



# 3. Atriyal Fibrilasyon Zirvesi 2014

30 - 31 Mayıs 2014 / The Marmara Hotel, Antalya

## Diđer cihaz komplikasyonları

Dr. Ata KIRILMAZ

# Disclosure

- Proctor to Medtronic
- Consultant to Biotronik

# Complications after cardiac implantable electronic device implantations: an analysis of a complete, nationwide cohort in Denmark

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Mayıs 2010 ile Nisan 2012 tarihleri  
arasında cihaz implantasyonundan  
sonraki ilk 6 ay içinde karşılaşılan  
komplikasyonlar

# Komplikasyonlar

- **Majör komplikasyonlar**

- Elektrod nedenli yeniden girişim °
- Enfeksiyon
- Drenaj gerektiren Pnömotoraks
- Kalp perforasyonu
- ° Ağrı nedeniyle cep revizyonu
- ° Jeneratör-elektrod etkileşimi nedeni ile yeniden girişim
- ° Yeniden girişim gerektiren hematoma
- Derin ven trombozisi, ° Twiddler sendromu, ° yara yeri revizyonu, miyokard enfarktüsü

- **Minör Komplikasyonlar**

- Hematom
- Antibiyotik ile tedavi edilebilen lokal enfeksiyonlar (Dikiş absesi)
- Konservatif tedavi edilen Pnömotoraks
- Yeniden girişim gerektirmeyen elektrod yer değiştirmesi

# 6ncı aydaki komplikasyonlar toplamı

## Komplikasyon oranı %9.5

	All (n = 5918)	New implant (n = 4355)	Generator replacement (n = 1136)	Upgrade/ lead revision (n = 427)
Any complication	562 (9.5; 8.7–10.2)	432 (9.9; 9.0–10.8)	67 (5.9; 4.5–7.3)	63 (14.8; 11.4–18.1)
Any major complication	329 (5.6; 5.0–6.1)	253 (5.8; 5.1–6.5)	40 (3.5; 2.4–4.6)	36 (8.4; 5.8–11.1)
Any minor complication	250 (4.2; 3.7–4.7)	189 (4.3; 3.7–4.9)	30 (2.6; 1.7–3.6)	31 (7.3; 4.8–9.7)
<b>Major complications</b>				
Lead related re-intervention	143 (2.4; 2.0–2.8)	120 (2.8; 2.3–3.2)	10 (0.9; 0.3–1.4)	13 (3.0; 1.4–4.7)
Infection	49 (0.8; 0.6–1.1)	24 (0.6; 0.3–0.8)	17 (1.5; 0.8–2.2)	8 (1.9; 0.6–3.2)
Local infection	22 (0.4; 0.2–0.5)	10 (0.2; 0.1–0.4)	8 (0.7; 0.2–1.1)	4 (1.0; 0.0–1.9)
Systemic infection/endocarditis	27 (0.5; 0.3–0.6)	14 (0.3; 0.2–0.5)	9 (0.8; 0.3–1.3)	4 (0.9; 0.0–1.9)
Pneumothorax requiring drainage	51 (0.9; 0.6–1.1)	45 (1.0; 0.7–1.3)	0	6 (1.4; 0.3–2.5)
Cardiac perforation	38 (0.6; 0.4–0.8)	35 (0.8; 0.5–1.1)	0	3 (0.7; 0.0–1.5)
No intervention	21 (0.4; 0.2–0.5)	18 (0.4; 0.2–0.6)	0	3 (0.7; 0.0–1.5)
Intervention <sup>b</sup>	17 (0.3; 0.2–0.4)	17 (0.4; 0.2–0.6)	0	0
Pocket revision because of pain	25 (0.4; 0.3–0.6)	10 (0.2; 0.1–0.4)	9 (0.8; 0.3–1.3)	6 (1.4; 0.3–2.5)
Generator-lead interface problem with re-intervention	7 (0.1; 0.0–0.2)	3 (0.1; 0.0–0.1)	4 (0.4; 0.0–0.7)	0
Haematoma requiring re-intervention	10 (0.2; 0.1–0.3)	9 (0.2; 0.1–0.3)	1 (0.1; 0.0–0.3)	0
Other <sup>c</sup>	16 (0.3; 0.1–0.4)	16 (0.4; 0.2–0.5)	0	0
<b>Minor complications</b>				
Haematoma <sup>d</sup>	138 (2.3; 1.9–2.7)	104 (2.4; 1.9–2.8)	20 (1.8; 1.0–2.5)	14 (3.3; 1.6–5.0)
Wound infection treated with antibiotics	69 (1.2; 0.9–1.4)	47 (1.1; 0.8–1.4)	12 (1.0; 0.5–1.7)	10 (2.3; 0.9–3.8)
Pneumothorax conservatively treated	39 (0.7; 0.5–0.9)	32 (0.7; 0.5–1.0)	0	7 (1.6; 0.4–2.8)
Lead dislodgement without re-intervention	10 (0.2; 0.1–0.3)	9 (0.2; 0.1–0.3)	0	1 (0.2; 0.0–0.7)

# Kimler risk altında

- 5918 ardışık hasta
- 562 hastada (%9.5) en azından bir komplikasyon
  - Kadın
  - Zayıf
  - Merkezin tecrübesinin az olması (Yılda <750 vaka)
  - Çift odacıklı ICD, CRT-D
  - Sistem yükseltilmesi veya elektrod revizyonu
  - Operatörün yıllık vaka sayısının < 50
  - Hastanın acil olarak alınması
  - Mesai saatleri haricinde acil olarak alınması

Tek odacıklı PM

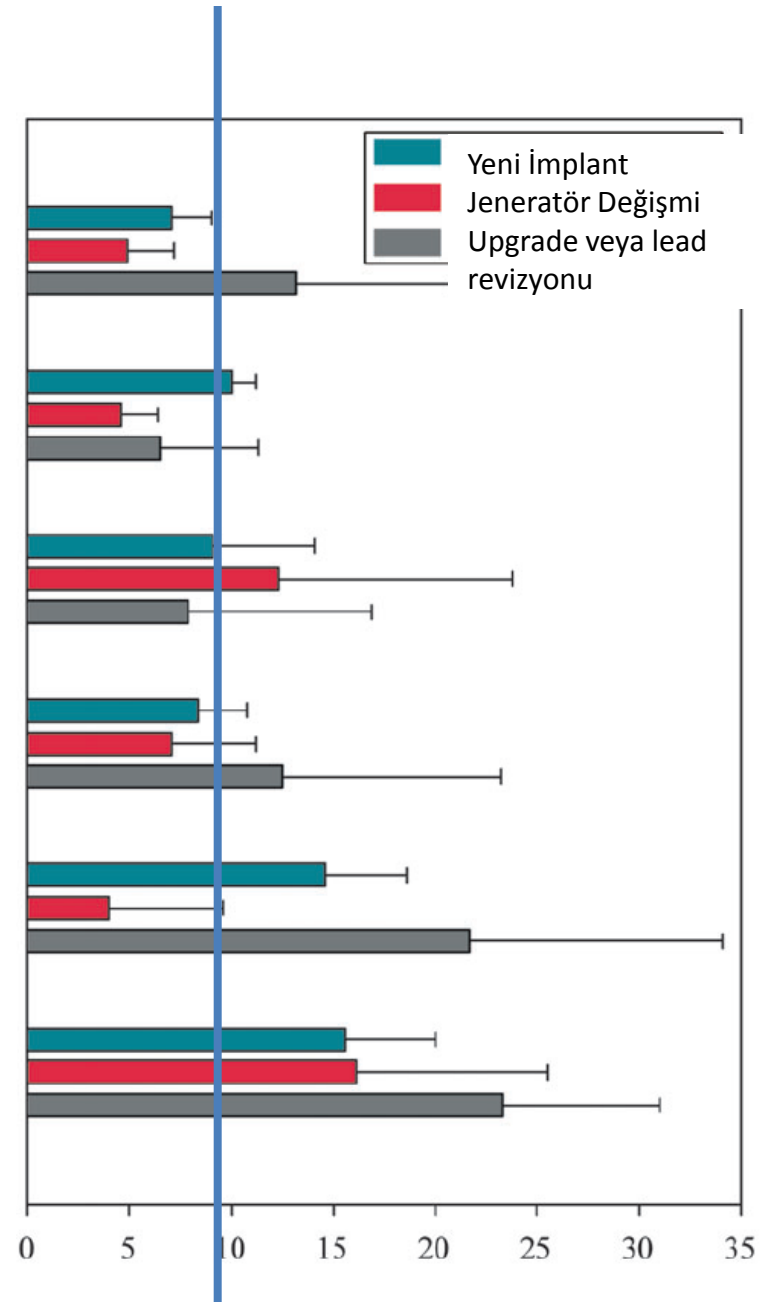
Çift odacıklı PM

CRT PM

Tek odacıklı ICD

Çift Odacıklı ICD

CRT ICD



6 aylık herhangi bir komplikasyon (%)

# Ölüm

- İlk 6 ayda 327 (%5.5) ölüm
- İşlem ile ilgili muhtemel 1 hasta (KOAH'lı olup minör Px ile taburcu edilmiş)



# Kaudal AP

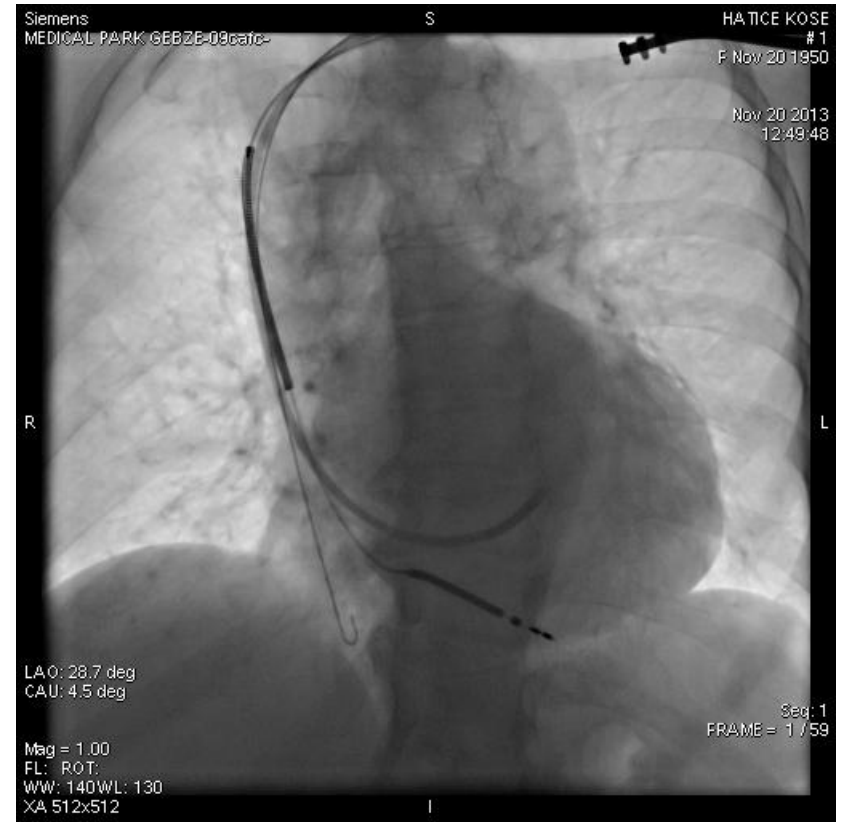
- **Artere girilmesi**
  - Dilatatör veya sheath girilmeden önce
  - Ekstratorasik ise elle bası
  - Intratorasik ise riskli
    - Angioseal, Perclose...
- **Pnömotoraks**
  - Subklavian ven > aksiller ven > sefalik ven
  - ~~Lateral iğne hareketi~~
  - Geç göğüs filmi
- **Subklavian Crush Sendromu**
  - Sefalik ven yolu ile
  - Aksiller ponksiyon
  - Ekstratorasik ponksiyon



Parallax tekniği; Ekstratorasik subklavian ven

## Hava embolisi

- CRT kılavuz sheath
- Derin inspirasyon
- Düşük venöz basınç
- Genellikle asemptomatik
- Önlenmesi
  - Nefes almama
  - Hidrasyon
  - Tredelenburg
  - Sheath kapatılması
- Tedavisi
  - O2, aspirasyon, CPR



# Ven trombozu

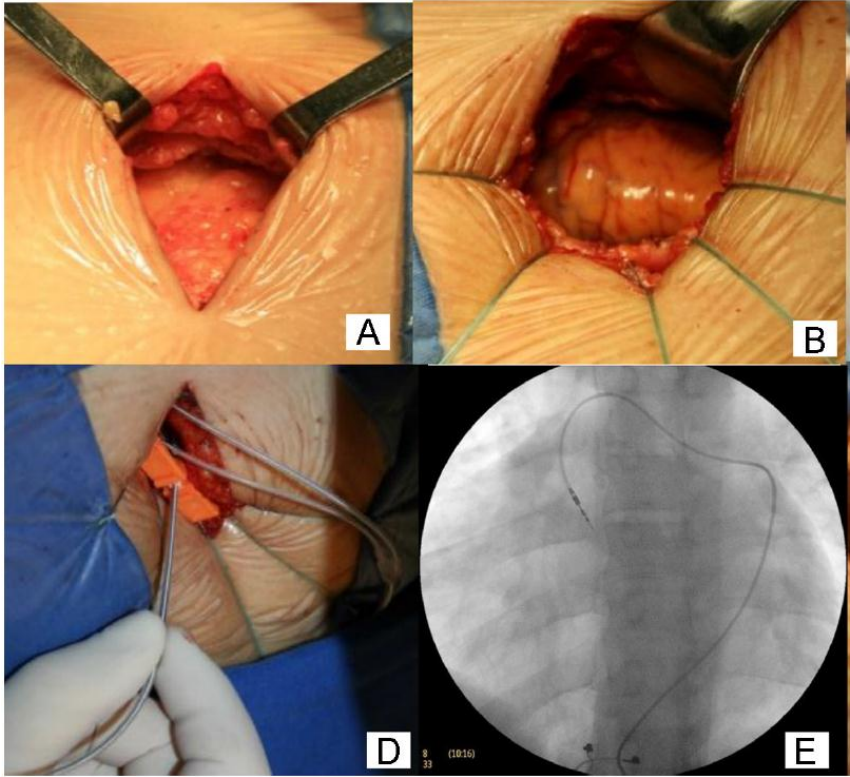
## Akut (%40)

- %2 semptomatik
  - Kolda şişme, ağrı
  - Jugüler dolgunluk
  - SCV sendromu
- Heparin/warfarin

## Kronik (%40)

- %10 total tıkanma
- Girişim gerektiğinde
  - Venogram
  - Hidrofilik kılavuz tel
  - Proksimal ponksiyon
  - Dilatasyon
  - Uzun sheath
  - Ekstraksiyon
  - Karşı taraftan Tünelleme

# Total oklüzyon



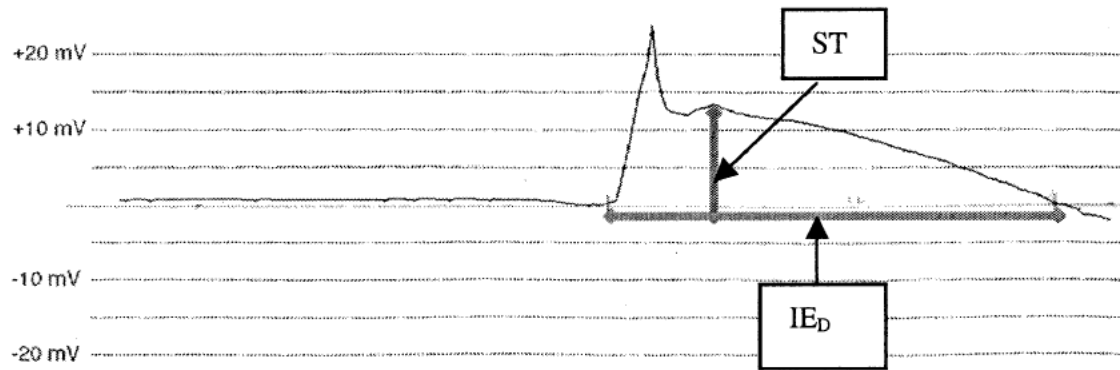
# Elektrodun yer deđiřtirmesi

- Atrial %3, ventriküler %2
- Genellikle 1nci günde
  - eřik yükselmesi
  - undersens
  - farklı capture
- Önlem
  - Yeterli geri destek ve test
  - Stabilite
  - “Sleeve” güvenli bağlanması
  - Aktif (injury akımı)

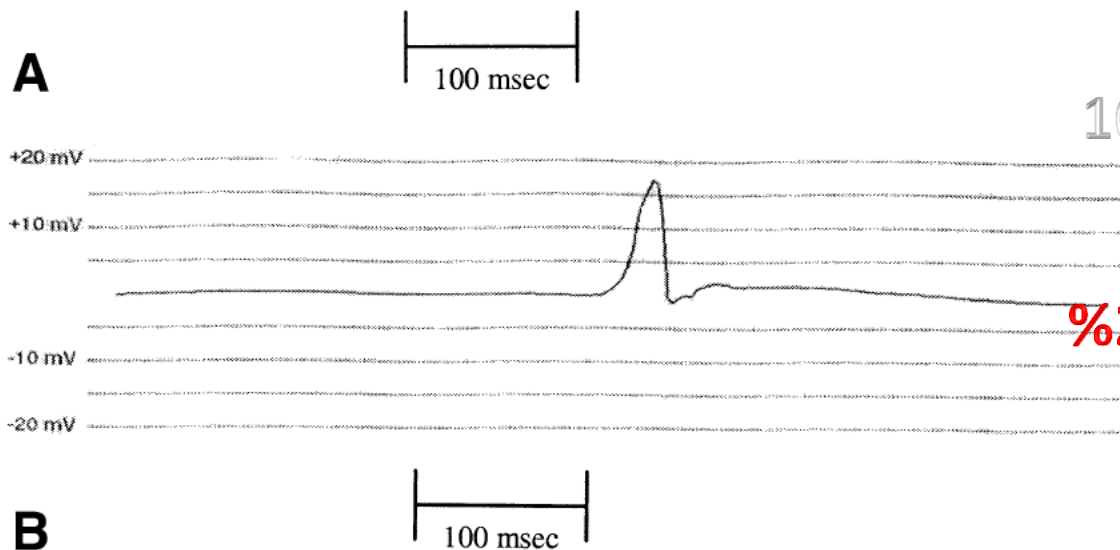
# Current of Injury Predicts Adequate Active Lead Fixation in Permanent Pacemaker/Defibrillation Leads

Sherry J. Saxonhouse, MD, Jamie B. Conti, MD, FACC, Anne B. Curtis, MD, FACC  
Gainesville, Florida

- Injury Akımı



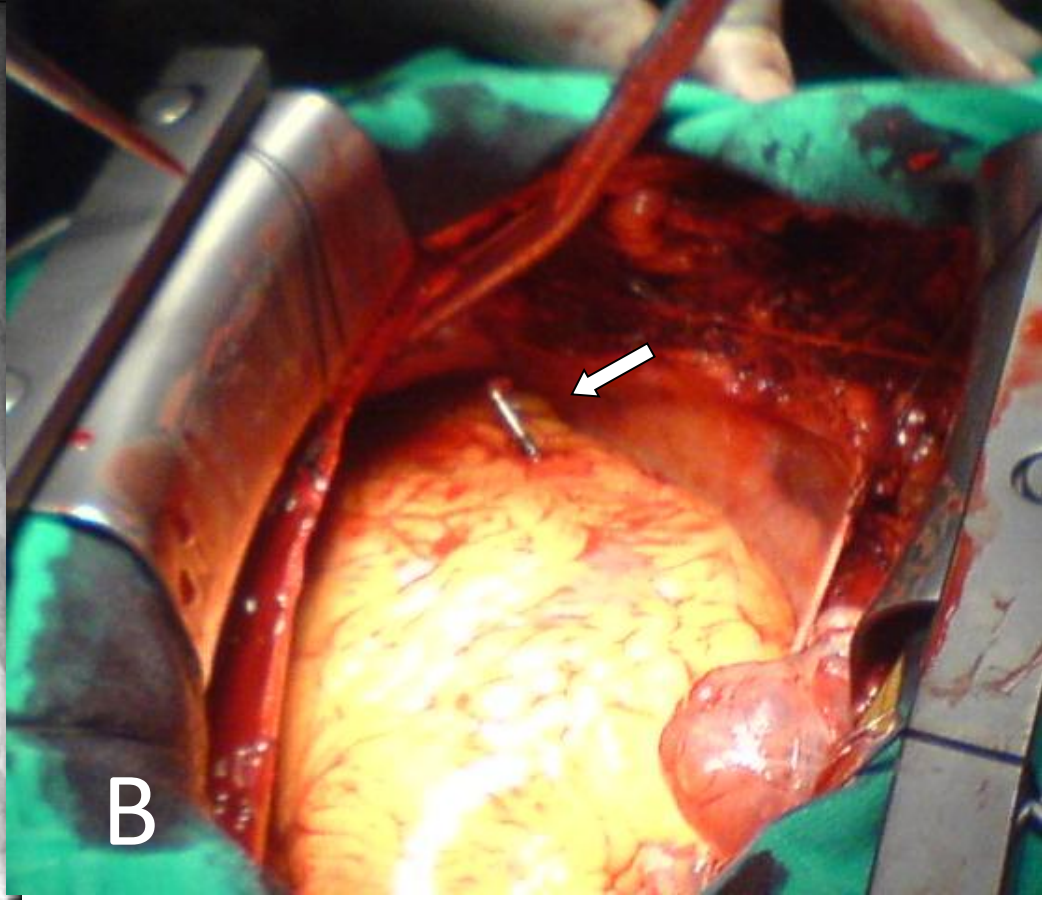
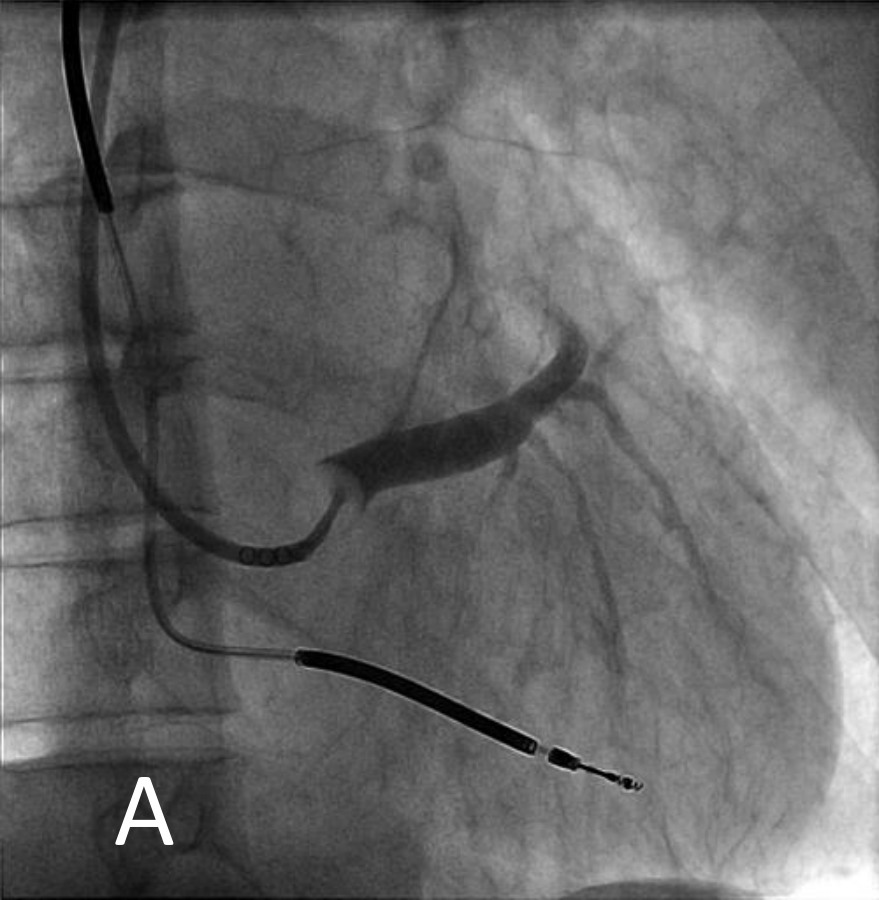
- EGM



# Kalp perforasyonu

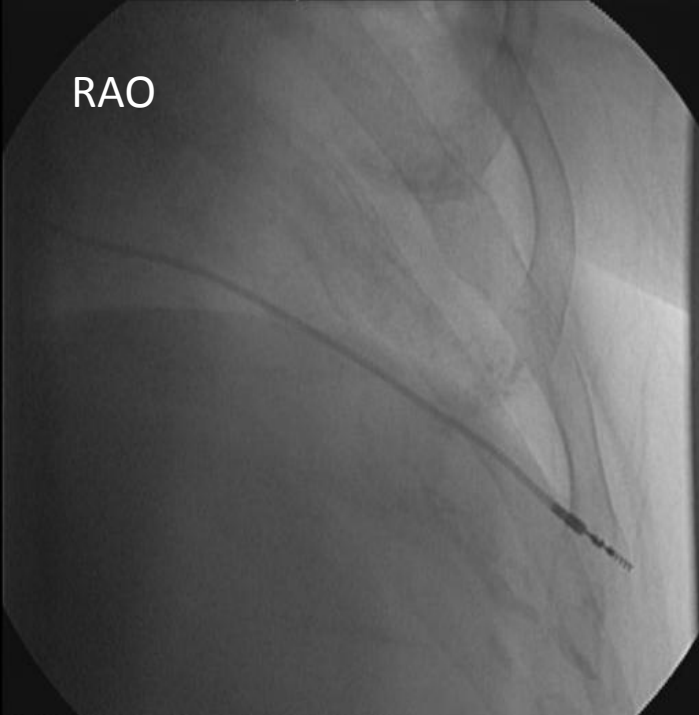
- %10
- Eşik yükselmesi, sens yetersizliği, perikardit, tamponad, interkostal adele veya diafragmatik stimülasyon
- Risk faktörleri
  - Geçici pil elektrodu (HR 2.7), Aktif elektrodlar (HR 2.5), Steroid kullanılması (HR 3.2)\*

\*Mahapatra *Heart Rhythm* 2005;2:907–911



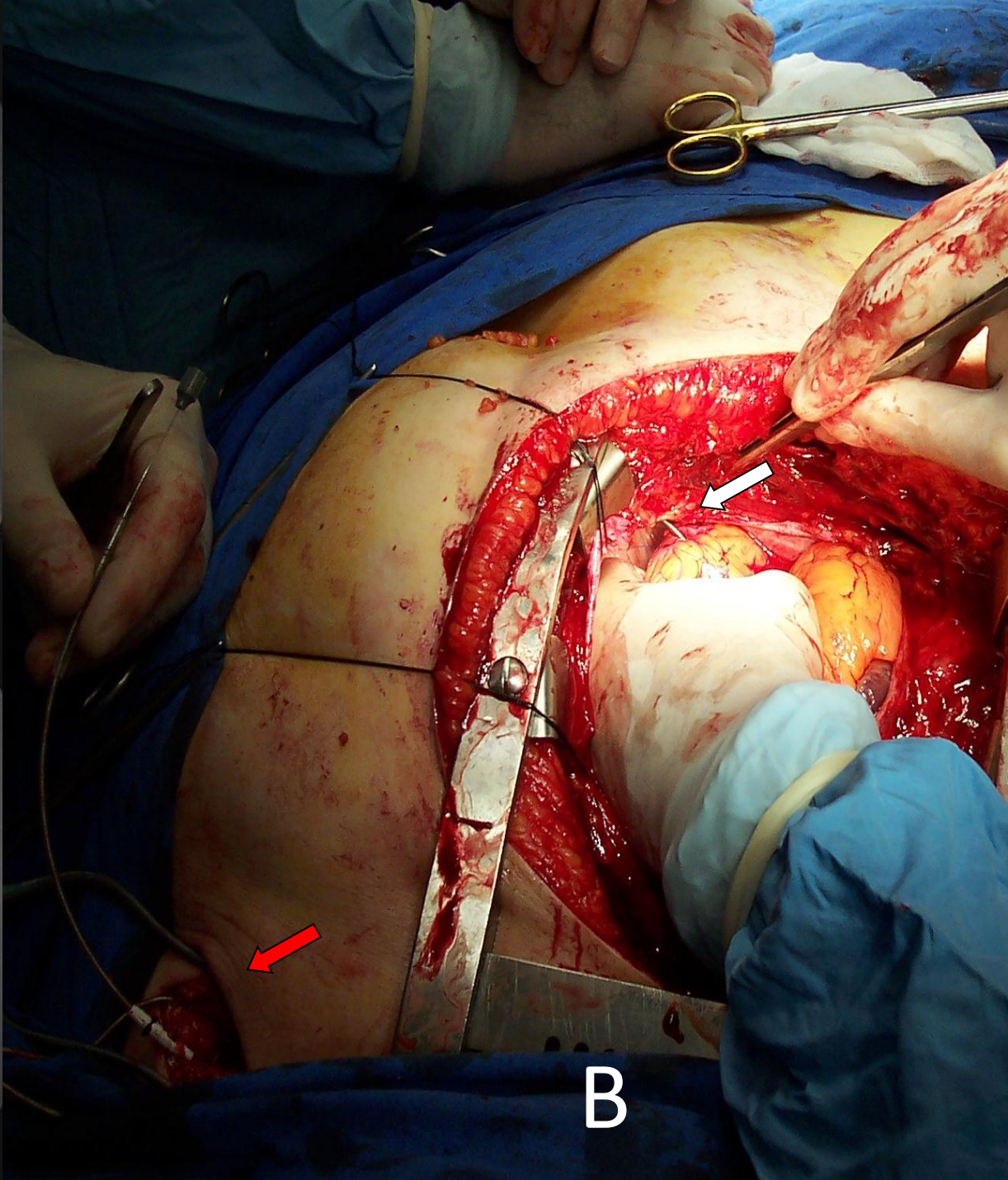
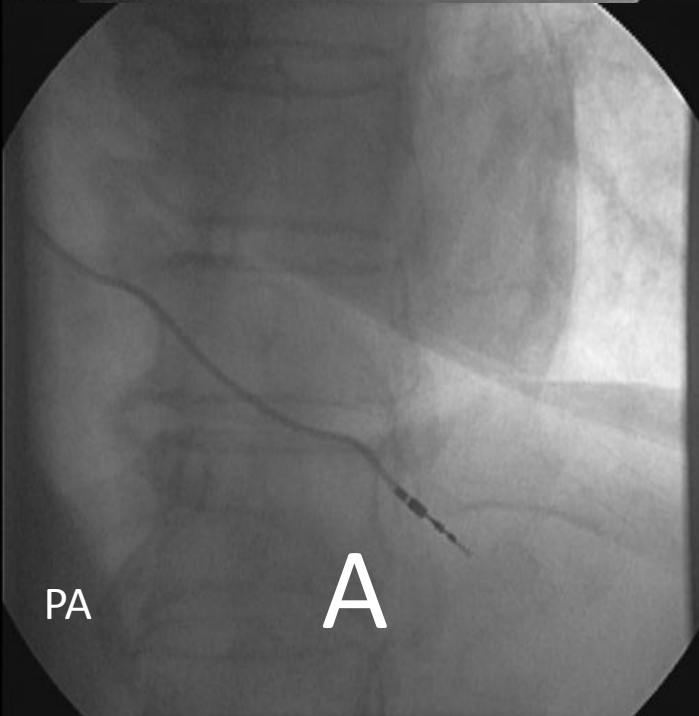


RAO



PA

A



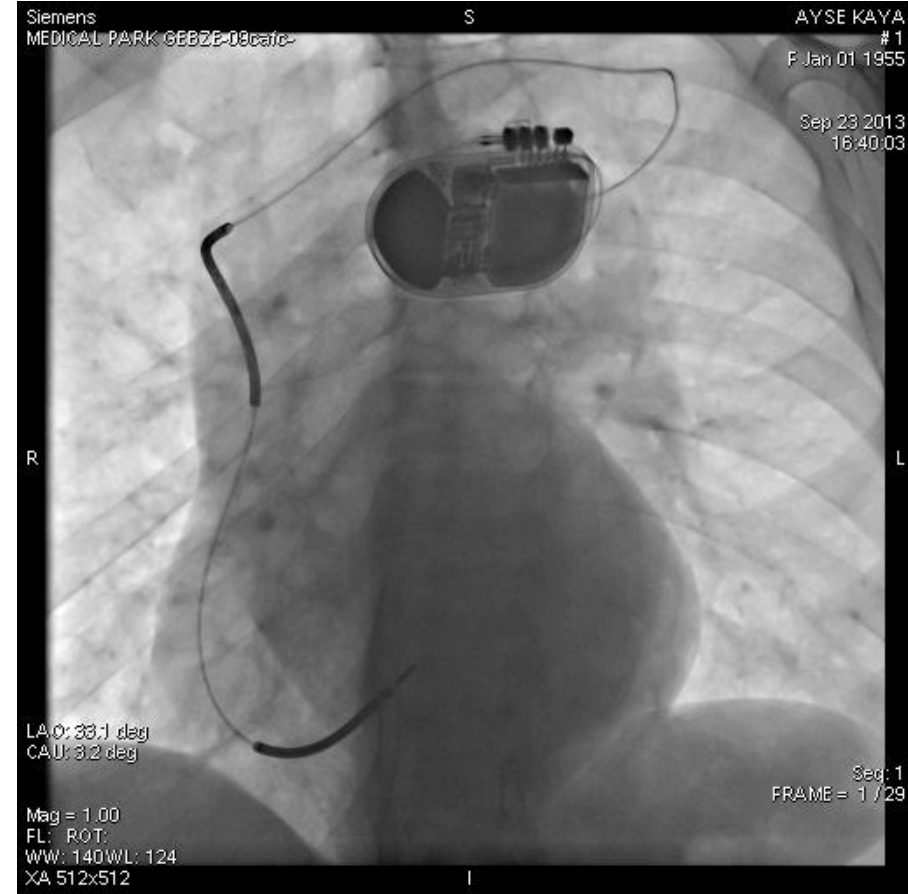
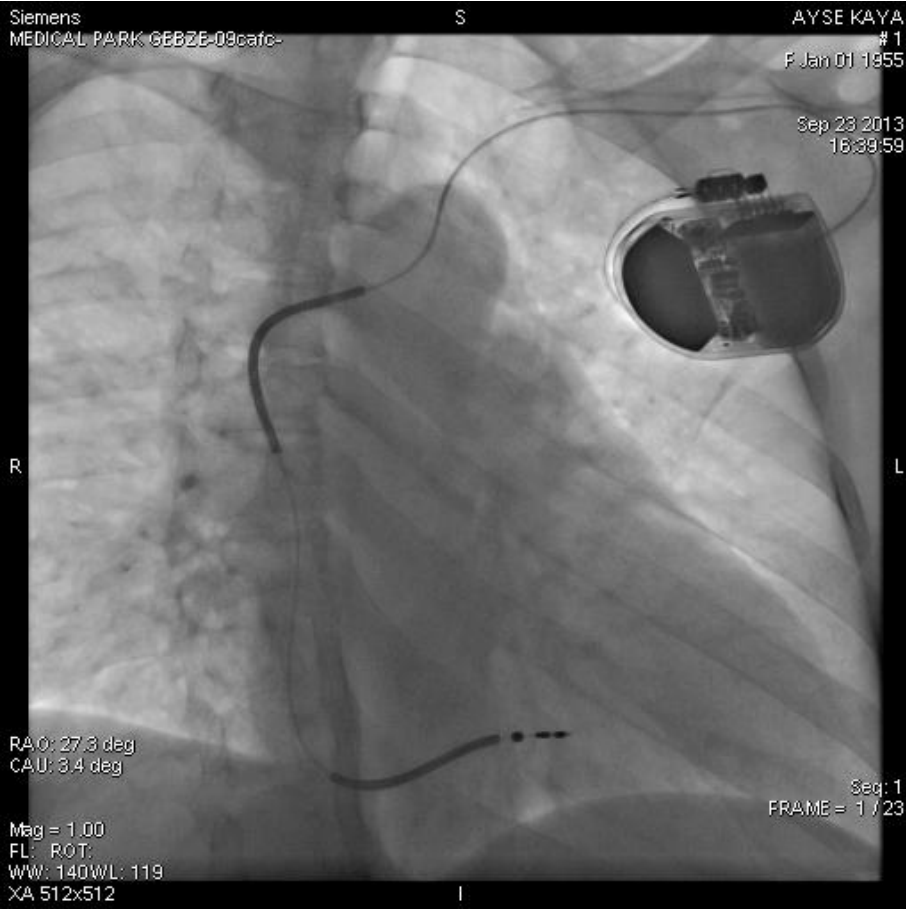
B

- Kalp perforasyonunun önlenmesi
  - Stileyi geri almak
  - Miyokarda fazla basınçdan kaçınma
  - Aktif elektrod ucunun fazla çevirilmemesi
  - SEPTAL implantasyon

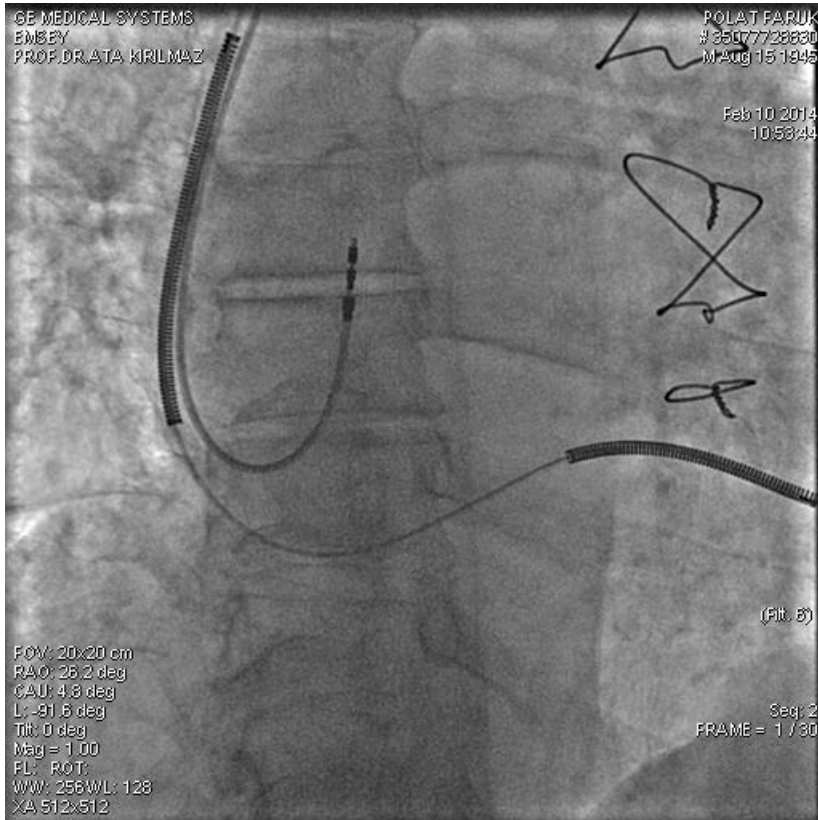
# RAO

# septal

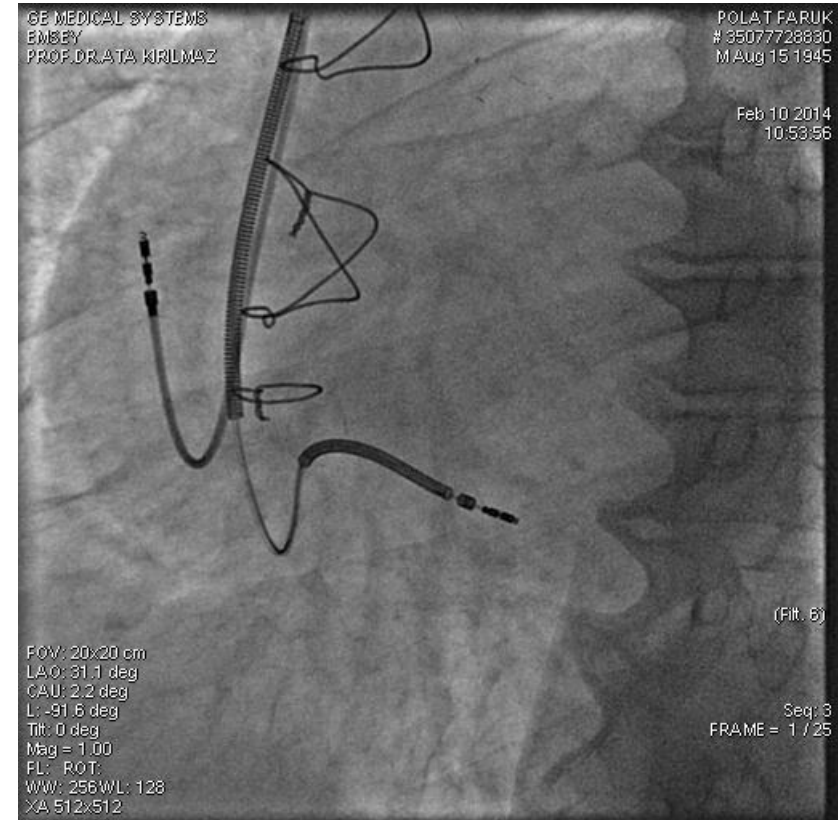
# LAO



# RAO



# septal

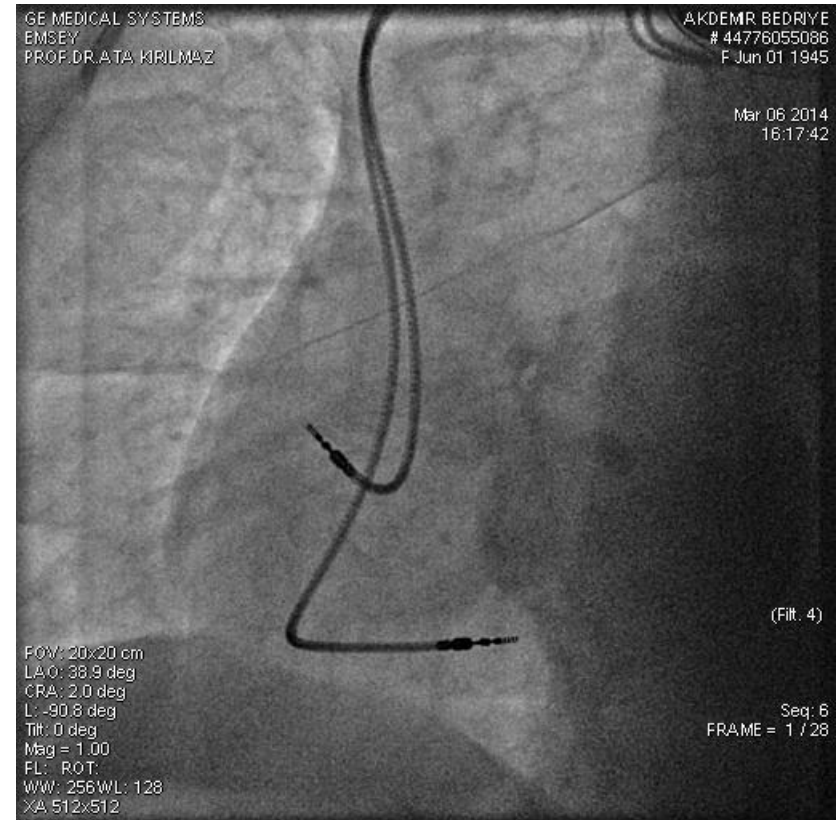
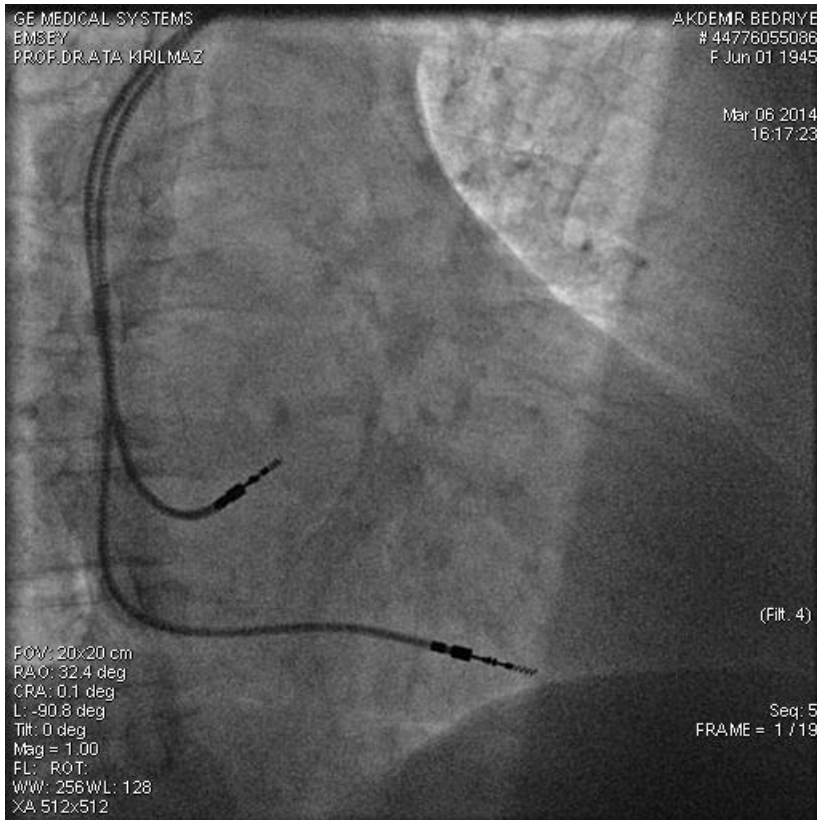


# LAO

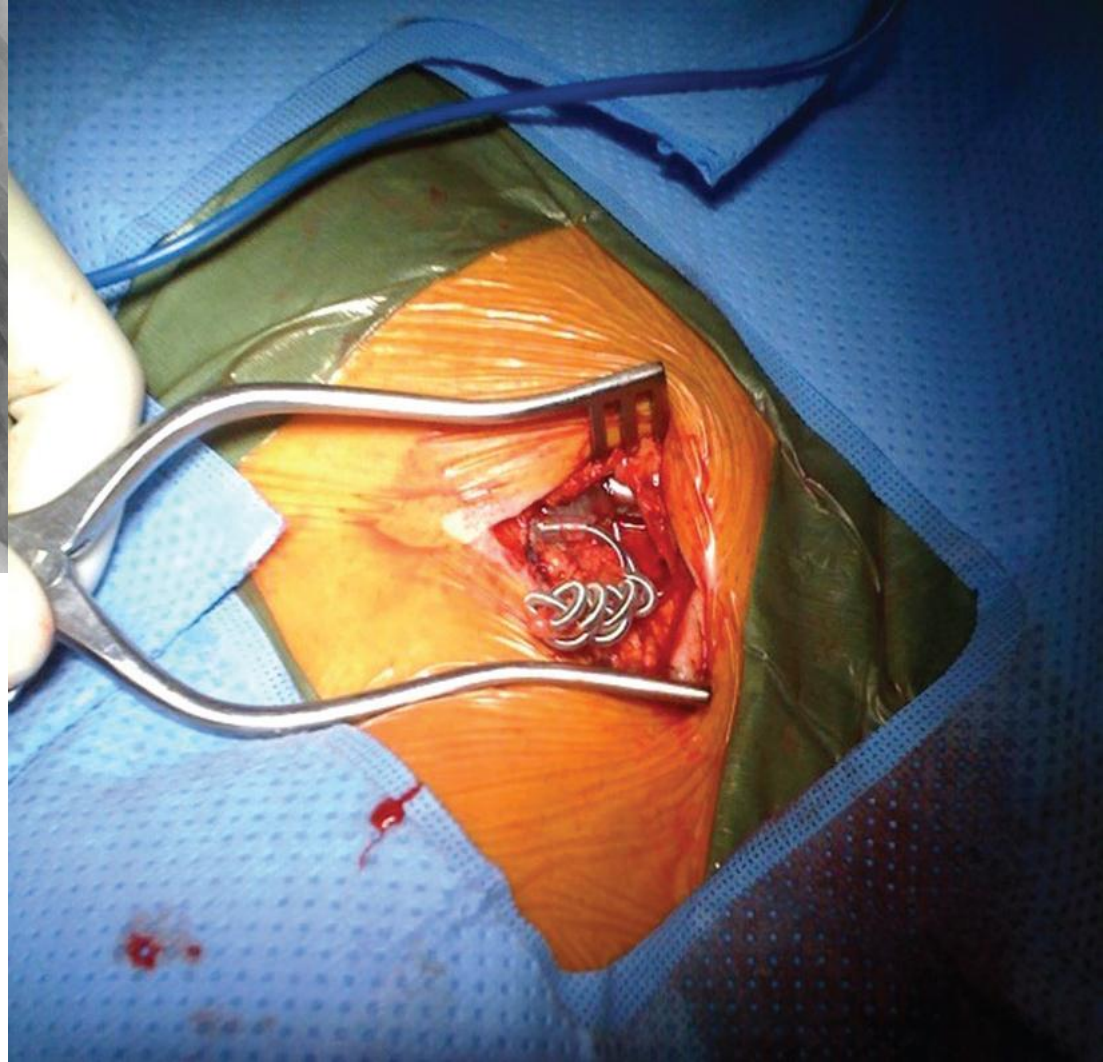
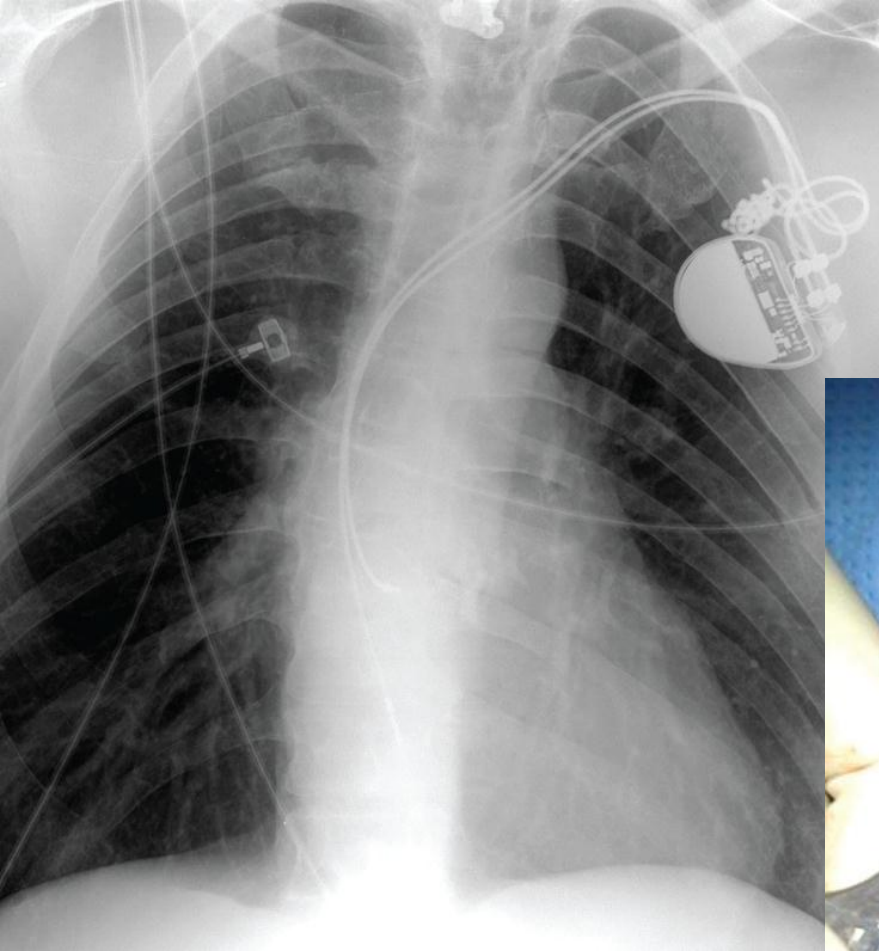
# RAO

# septal

# LAO



# Twiddler Sendromu



# Hematoma





• <http://www.topclosure.com/productTutorial.aspx>



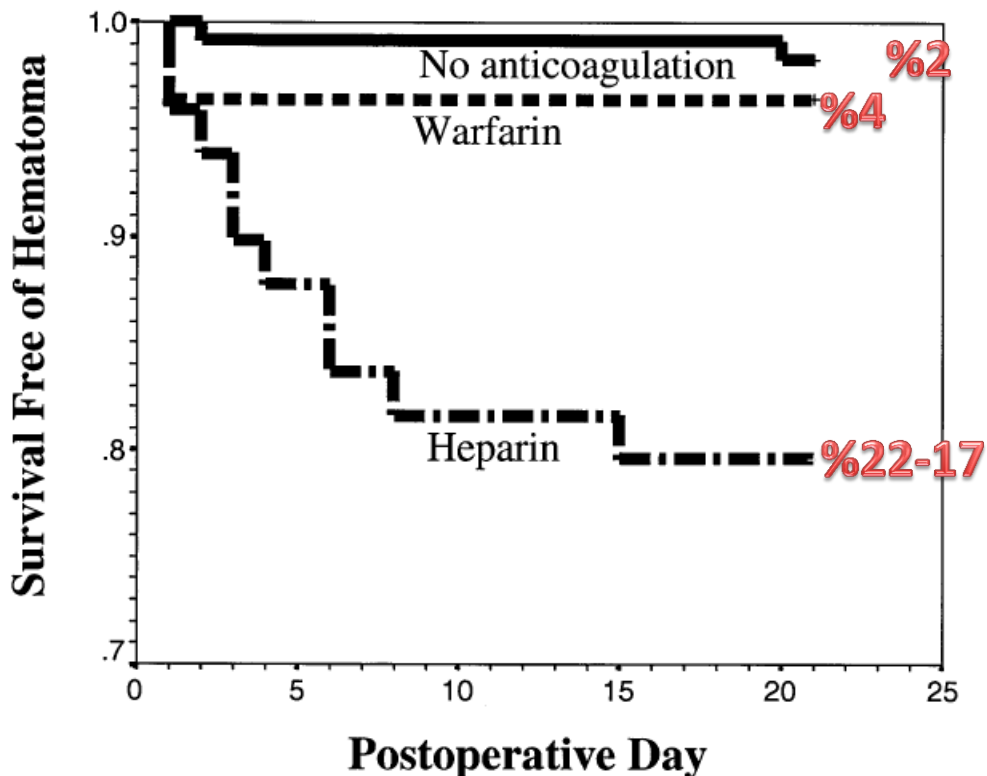
# Cep Hematomunda

- İğne aspirasyonu kontrendikedir !
- Yarada açılma, şiddetli ağrı veya hematomda ilerleme varsa açılmalıdır
- Hematom açıldığında enfeksiyon riski 15 kat artar

# A Randomized Trial Comparing Heparin Initiation 6 h or 24 h After Pacemaker or Defibrillator Implantation

Gregory F. Michaud, MD, Frank Pelosi Jr., MD, Matthew D. Noble, BS, Bradley P. Knight, MD, Fred Morady, MD, FACC, S. Adam Strickberger, MD, FACC

*Ann Arbor, Michigan*



# Evaluation of a new standardized protocol for the perioperative management of chronically anticoagulated patients receiving implantable cardiac arrhythmia devices

Oscar Cano, MD,\*† Begoña Muñoz, MD,\* David Tejada, MD,\* Joaquín Osca, MD, PhD,\*  
María-José Sancho-Tello, MD,\* José Olagüe, MD,\* José E. Castro, MD,\* Antonio Salvador, MD, PhD\*

From the \*Electrophysiology Section, Cardiology Department, Hospital Universitari i Politècnic La Fe, Valencia, Spain;  
†Instituto Investigación Sanitaria La Fe, Valencia, Spain.

## YÜKSEK RİSK

- CHADS2 skoru  $\geq 2$
- Öncesinde SVO
- Romatizmal kapak hastalığı
- Kapak protezi

Oral antikoagülan kesilmedi

n=129    %2.3

Heparin Köprüleme (öncesi ve sonrası LMWH n=62)

%17.7

## DÜŞÜK RİSK

Oral antikoagülan tamamen kesildi

(n=82)    %0

Heparin Köprüleme (LMWH sadece sonrası n=142)

%13

# Hematom riski

- DMAH>Heparin>warfarin
- warfarin'i kesmeyin
  - Mutlaka unipolar cerrahi koter



- Sefalik ven “cutdown”, aksiller ven, ekstratorasik subklavian ven ponksiyonu
  - Px, hemotoraks, subklavian ezilme-kırılma
- warfarin’e devam (cerrahi koter)
  - Hematom
- Septal implantasyonu
  - Perforasyon, lead yer deđiřtirmesi
- Injury Akımı
  - Lead yer deđiřtirmesi

- teşekkürler