12,979	5.8%

	Infected CIED from 2004 to 2006 (N = 306)	Noninfected CIED Recipients from 2004 to 2006 (N = 6,527)	P value
National estimates of no. of patients	31,256	631,422	NA
Age (years)	67 ± 16	66 ± 16	0.195
Gender (Female)	34%	26%	0.008
White race	56%	54%	0.285
Length of stay (days)	11 ± 10	4 ± 3	<0.001
In-hospital death	5.2%	1.0%	<0.001

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PACE 2010; 33:414–419)

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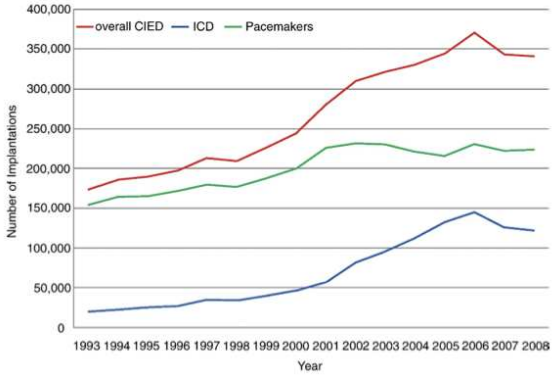
CLINICAL RESEARCH — Heart Rhythm Disorders

16-Year Trends in the Infection Burden for Pacemakers and Implantable Cardioverter-Defibrillators in the United States

1993 to 2008

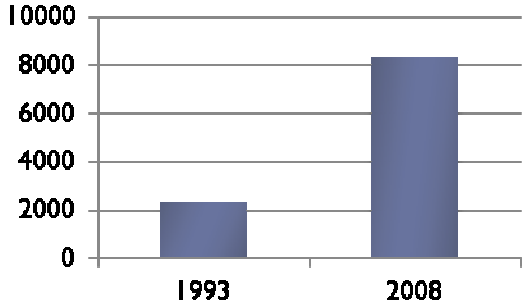
Arnold J. Greenspon, MD,* Jasmine D. Patel, PHD,†‡ Edmund Lau, MS,†‡ Jorge A. Ochoa, PHD,‡ Daniel R. Frisch, MD,* Reginald T. Ho, MD,* Behzad B. Pavri, MD,* Steven M. Kurtz, PHD†‡

Philadelphia, Pennsylvania



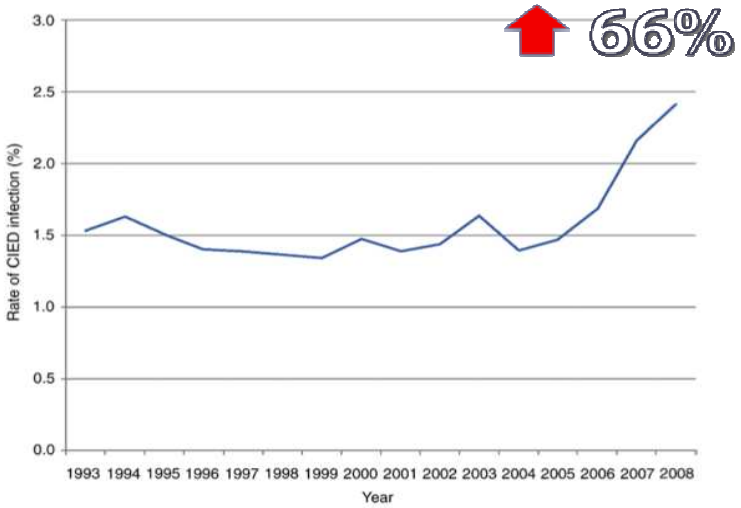
96%

Increment en nombre de dispositius

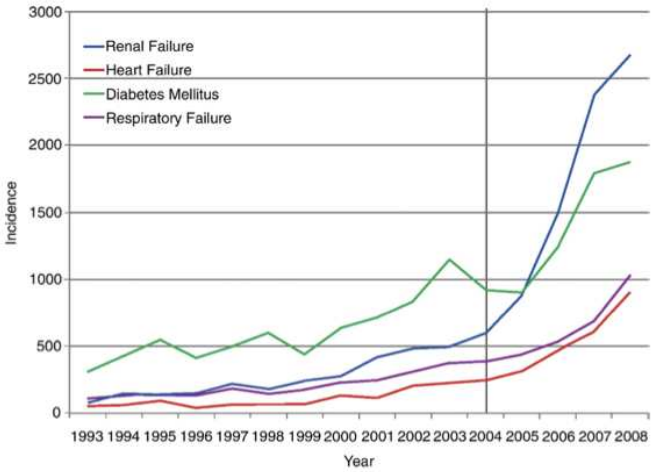


210%

Increment en nombre d'infeccions



Increment en proporció d'infeccions



Comorbilitats

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JACC Vol. 58, No. 10, 2011

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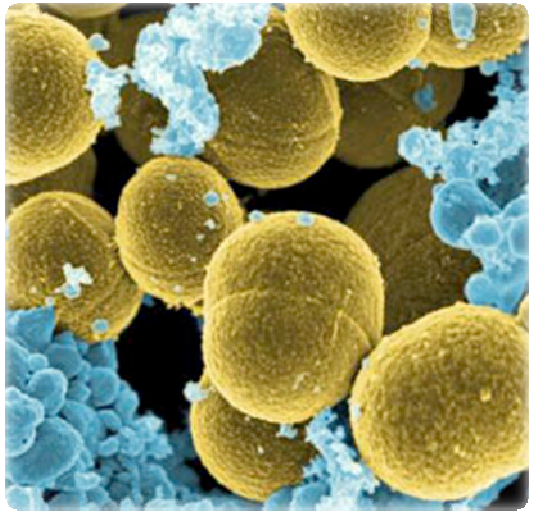
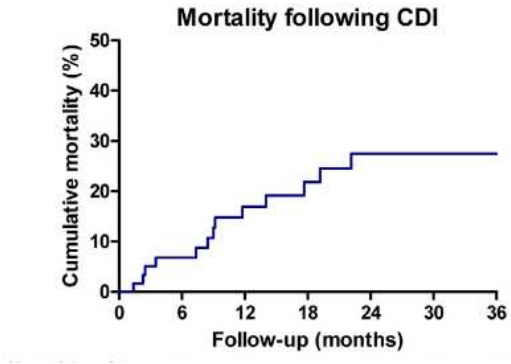
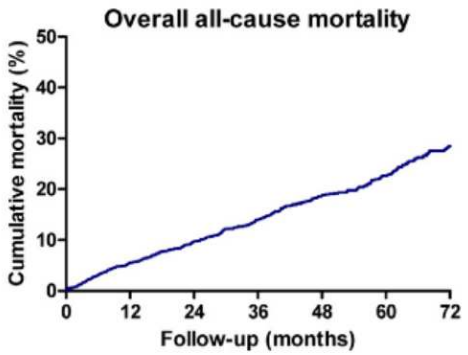
Per què hi ha més infeccions?

- Més recanvis
- Més actualitzacions ("upgrades")
- Procediments més llargs/complexes (DDD, TRC ...)
- Pacients majors
- Més comorbiditats (IC, IR, DM ...)
- Tècnica quirúrgica?
- Dispostius més grans (DAI, TRC)
- Dispositius de menor longevitat (DAI, TRC): més recanvis
- Més cables
- Mes "recalls"
- ...



Les infeccions augmenten la mortalitat >x2





Cardiac device infections are associated with a significant mortality risk

Mihály K. de Bie, MD,* Johannes B. van Rees, MD,* J. Thijssen, MD,*
C. Jan Willem Borleffs, MD, PhD,* Serge A. Trines, MD, PhD,* Suzanne C. Cannegieter, MD, PhD,†
Martin J. Schalij, MD, PhD,* Lieselot van Erven, MD, PhD*

*From the *Departments of Cardiology and †Clinical Epidemiology, Leiden University Medical Center, Leiden, The Netherlands.*

mained free of CDI (hazard ratio 1.87; 95% CI 1.07–3.26; $P = .027$). After adjustment for potential confounders (age, gender, renal clearance, and diabetes mellitus), the relative risk of all-cause mortality, associated with CDI, increased to 2.40 (95% CI 1.35–4.28; $P = .003$).

L'única solució eficaç és l'extracció...

Surgical Treatment of Pacemaker and Defibrillator Lead Endocarditis*

The Impact of Electrode Lead Extraction on Outcome

Ana del Río, MD; Ignasi Anguera, MD; José M. Miró, MD, PhD; Lluis Mont, MD, PhD; Vance G. Fowler, Jr., MD, MHS; Manel Azqueta, MD; Carlos A. Mestres, MD; and the Hospital Clínic Endocarditis Study Group†

Table 4—*Failure of Treatment or Mortality (Adverse Outcomes) According to Therapeutic Management

Treatment	Treated Patients	Cures/Relapses	Deaths	Overall Adverse Outcomes
Medical treatment†	7	0/7	1 (14)	7 (100)
Surgical treatment in patients with failed medical treatment	6	6/0	0 (0)	0 (0)
Surgical treatment as initial therapy	24	20/1	3 (13)	4 (17)
Percutaneous lead extraction	19	17/1	1 (5)	2 (10)
CPB	5	3/0	2 (40)	2 (40)
Global mortality	31		4 (13)	

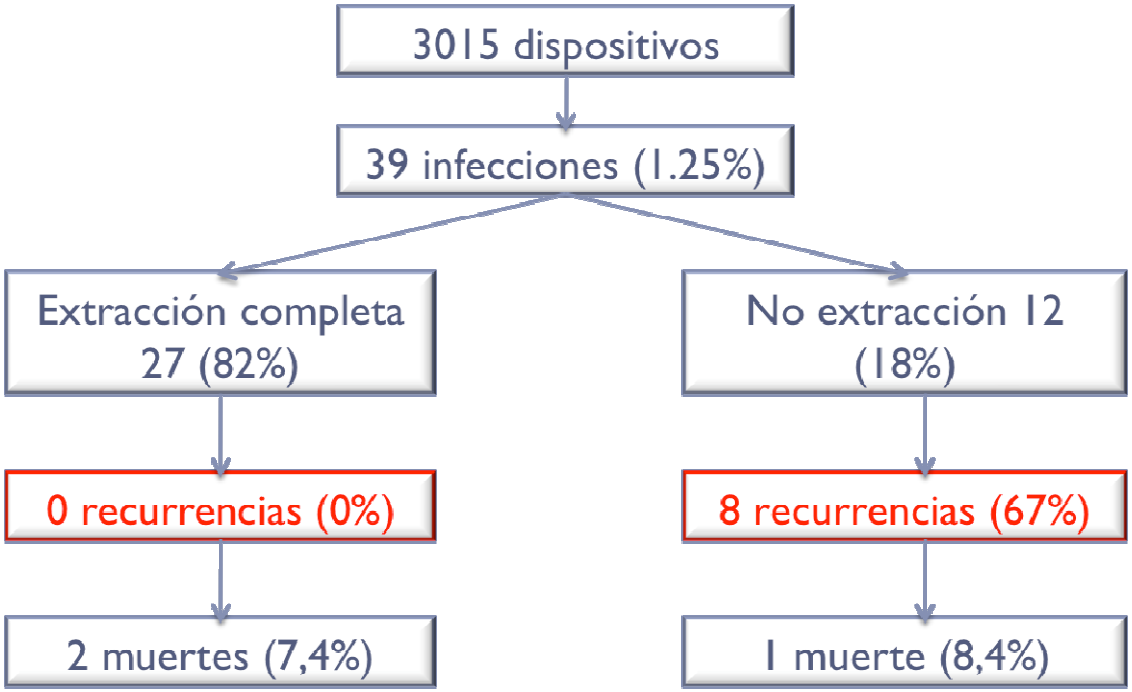
*Data are presented as No. or No. (%).

†Three patients had one relapse, two patients had two relapses, two patients had three relapses (one patient died without surgery).

Europace (2010) **12**, 64–70
doi:10.1093/europace/eup362

Contemporary management of and outcomes from cardiac device related infections

Ronan Margey[1]*, Hugh McCann[1], Gavin Blake[1], Edward Keelan[1], Joseph Galvin[1], Maureen Lynch[2], Niall Mahon[1], Declan Sugrue[1], and James O'Neill[1]



… i quan abans millor

Impact of timing of device removal on mortality in patients with cardiovascular implantable electronic device infections

Katherine Y. Le, MD, MPH,* Muhammad R. Sohail, MD,† Paul A. Friedman, MD,‡ Daniel Z. Uslan, MD,§ Stephen S. Cha, MS,‖ David L. Hayes, MD, FHRS,‡ Walter R. Wilson, MD,† James M. Steckelberg, MD,† Larry M. Baddour, MD,† for the Mayo Cardiovascular Infections Study Group

*From the *Mayo School of Graduate Medical Education, Mayo Clinic, Rochester, Minnesota; †Divisions of Infectious Diseases and ‡Cardiovascular Diseases, ‖Biostatistics and Informatics, Department of Medicine, Mayo Clinic, Rochester, Minnesota; and §Division of Infectious Diseases, Department of Medicine, David Geffen School of Medicine, University of California Los Angeles, California.*

Table 4 Multivariate Cox proportional hazard models depicting the relationship between device removal and mortality

	30-day mortality		1-year mortality	
	HR (95% CI)	*P*	HR (95% CI)	*P*
Model 1*				
High-risk device removal candidate				
Yes	5.52 (1.31–23.14)	0.019	3.12 (1.19–8.19)	0.02
No	Referent		Referent	
Model 2†				
Antimicrobial therapy alone	6.97 (1.36–35.60)	0.019	1.61 (0.37–6.86)	0.518
Antimicrobial therapy with complete device removal	Referent		Referent	
Model 3*				
Device removal complication				
Yes	4.33 (1.47–12.70)	0.007	3.77 (1.88–7.55)	<.001
No	Referent		Referent	
Model 4‡				
Immediate device removal				
Yes	0.76 (0.16–3.60)	0.738	0.35 (0.16–0.75)	0.007
No	Referent		Referent	

- Què?
  -
  - Indicacions
-
  -
  -
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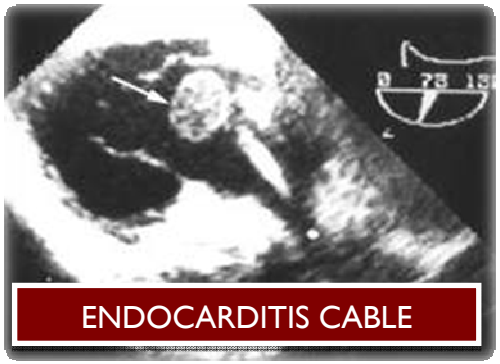
-
  -

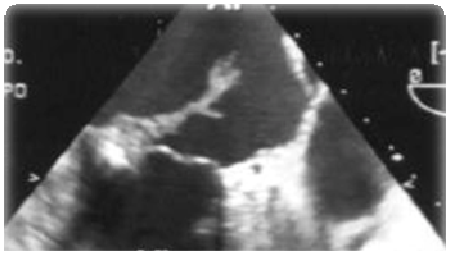
Indicacions: infecció sistèmica

I



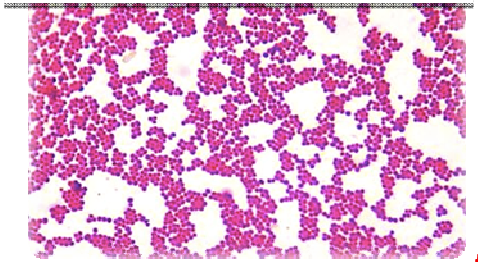
ENDOCARDITIS CABLE

SEPSIS

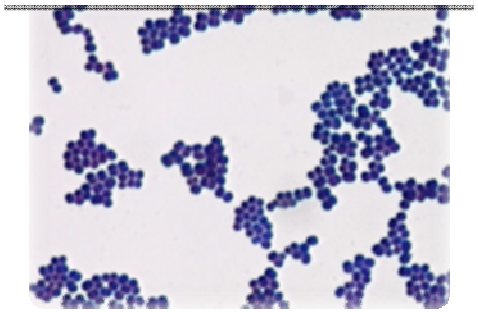


ENDOCARDITIS VALVULAR

BACTERIEMIA CGP



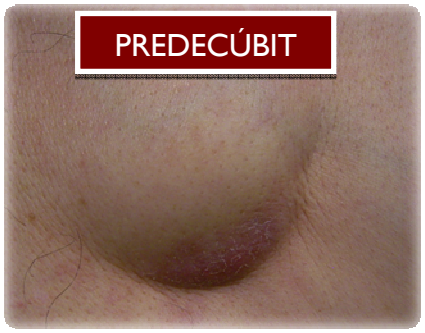
BACTERIEMIA CGN



IIa

Indicacions: infecció local

I

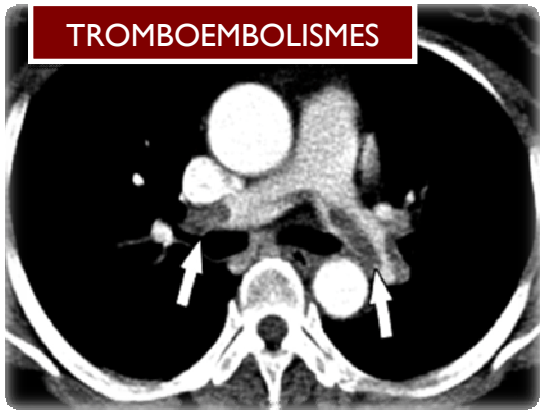


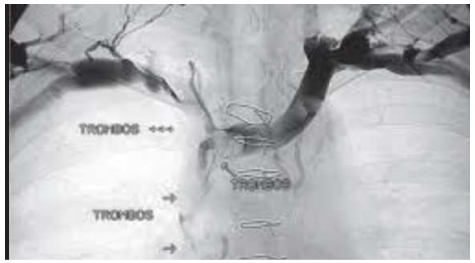
Heart Rhythm, Vol 6, No 7, July 2009

Indicacions: trombosi venosa

I

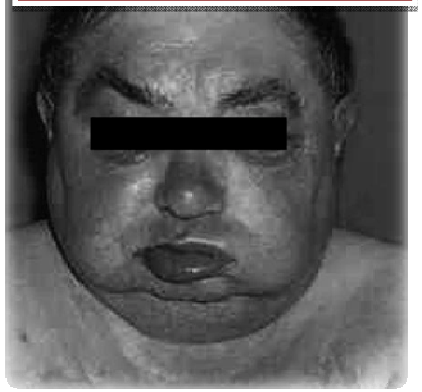
TROMBOEMBOLISMES





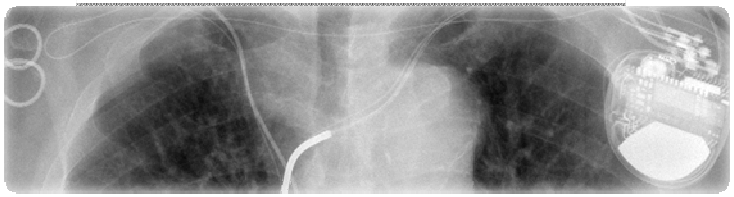
OCLUSIÓ UNI O BILATERAL QUE IMPEDEIX IMPLANT

OCLUSIÓ BILATERAL SIMPTOMÀTICA



IIa

OCLUSIÓ UNILATERAL QUE NO IMPEDEIX IMPLANT CL



Heart Rhythm, Vol 6, No 7, July 2009

Indicacions: cables innecesaris

- **Clase I (recomanat)**
  - Arítmies severes
  - Interferència amb elèctrodes operatius
  - Interferència amb tractament de càncer (radioteràpia)
- **Classe IIa (raonable)**
  - Més de 4 elèctrodes en un costat, més de 5 elèctrodes cava superior
- **Classe IIb (és podria considerar)**
  - Risc d'interferència amb DAI
  - Elèctrodes funcionals però que no s'utilitzaran
  - Interferència amb RM si no hi ha alternatives (??)
- **Classe III (no indicat)**
  - Expectativa de vida menor d'un any
  - Posició elèctrode anòmala travessant estructures no venoses (artèria subclàvia, aorta, pleura, paret ventricular, paret auricular, mediastí).

- Com?
  - Tècniques

Alliberació bucles de la butxaca

↓

Eliminació material protèsic (manegot, sutures)

↓

Tracció simple amb estilet

↓

Secció del cable

↓

Estilet de bloqueig: punt recolzament+ carril

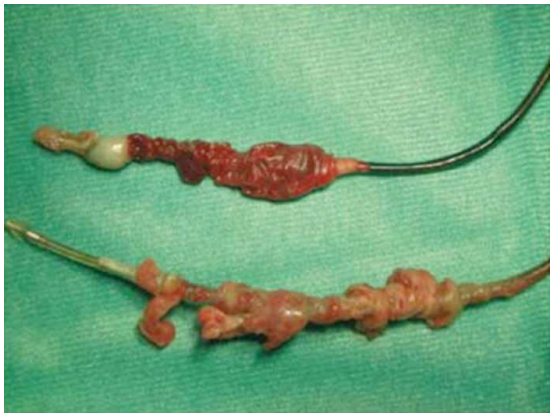
↓

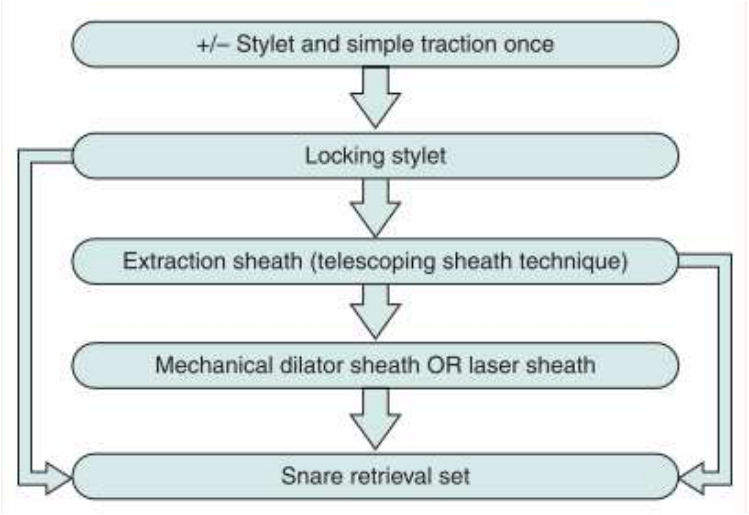
Beina de dissecció:

-Tefló/polipropilè/acer

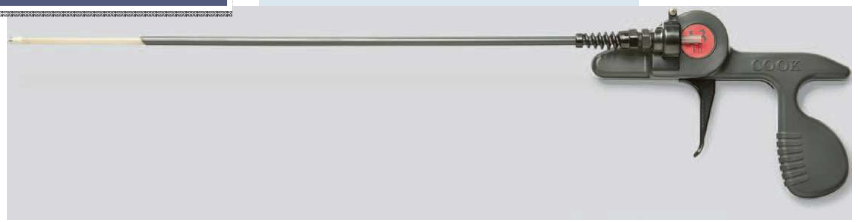
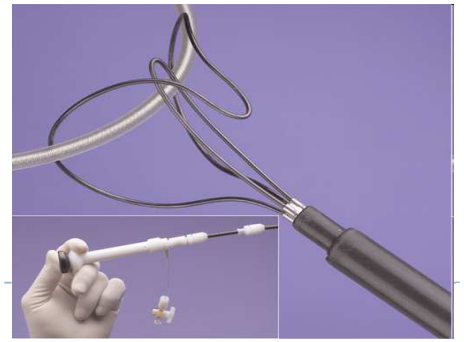
- Rotació mecànica

-Làser/ radiofreqüència





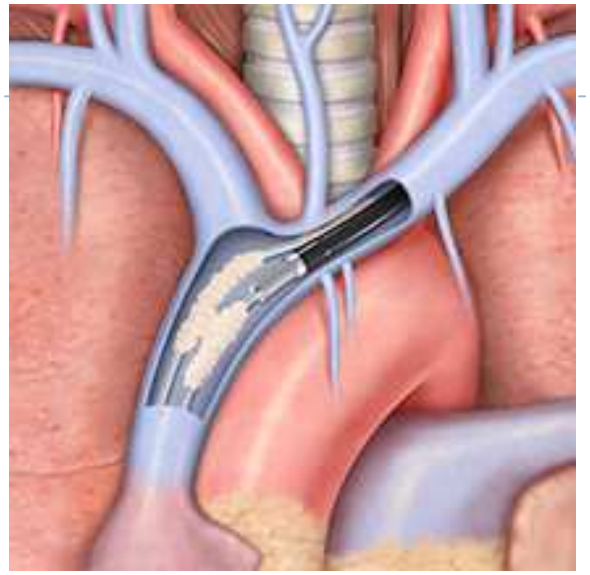
Byrd CL, Pacing Clin Electrophysiol. 1990;13(pt 2):1871–1875.

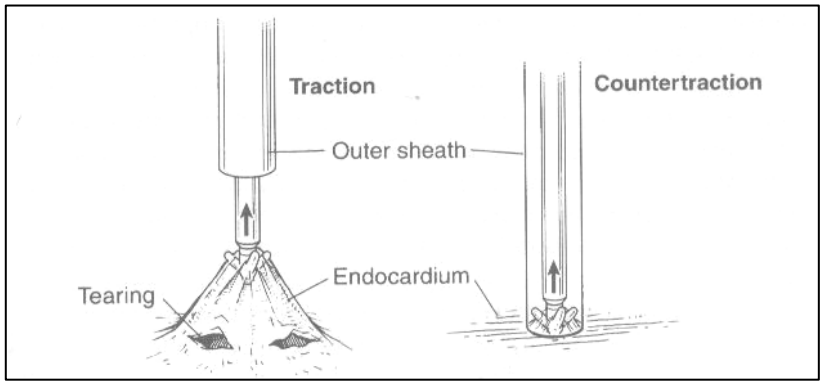
- Tracció simple → 
- Estilet de bloqueig → 
- Beina de disecció mecànica rotacional → 
- Ganxo femoral → 

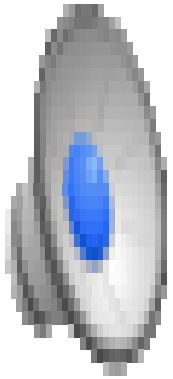
Estilet de bloqueig o de tancament

Importantíssim:
- Evita ”estirar de la silicona" o estirar el conductor
- El cable ha d’estar íntegre (no elongat ni tallat)
- Eficaç si sol per
- Imprescindible el pas 3

Beinas de disecció mecànica rotacional







Eficàcia mètodes d'extracció mecànica rotacional

Evolution in Transvenous Extraction of Pacemaker and Implantable Cardioverter Defibrillator Leads Using a Mechanical Dilator Sheath

ALI OTO, M.D.,* KUDRET AYTEMIR, M.D.,* UĞUR CANPOLAT, M.D.,* HIKMET YORGUN, M.D.,† LEVENT ŞAHINER, M.D.,* ERGÜN BARIŞ KAYA, M.D.,* GIRAY KABAKÇI, M.D.,* and LALE TOKGÖZOĞLU, M.D.*

From the *Department of Cardiology, Hacettepe University Faculty of Medicine, Ankara, Turkey; and †Develi State Hospital, Kayseri, Turkey

Table III.

Success Rates and Adverse Events Related with Extraction Procedures

Success rates	n (%)
Clinical success	65 (98.5)
Complete success without further extraction tools	58 (87.9%)
Complete success with additional use of femoral snare	63 (95.5)
Procedure abandoned because of complications	1 (1.5)
Major complications directly related to lead extraction	
Subclavian vein tear that requiring thoracotomy and surgical repair	1 (1.5)
Minor complications directly related to lead extraction	
Pericardial effusion not requiring pericardiocentesis or surgical intervention	1 (1.5)
Hematoma at the surgical site requiring re-operation for drainage	1 (1.5)
Other adverse events	
Atrial fibrillation requiring cardioversion	2 (3.0)
Transient hypotension that spontaneously resolved	1 (1.5)

PACE 2012; 35:834–840

Làser

Initial experience of pacemaker and implantable cardioverter defibrillator lead extraction with the new GlideLight 80 Hz laser sheaths

Samer Hakmi[a,*], Simon Pecha[a], Björn Sill[a], Beate Reiter[a], Stephan Willems[b], Muhammet Ali Aydin[b], Yalin Yildirim[a], Hermann Reichenspurner[a] and Hendrik Treede[a]

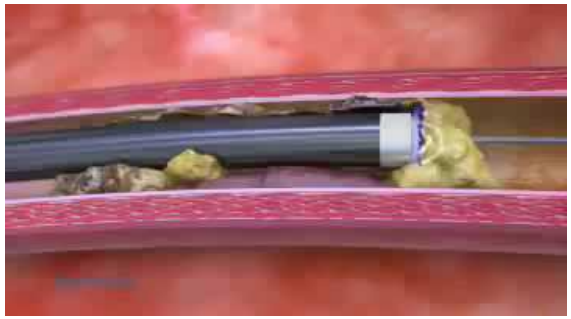
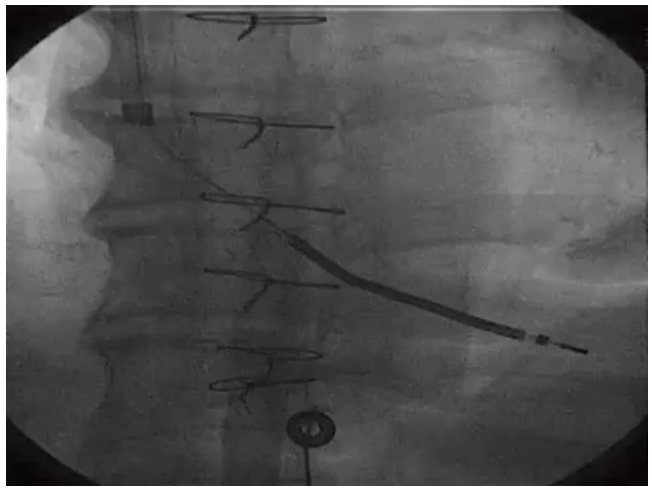


Table 4: Results and complications

Number of treated leads	*n* = 76
Extraction, *n* (%)	
Complete	72 (94.8%)
Partial	2 (2.6%)
Failure	2 (2.6%)
Number of treated patients	*n* = 38
Complications, *n* (%)	
Emergent sternotomy for SVC perforation	1 (2.6%)
Pocket haematoma	1 (2.6%)
Death	0 (0%)
Clinical success of procedure	36 of 38



Germans Trias i Pujol Hospital

Interact Cardiovasc Thorac Surg. 2014 Jan;18(1):56-60

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Mecànica rotacional vs. làser

Transvenous lead extractions: comparison of laser vs. mechanical approach

Christoph T. Starck[1]*, Hector Rodriguez[1], David Hürlimann[2], Jürg Grünenfelder[1], Jan Steffel[2], Sacha P. Salzberg[1], and Volkmar Falk[1]

Table 2 Results of leads with an implant duration of 12 months and more with regard to the different groups (group A = no specific extraction tools, Group B = laser extraction approach, Group C = mechanical extraction approach; n.s. = not significant)

	Group A (n = 41)	Group B (n = 39)	Group C (n = 99)	P value
Mean implant duration (months)	38.1 (19–122)	83.1 (13–168)	95.4 (12–384)	A vs. B: $P < 0.0001$ A vs. C: $P < 0.0001$ B vs. C: n.s.
Ratio of ICD leads	26.8%	69.2%	37.4%	A vs. B: $P < 0.0001$ A vs. C: n.s. B vs. C: $P = 0.001$
Complete procedural success	100% (41)	76.9% (30)	88.9% (88)	A vs. B: $P < 0.0001$ A vs. C: $P = 0.005$ B vs. C: n.s.
Clinical success	100% (41)	76.9% (30)	97.0% (96)	A vs. B: $P = 0.001$ A vs. C: n.s. B vs. C: $P = 0.018$
Operative Mortality	0	0	0	n.s.
Minor complications	2	2	3	n.s.
Major complications	0	0	2	n.s.

Europace (2013) 15, 1636–1641

Mecànica rotacional vs. làser

Table 1 Clinical and technical characteristics according to the use of laser or evolution system

	Laser system (n = 73)	Evolution system (n = 48)	
Age (years)	60.2 ± 14.2	65.4 ± 14.4	0.054
Males (%)	79.5	77.1	0.75
Device type			
PM	17.8	23.4	0.82
ICD	34.2	27.7	
CRT-P	2.7	2.1	
CRT-D	45.2	46.8	
LE indication			
Infection	78.1	75	0.11
Lead malfunction	19.2	18.8	
System upgrade	2.7	0	
Others	0	6.3	
No. of leads existed	2.53 ± 0.8	2.83 ± 1.1	0.098
No. of lead extracted	2.4 ± 0.9	2.77 ± 1.1	0.049
First implant duration	62.4 ± 42.1	101.1 ± 66.4	0.001

PM, pacemaker; ICD, implantable cardioverter defibrillator; CRT, cardiac resynchronization therapy.

Advanced techniques for chronic lead extraction: heading from the laser towards the evolution system

Patrizio Mazzone*, Dimitris Tsiachris, Alessandra Marzi, Giuseppe Ciconte, Gabriele Paglino, Nicoleta Sora, Simone Gulletta, Pasquale Vergara, and Paolo Della Bella

Table 3 Procedural characteristics according to the use of laser or evolution system

	Laser system (n = 73)	Evolution system (n = 48)	P
Use of snare (%)	8.2	27.1	0.005
Procedural success (%)	97.3	91.7	0.16
Clinical success (%)	98.6	97.9	0.76
Major complication (%)	2.7	4.2	0.66
Minor complication (%)	5.5	4.2	0.76

Només beines manuals + múltiples accesos venosos

Transvenous removal of pacing and implantable cardiac defibrillating leads using single sheath mechanical dilatation and multiple venous approaches: high success rate and safety in more than 2000 leads

Maria Grazia Bongiorni*, Ezio Soldati, Giulio Zucchelli, Andrea Di Cori, Luca Segreti, Raffaele De Lucia, Gianluca Solarino, Alberto Balbarini, Mario Marzilli, and Mario Mariani

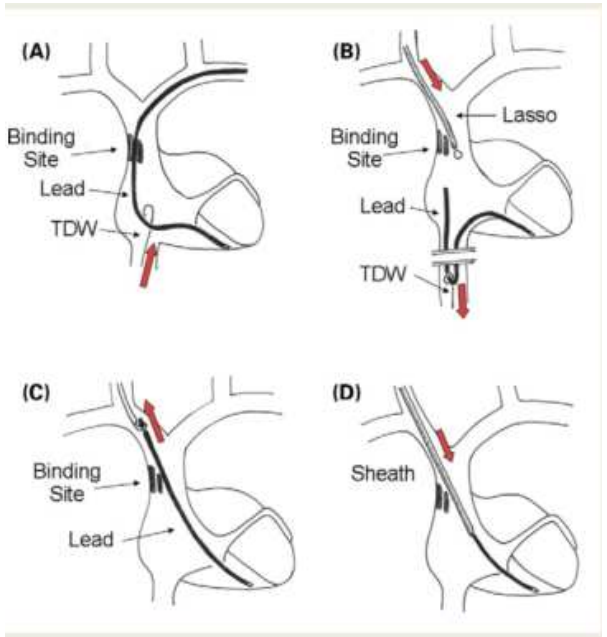

Table 3 Procedural patients and leads overall outcome

Removal	A and RV PL	LV PL	ICD L	Total	%
Complete	1723	72	237	2032	98.4
Partial	18	–	–	18	0.9
Failed	12	–	–	12	0.6
TLR not applicable	3	–	–	3	0.2
Complications		Tamponade	Hemothorax		
Major		7	1	8	0.7
Fatal		2	1	3	0.3
Not fatal		5	–	5	0.4

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Bongiorni, European Heart Journal (2008) 29, 2886–2893

iCor.cat

Només ganxo femoral

The Needle's Eye Snare as a primary tool for pacing lead extraction

Frank A. Bracke*, Lukas Dekker, and Berry M. van Gelder

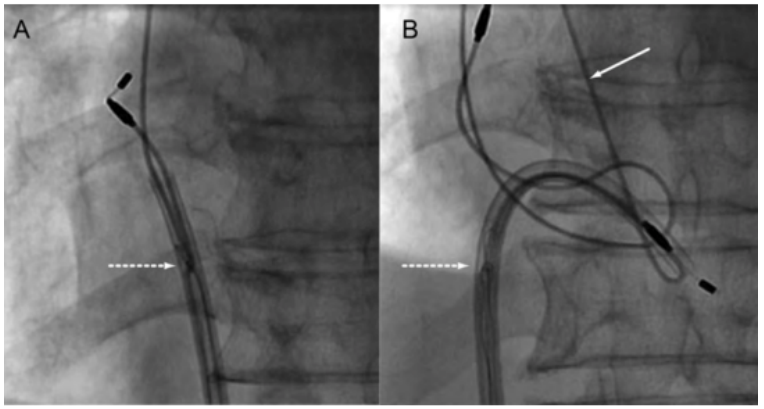

Table I Results of extraction

	Traction (136 leads)			Needle's Eye Snare (340 leads)		
	A	RV	CS	A	RV	CS
All	62 (4.0 ± 2.8)	52 (3.5 ± 2.8)	22 (3.3 ± 3.2)	144 (9.1 ± 5.9)	182 (9.5 ± 6.1)	14 (6.0 ± 3.5)
Complete success	–	–	–	143 (9.0 ± 5.4)	164 (9.2 ± 6.0)	14 (6.0 ± 3.5)
Partial success	–	–	–	0	13 (10.3 ± 6.7)	0
Failure	–	–	–	1 (24.9 ± 0)	5 (15.8 ± 3.4)	0

Europace (2013) 15, 1007–1012

Dilatació mecànica "TighRail™"

Europace
doi:10.1093/europace/euv245

CLINICAL RESEARCH

Initial experience with the TightRail™ Rotating Mechanical Dilator Sheath for transvenous lead extraction

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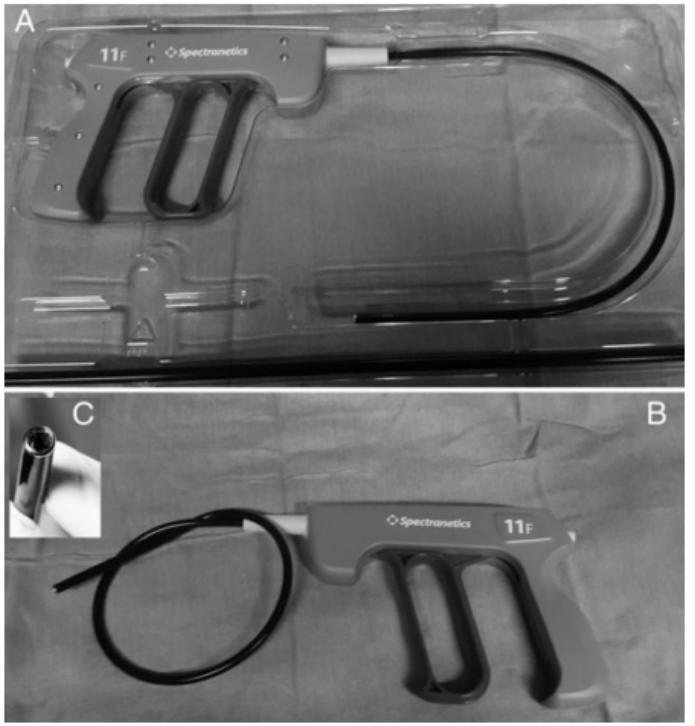
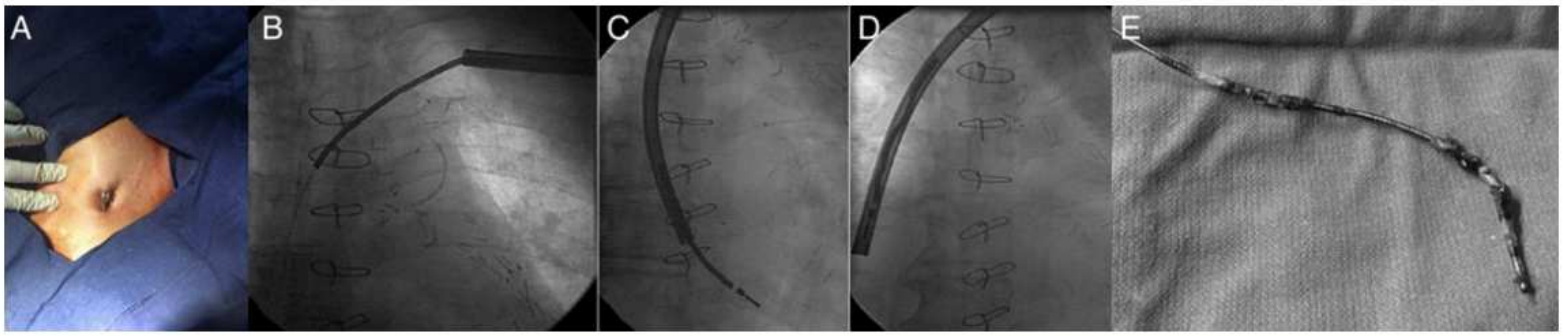
Received 25 April 2015; accepted after revision 17 June 2015

- 23 p / 42 cables
- 72 mesos temps d'implantació mig
- 95,7 % èxit complet (41/42)
- 100% èxit clínic





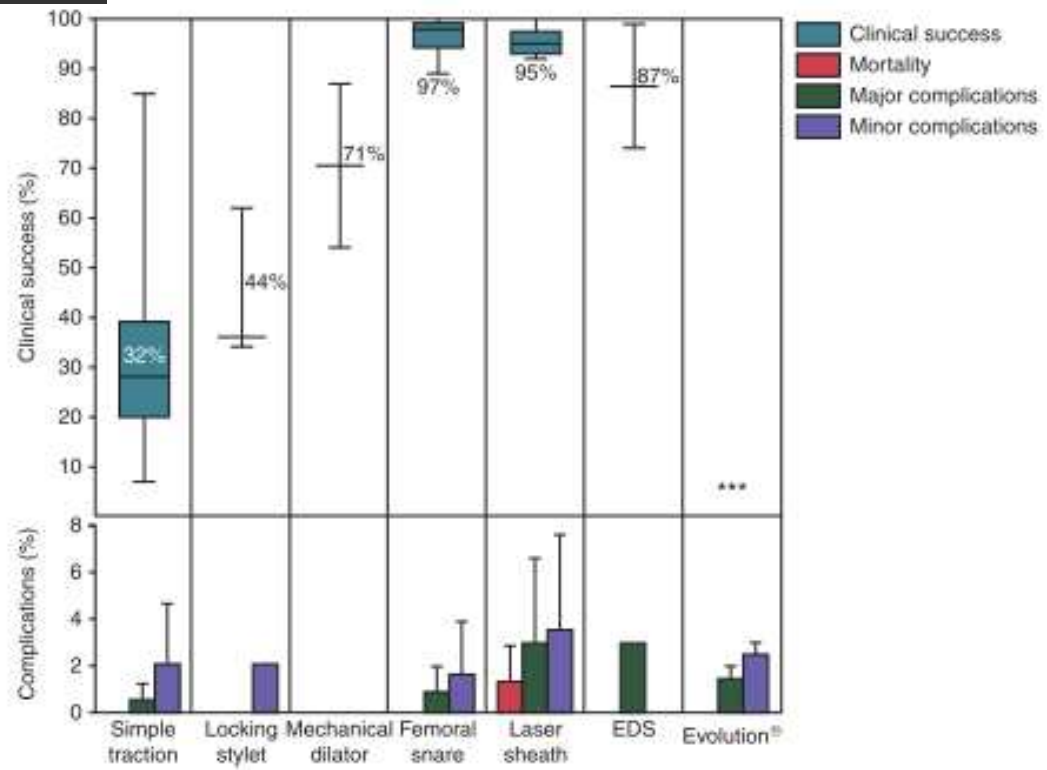
Comparativa entre tècniques

How adequate are the current methods of lead extraction? A review of the efficiency and safety of transvenous lead extraction methods

Maurits S. Buiten†, Aafke C. van der Heijden†, Martin J. Schalij, and Lieselot van Erven*

Department of Cardiology, Leiden University Medical Center, Leiden, The Netherlands

Received 21 August 2014; accepted after revision 2 December 2014; online publish-ahead-of-print 16 February 2015



Europace (2015) 17, 689–700

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- Qui?
  - Cirurgià o electrofisiòleg

¿Cirurgià o electrofisiòleg?

Transvenous Lead Extraction: Heart Rhythm Society Expert Consensus on Facilities, Training, Indications, and Patient Management

This document was endorsed by the American Heart Association (AHA).

TABLE 2 Required personnel*

Primary Operator: A physician performing the lead extraction who is properly trained and experienced in device implantation, lead extraction and the management of complications.
Cardiothoracic surgeon well versed in the potential complications of lead extraction and techniques for their treatment, on site and immediately available
Anesthesia support
Personnel capable of operating fluoroscopic equipment
"Scrubbed" assistant (nurse/technician/physician)
Non "scrubbed" assistant
Echocardiographer

OPERADOR PRINCIPAL

- ✓ Àmplia **experiència** en **implant** de dispositius
- ✓ **40 cables** extrets **sota supervisió** amb diverses tècniques i eines
- ✓ **Supervisor**: **>75** Extraccions
- ✓ **20 Extraccions** / any / operador
- ✓ Inici de un programa: contactar amb extractors per mentorització
- ✓ Simuladors?

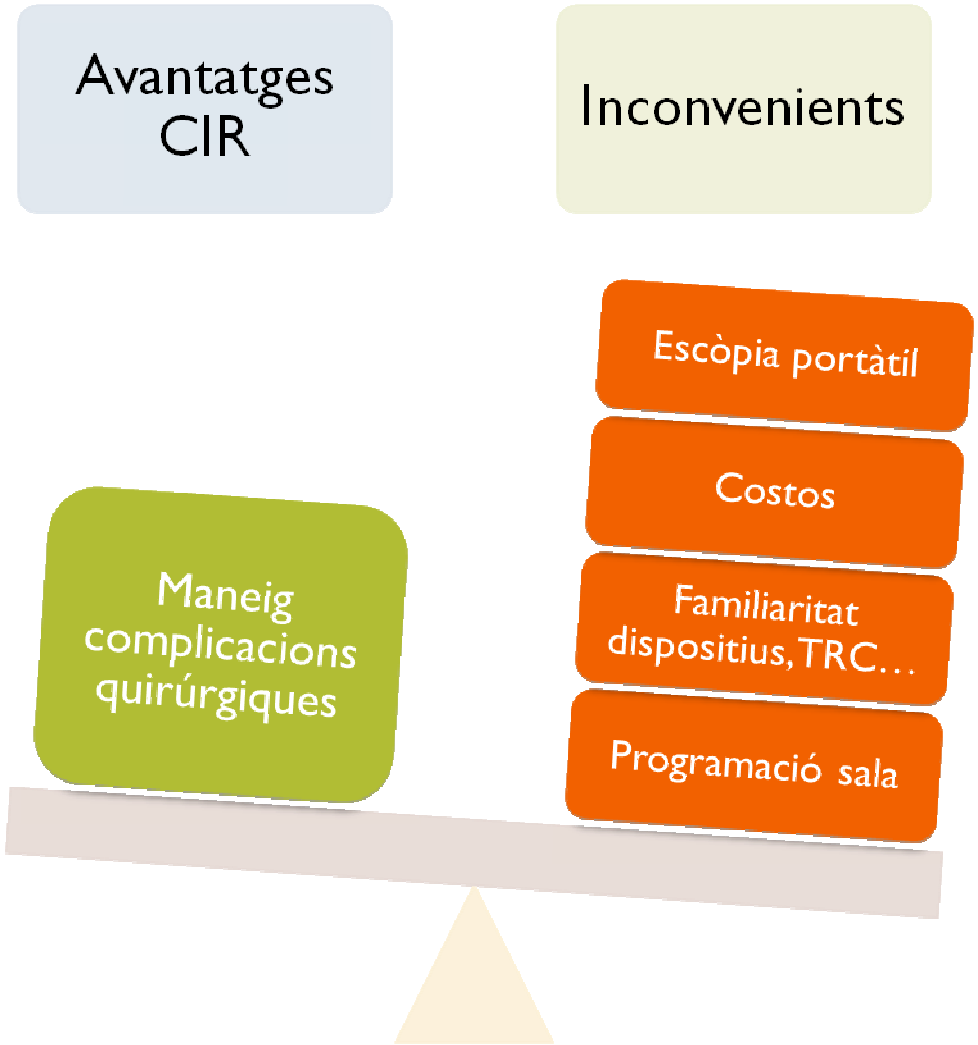
Wilkoff et al. HRS/AHA guidelienes. Heart Rhythm, Vol 6, No 7, July 2009

- Qui?
  - Quiròfan o lab. electrofisiologia

- ✓ **Quiròfan o sala** de procediments invasius **dissenyada per implant de dispositius**
- ✓ **Espaiosa**: permetre equipament i realitzar intervencions emergents: toracotomia, esternotomia, etc.
- ✓ **Sistema de ventilació** per prevenir infeccions quirúrgiques (flux laminar, pressió positiva, filtres)
- ✓ **Fluoroscòpia** d'alta qualitat

Wilkoff et al. HRS/AHA guidelines. Heart Rhythm, Vol 6, No 7, July 2009

Quiròfan cirurgia vs. laboratori EF



Quiròfan cirurgia vs. laboratori EF

Extraction of transvenous leads in the operating room versus electrophysiology laboratory: A comparative study

Frédéric Franceschi, MD,* Marc Dubuc, MD, FHRS,† Jean-Claude Deharo, MD,* Julien Mancini, MD, PhD,‡ Pierre Pagé, MD,† Bernard Thibault, MD,† Linda Koutbi, MD,* Sébastien Prévôt, MD,* Paul Khairy, MD, PhD†

	Operating room	Electrophysiology laboratory	*P*-value
Per lead (N = 1,364)	N = 533	N = 831	
Complete extraction, N (%)	487 (91.4)	774 (93.1)	0.227
Partial extraction, N (%)	24 (4.5)	36 (4.3)	
Failed extraction, N (%)	22 (4.1)	21 (2.5)	
Per procedure (N = 684)	N = 282	N = 402	
Any complication, N (%)	8 (2.84)	9 (2.24)	0.431
Minor complication, N (%)	2 (0.71)	5 (1.24)	0.765
Pneumothorax requiring chest tube drainage	1 (0.35)	0 (0.00)	
Small pericardial effusion with spontaneous resolution	1 (0.35)	5 (1.24)	
Major complication, N (%)	6 (2.1)	4 (1.00)	0.794
Superior vena caval laceration with death	1 (0.35)	1 (0.25)	
Cardiac tamponade requiring pericardocentesis	1 (0.35)	2 (0.50)	
Cardiogenic shock	0 (0.0)	1 (0.25)	
Transient blood pressure drop prompting surgical exploration	1 (0.35)	0 (0.00)	
Subclavian vein laceration with massive hemorrhage requiring surgical repair	2 (0.71)	0 (0.00)	
Tricuspid laceration requiring surgical repair	1 (0.35)	0 (0.00)	

- Qui?
  - Quins centres

CENTRE EXTRACTOR

- Cirurgia cardíaca
- Alt volum d'implants (**> 200/a**)
- Centre **implicat** i compromès en millorar la **qualitat** i la **innovació** i en proporcionar el **volum** necessari per mantenir les habilitats tècniques
- Garanteixi l'adequació d'**instal·lacions**, **equipaments** i **personal**
- Reculli resultats i els revisi

CENTRE IMPLANTADOR

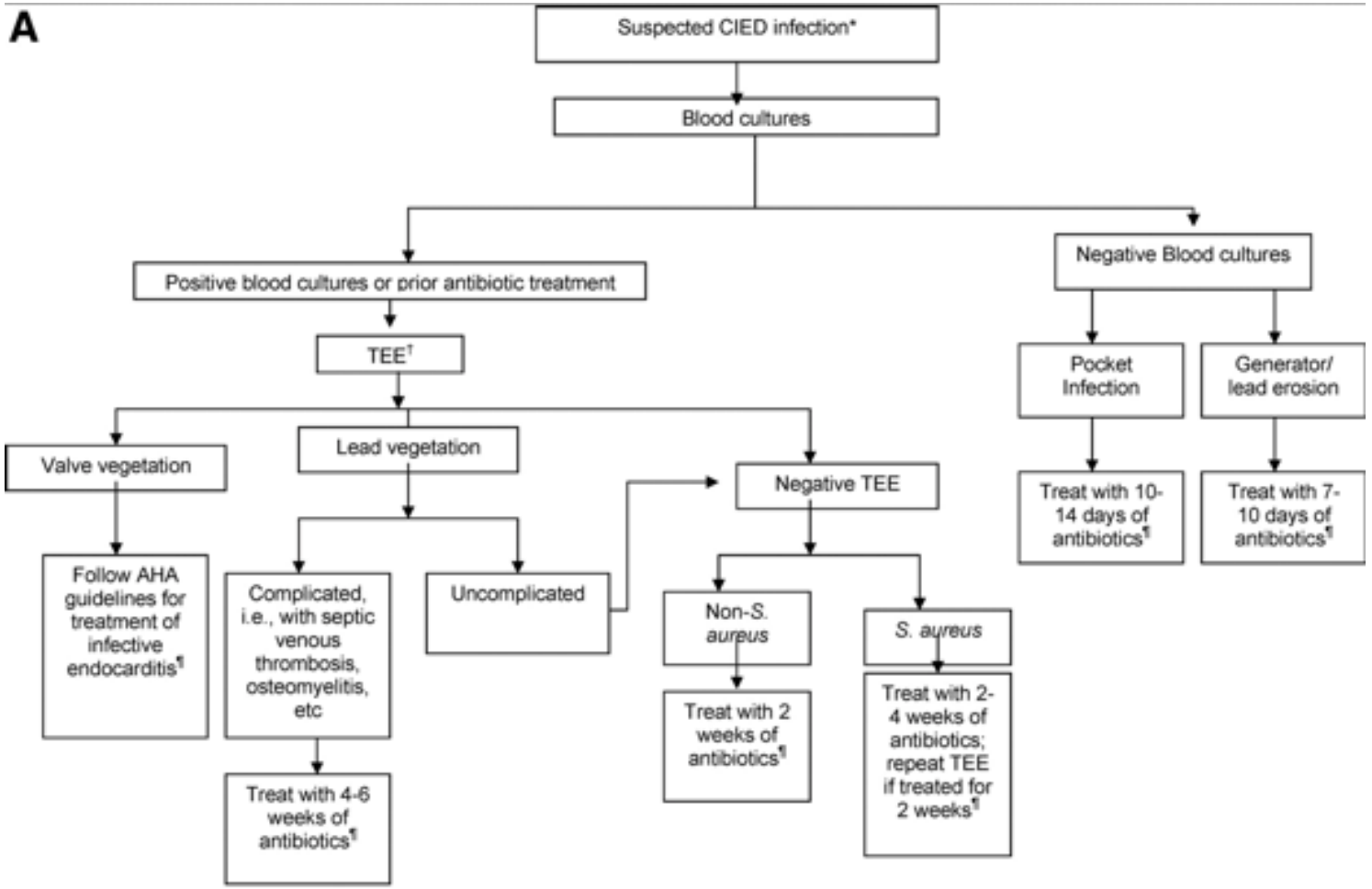
- **Protocol** d'actuació davant d'una **infecció** d'un dispositiu (clar i per escrit)
- Si no es extractor: circuit de **derivació**

INFECCIÓ = DERIVACIÓ

- Si no és centre extractor: explants no infecciosos
  - <1 any
  - Clase IIa

Wilkoff et al. HRS/AHA guidelines. Heart Rhythm, Vol 6, No 7, July 2009

Protocol d'infecció



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Circulation. 2010;121:458–477.

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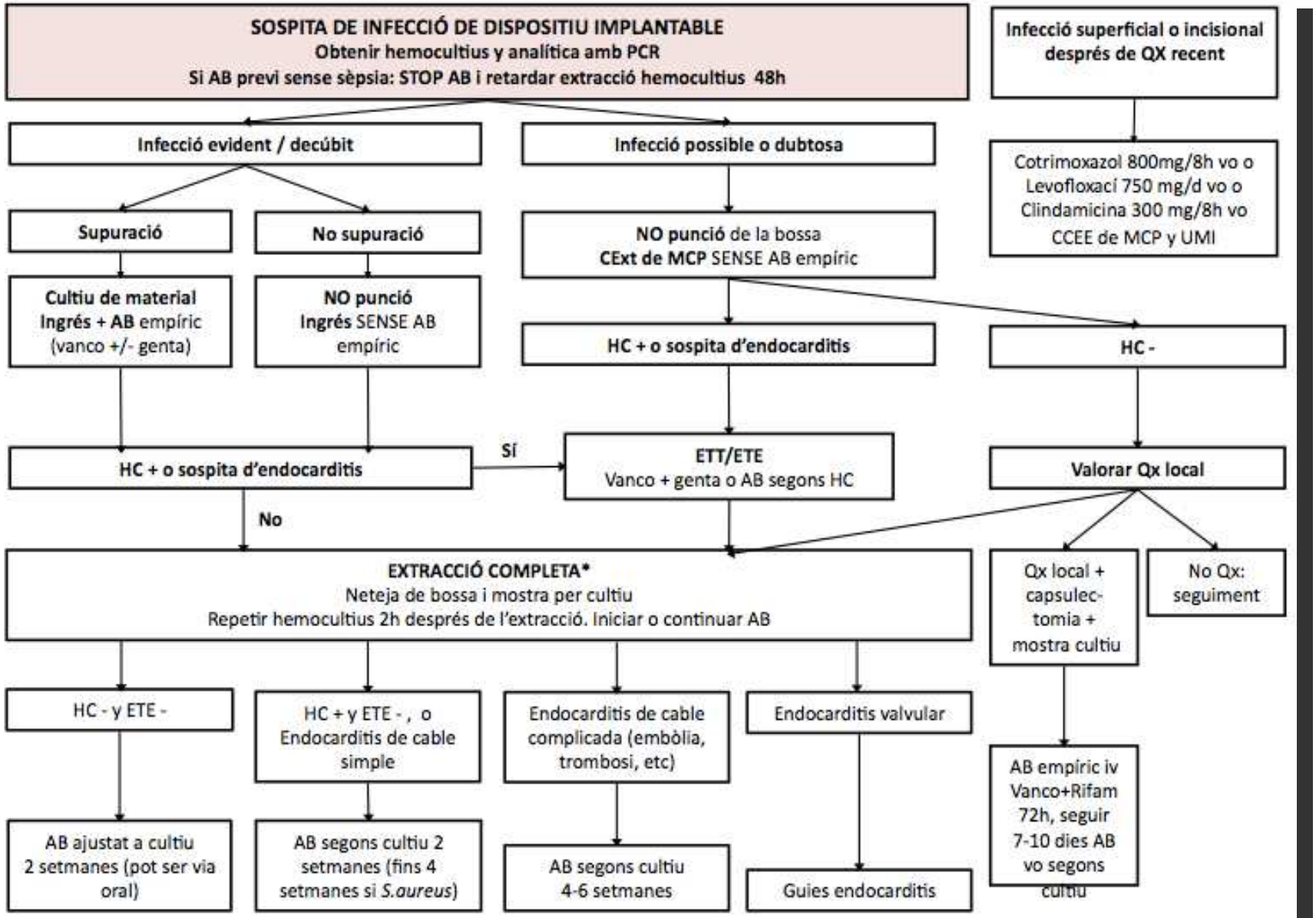

**En cas de contraindicació o risc molt alt per la extracció valorar tractament AB supressiu continu*

Tractament conservador?

Infection of an Implantable Cardioverter Defibrillator: Management Without Removal of the Device in Selected Cases

ROBERT L. TAYLOR,* DAVID J. COHEN,* LAWRENCE E. WIDMAN,**
ROBERT J. CHILTON,** and ROBERT A. O'ROURKE**

From the Divisions of *Cardiothoracic Surgery and **Cardiology, The University of Texas Health Science Center at San Antonio, San Antonio, Texas

Successful Management of an Infected Implantable Cardioverter Defibrillator with Oral Antibiotics and without Removal of the Device

VLADIMIR TURKISHER, ISRAEL PRIEL, and MICHAEL DAN

From The Departments of Cardiology and Medicine "E" and The Infectious Diseases Unit, The E. Wolfson Hospital, Holon, Israel

Vacuum-Assisted Wound Closure for Pacemaker Infection

TAKUMA SATSU, M.D. and MASAHIKO ONOE, PH.D.

From the Department of Cardiovascular Surgery, Kishiwada City Hospital, Osaka, Japan

Europace (2013) **15**, 541–545
doi:10.1093/europace/eus317

CLINICAL RESEARCH
Pacing and resynchronization therapy

Conservative management of infected pacemaker and implantable defibrillator sites with a closed antimicrobial irrigation system

J. Alberto Lopez[1,2]*

Germans Trias i Pujol Hospital

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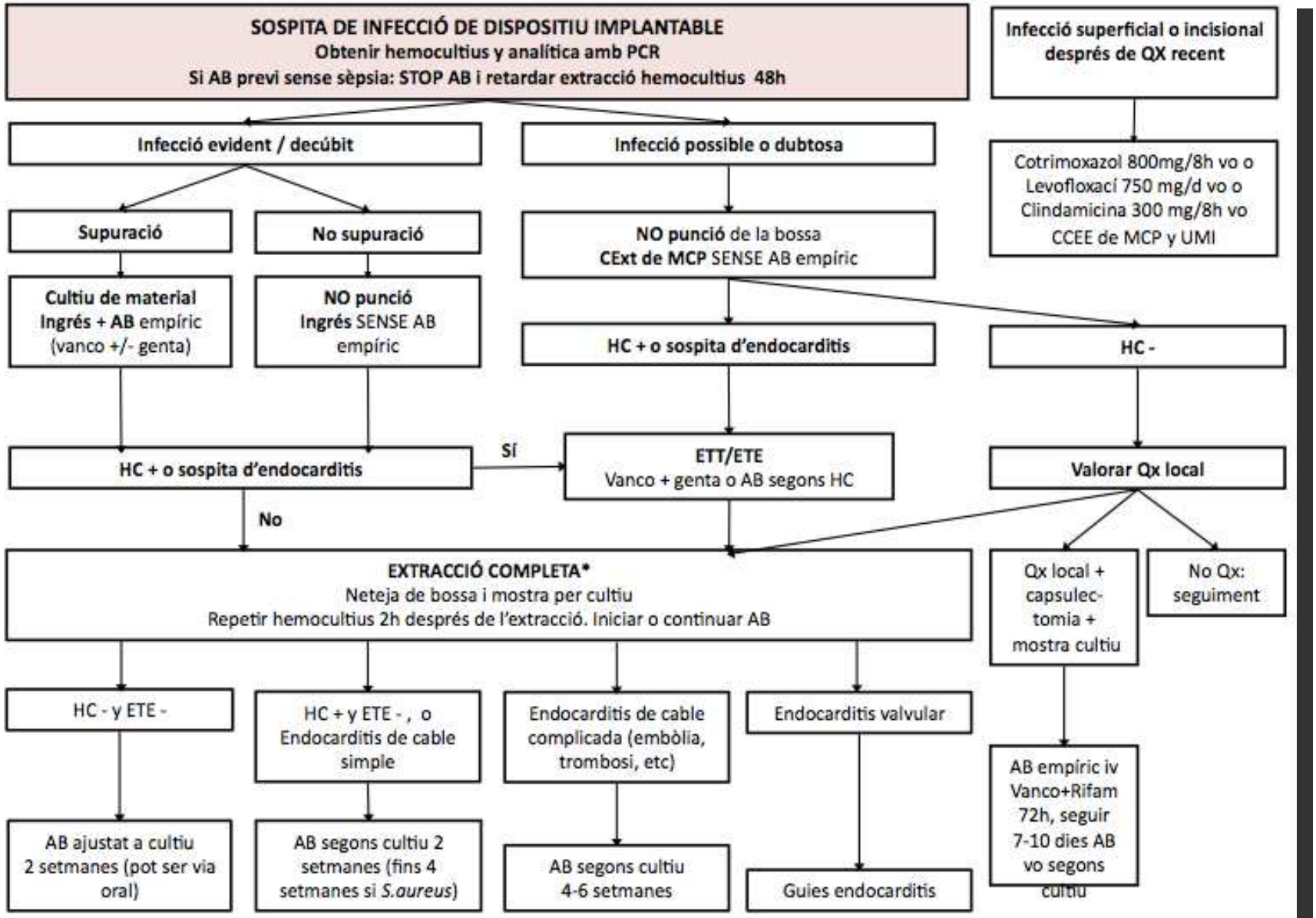
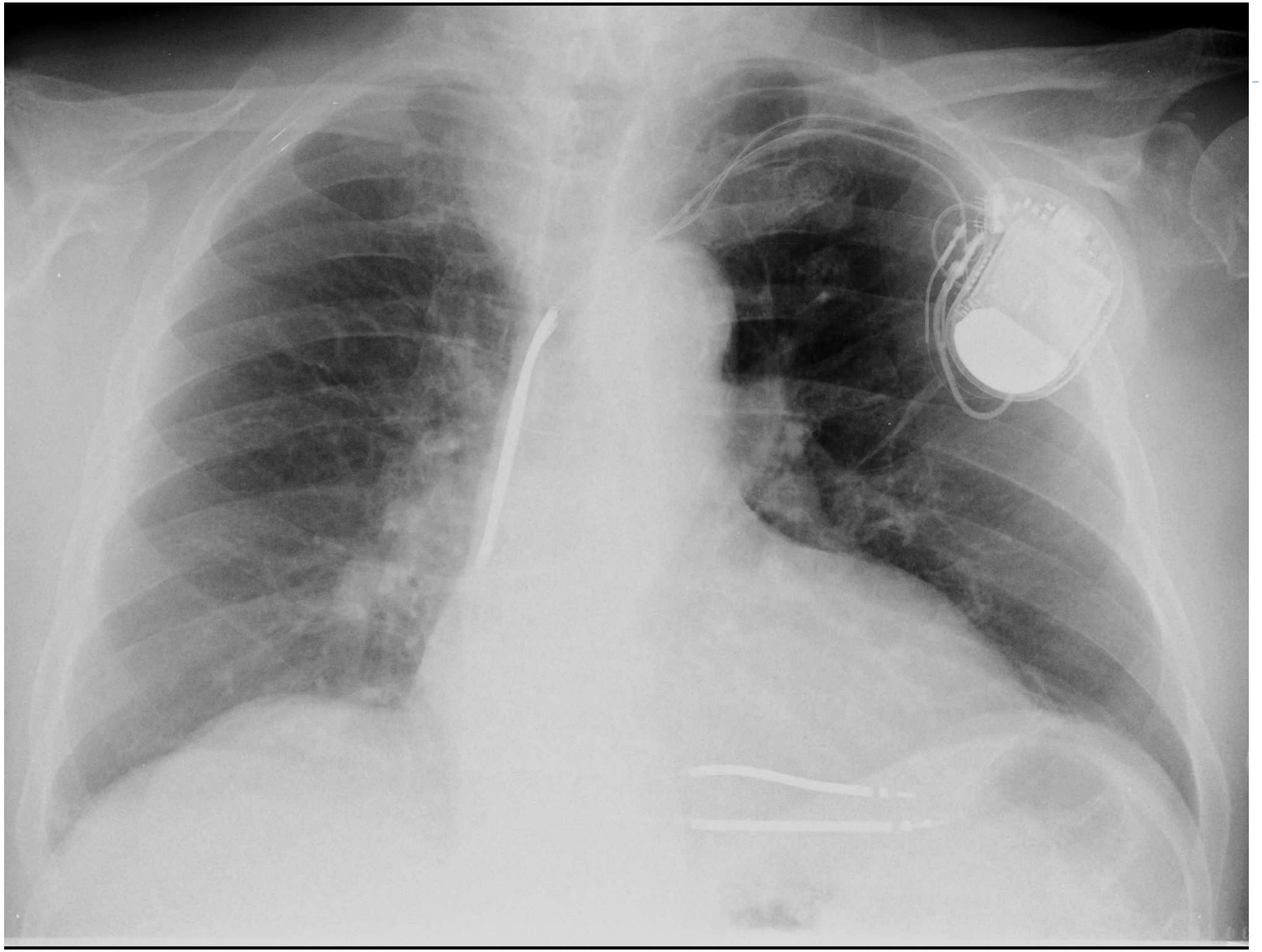
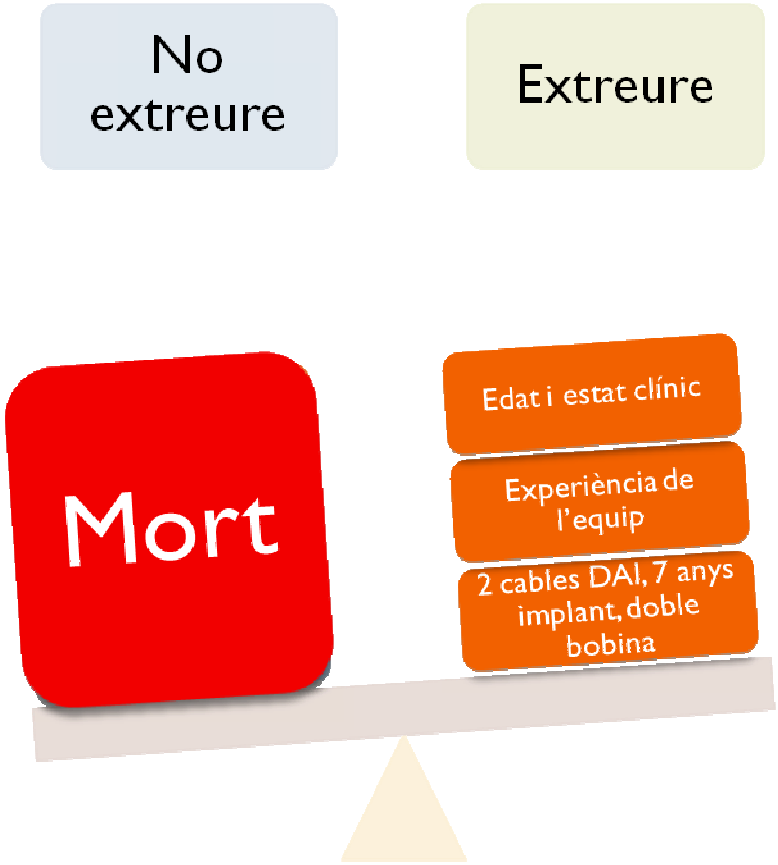

SOSPITA DE INFECCIÓ DE DISPOSITIU IMPLANTABLE
Obtenir hemocultius y analítica amb PCR
Si AB previ sense sèpsia: STOP AB i retardar extracció hemocultius 48h
Infecció superficial o incisional després de QX recent
Cotrimoxazol 800mg/8h vo o Levofloxaci 750 mg/d vo o Clindamicina 300 mg/8h vo CCEE de MCP y UMI
Infecció evident / decúbit
Infecció possible o dubtosa
Supuració
No supuració
NO punció de la bossa CExt de MCP SENSE AB empíric
Cultiu de material Ingrés + AB empíric (vanco +/- genta)
NO punció Ingrés SENSE AB empíric
HC + o sospita d'endocarditis
HC -
HC + o sospita d'endocarditis
Sí
ETT/ETE Vanco + genta o AB segons HC
Valorar Qx local
No
EXTRACCIÓ COMPLETA*
Neteja de bossa i mostra per cultiu
Repetir hemocultius 2h després de l'extracció. Iniciar o continuar AB
Qx local + capsulec-tomia + mostra cultiu
No Qx: seguiment
HC - y ETE -
HC + y ETE - , o Endocarditis de cable simple
Endocarditis de cable complicada (embòlia, trombosi, etc)
Endocarditis valvular
AB empíric iv Vanco+Rifam 72h, seguir 7-10 dies AB vo segons cultiu
AB ajustat a cultiu 2 setmanes (pot ser via oral)
AB segons cultiu 2 setmanes (fins 4 setmanes si S.aureus)
AB segons cultiu 4-6 setmanes
Guies endocarditis
*En cas de contraindicació o risc molt alt per la extracció valorar tractament AB supressiu continu

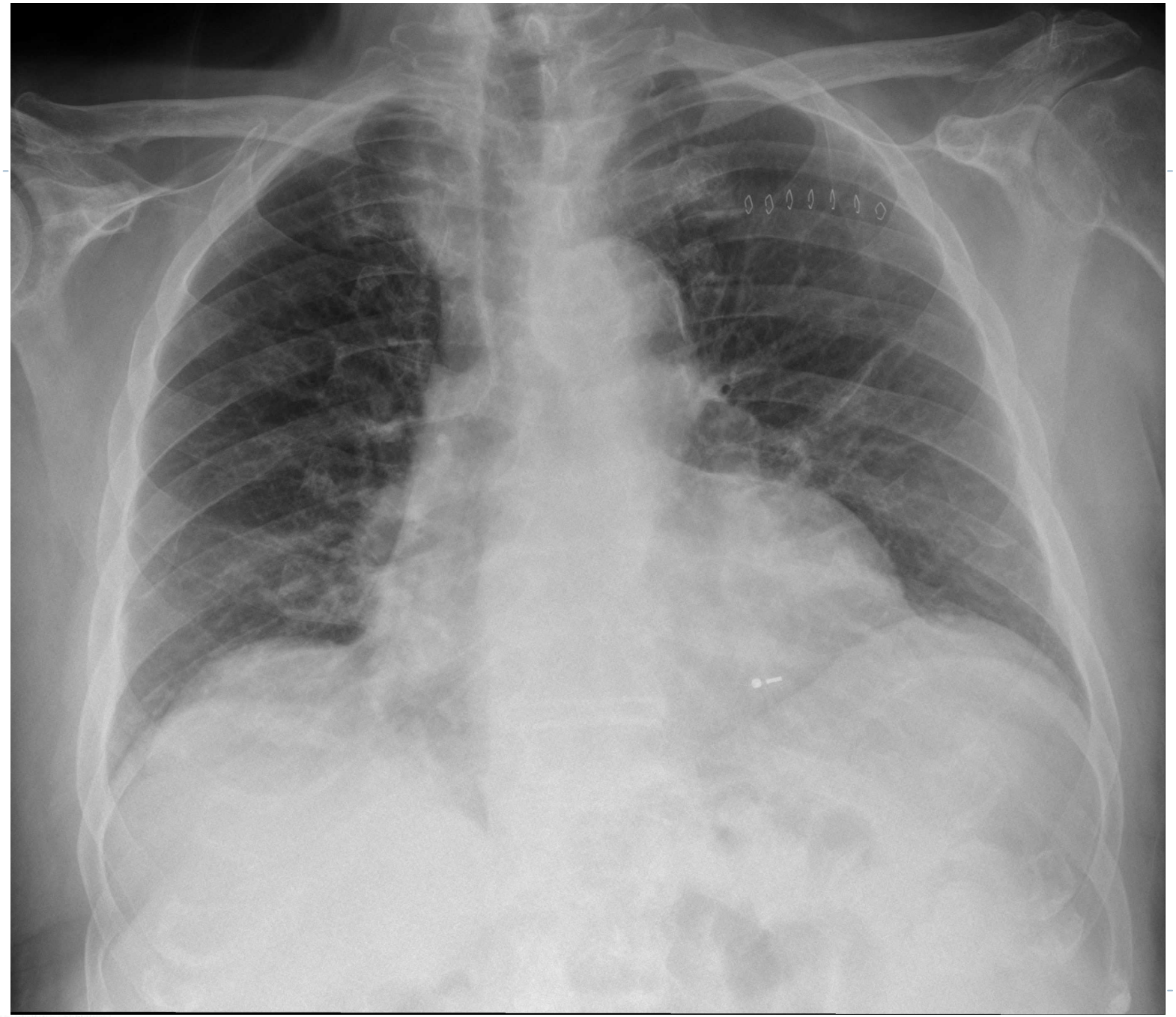
Cas

- Home de 84 a.
- Cardiopatia isquèmica. FEVE 40%
- Inuficiència renal
- **2/04**: TVs mal tolerades. Implant DAI monocameral, bibobina, fixació passiva.
- **11/10**: dany elèctrode, reintervenció. No es va poder extreure el cable antic per tracció simple, es va implantar un nou cable bibobina de fixació activa.
- **2/11**: Endocarditis per estafilococ coagulasa negatiu, febre mantinguda malgrat ATB adequats, leucocitosi, VSG elevada, hipotensió, UCI, NAD....
- ETE: vegetació 25 mm en el cable retingut

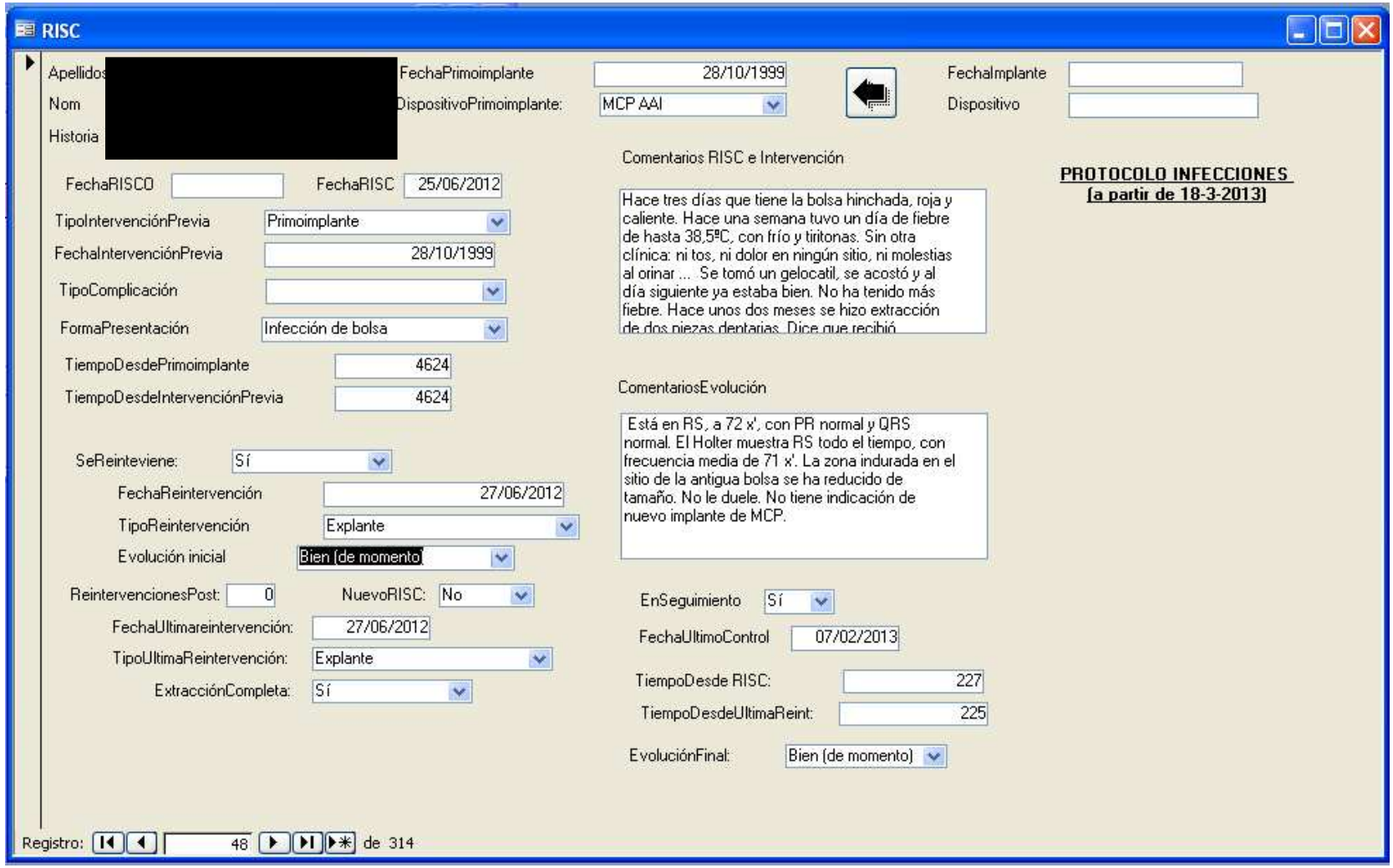


Risc vs. risc


No extreure
Extreure
Mort
Edat i estat clínic
Experiència de l'equip
2 cables DAI, 7 anys implant, doble bobina



BD infeccions



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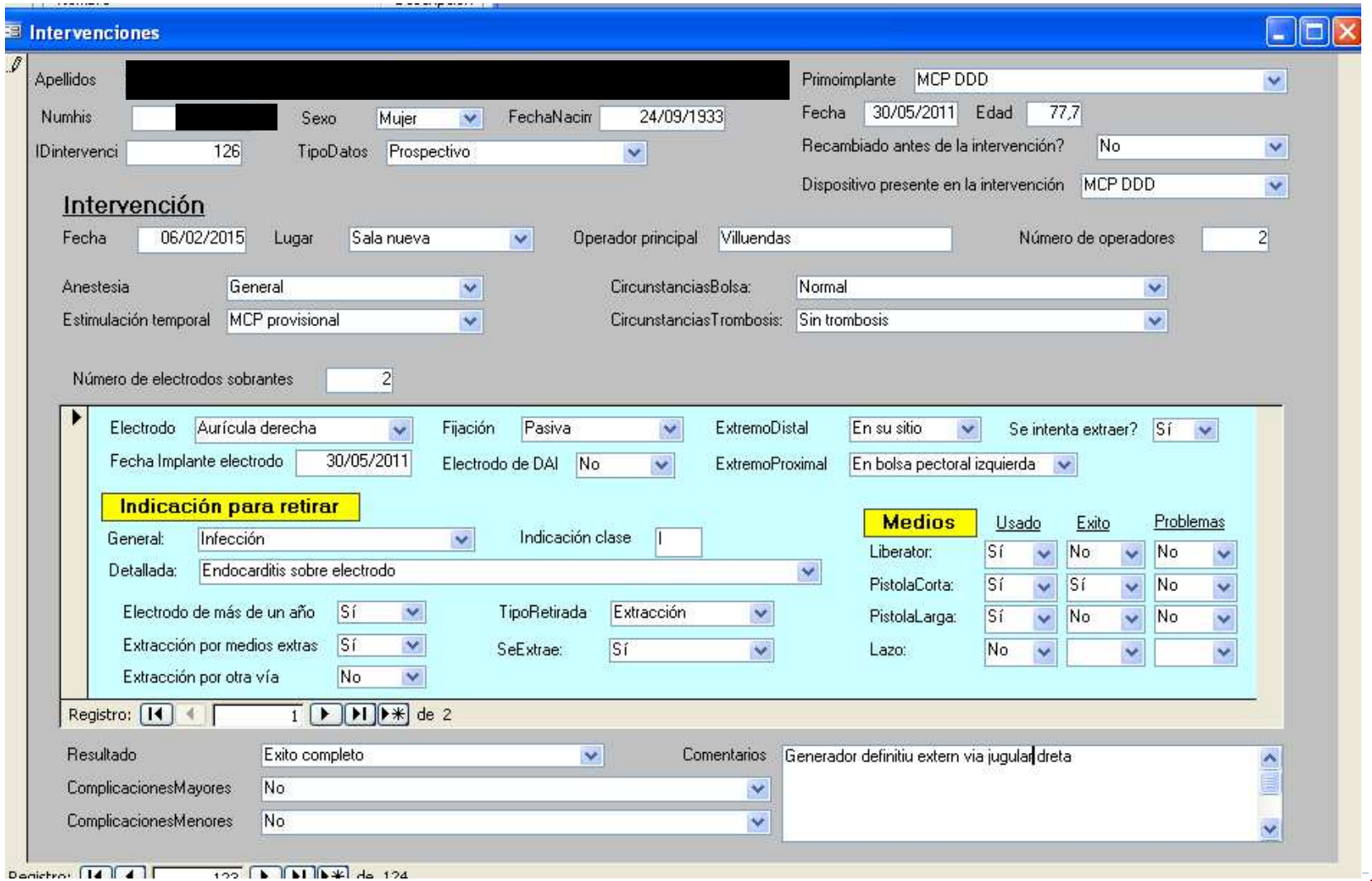
BD extraccions



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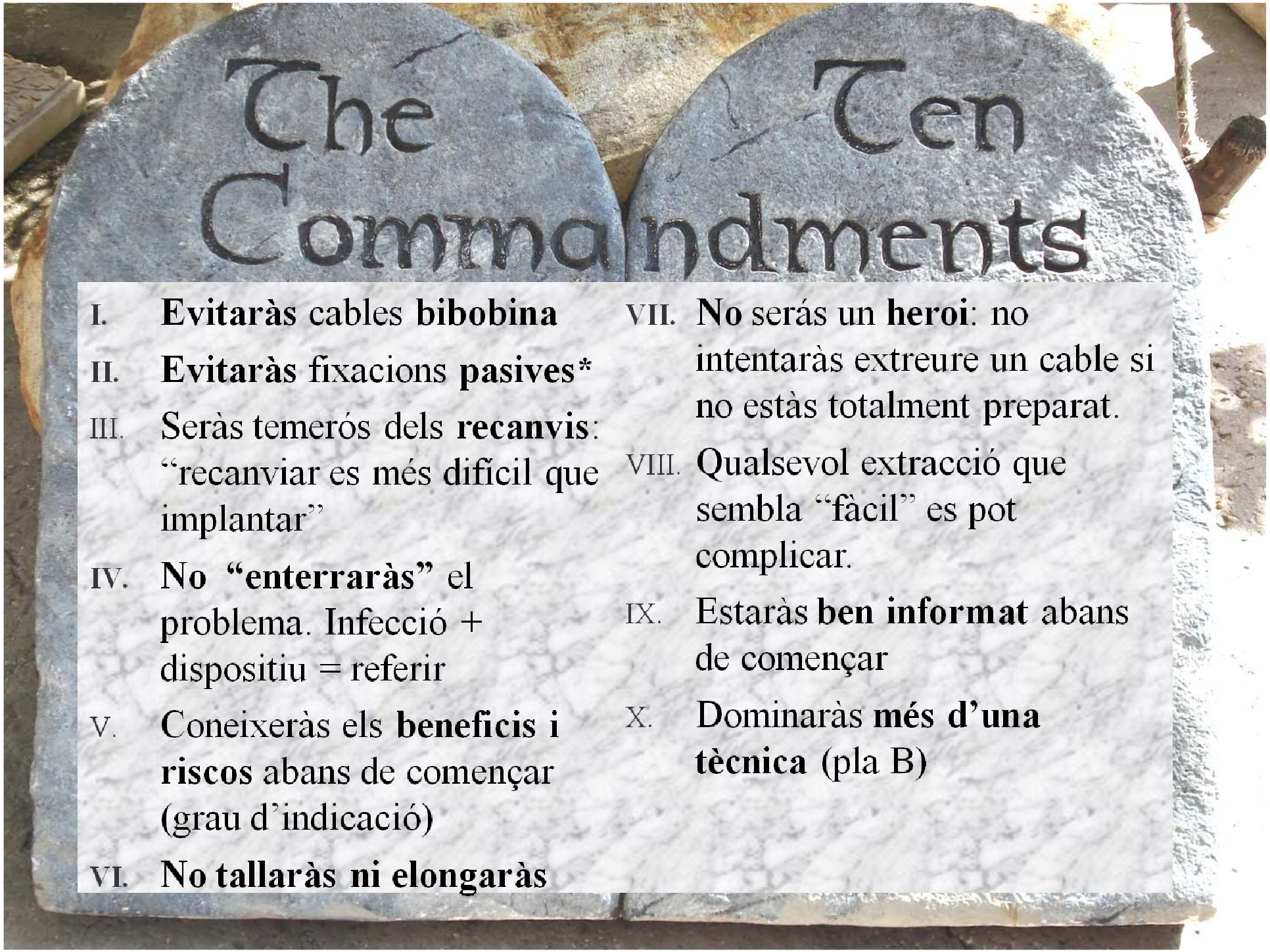
La nostra experiència

- Feb 2012- Oct 2015
- 131 cables a 68 pac. (1.9/pac.)
- 60% infecció
- Èxit complet 85,7%
- Èxit clínic el 88,2%
- Classe I:
  - 97,5 % èxit clínic. (1 fracàs: una pacient va requerir cirurgia)
- 6% complicacions menors
- 3% complicacions majors (1 hemotòrax, 1 mort)
- 1 mort (1,5%): xoc sèptic (no es van utilitzar eines)



I. **Evitaràs** cables **bibobina**

II. **Evitaràs** fixacions **pasives***

III. Seràs temerós dels **recanvis**: "recanviar es més difícil que implantar"

IV. **No "enterraràs"** el problema. Infecció + dispositiu = referir

V. Coneixeràs els **beneficis i riscos** abans de començar (grau d'indicació)

VI. **No tallaràs ni elongaràs**

VII. **No** serás un **heroi**: no intentaràs extreure un cable si no estàs totalment preparat.

VIII. Qualsevol extracció que sembla "fàcil" es pot complicar.

IX. Estaràs **ben informat** abans de començar

X. Dominaràs **més d'una tècnica** (pla B)