

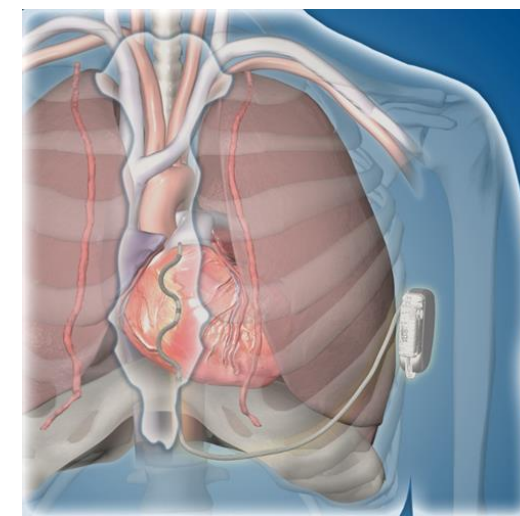
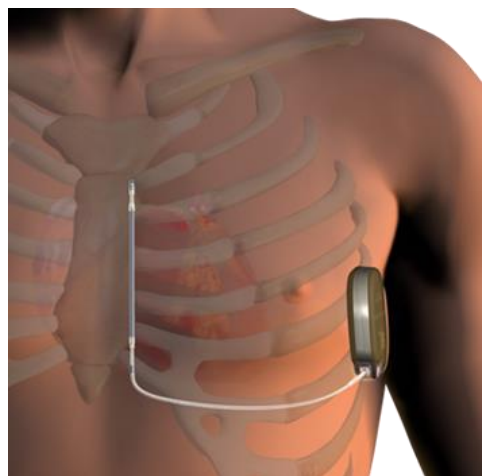
3<sup>èmes</sup> JOURNÉES de STIMULATION & DÉFIBRILLATION

GROUPE DE RYTHMOLOGIE ET DE STIMULATION CARDIAQUE DE LA SOCIÉTÉ FRANÇAISE DE CARDIOLOGIE



Session: Défibrillation

# Le défibrillateur sous-cutané et le défibrillateur sous-sternal



Université Lille 2  
Droit et Santé

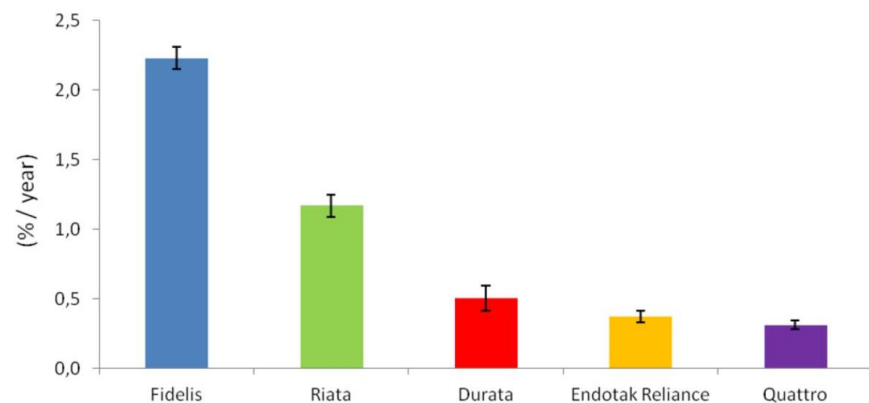


Christelle MARQUIE, Lille

# Liens d'intérêts

- Abbott
- Biotronik
- Boston
- Medtronic
- Microport
- Zoll

# Rationnel : les fractures de sondes

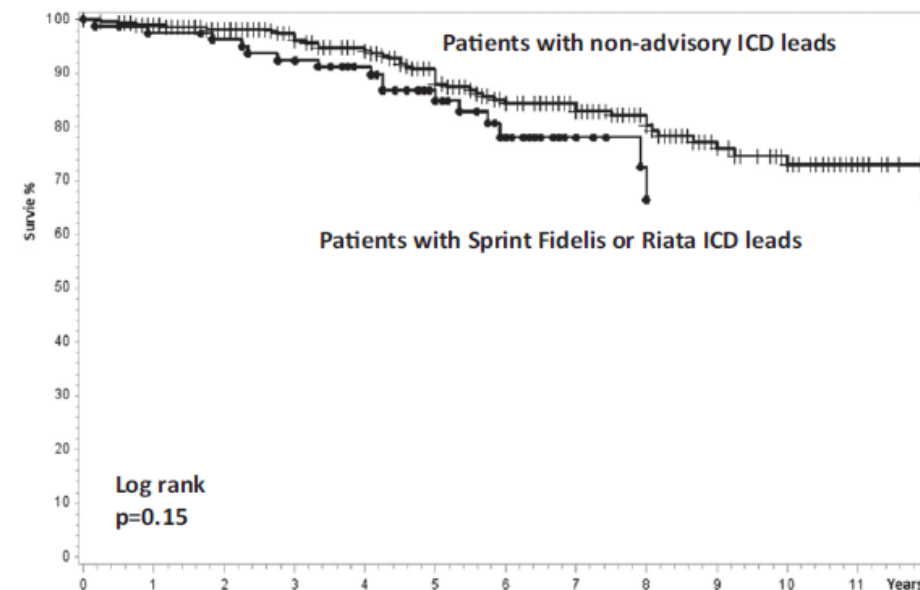


	Fidelis	Riata	Durata	Endotak Reliance	Quattro
<i>n</i>	11 709	5900	5538	10 605	16 119
Lead-years	35 300	17 324	6716	27 479	49 689
Incidence (% per year)	2.23	1.17	0.45	0.36	0.29
95% CI	2.08 to 2.39	1.01 to 1.33	0.31 to 0.64	0.30 to 0.44	0.25 to 0.34

## A Meta-Analysis of Observational Studies <sup>1</sup>

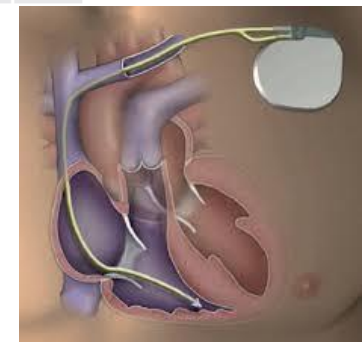
- Meta-analysis of 17 studies
- 49 871 leads
  - 136 509 lead-years

Rate of **lead failure** depends on lead family design, ranging from **2.9% to 4.5% at 10 years** for non-recalled lead families.<sup>1</sup>



Year	0	1	2	3	4	5	6	7	8	9	10	11	12
Non-advisory ICD leads	296	273	245	221	203	165	140	113	87	62	46	25	12
Sprint fidelis or Riata leads	82	79	76	72	66	45	29	17	12	0	0	0	0

## Brugada patients <sup>2</sup>



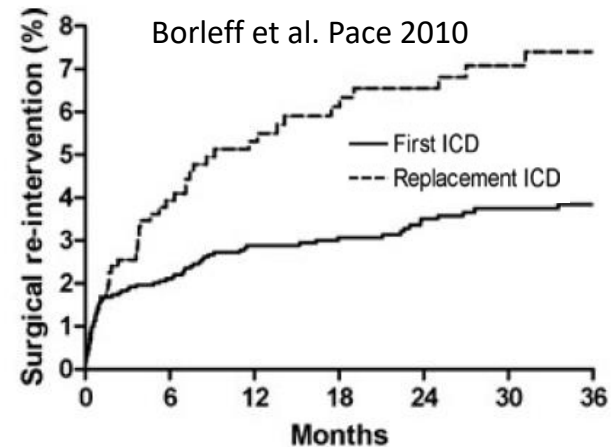
1. Rui Providência et al. J Am Heart Assoc 2015;4:e002418  
 2. Sacher .Circulation 2013; 128:1937-47

# Rationnel : les infections

## • Infection 1 to 7%

- The **more complex CIED system** implanted the higher infection risk.<sup>3</sup>
- Infection risk is **2–4 × greater** after **device replacement** and **upgrades** compared with primary implants<sup>3</sup>

### Infections and ICD replacement<sup>1</sup>



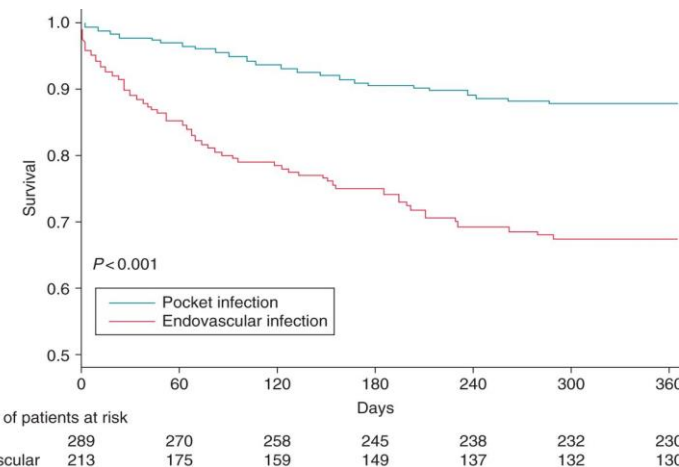
ICDs at risk	0	6	12	18	24	30	36
First ICD	2415	1748	1299	912			
Replacement ICD	748	514	372	235			

## Mortality 10 to 30%

- Infection commonly **tracks along leads** and/or **causes secondary blood-stream infection and endocarditis**<sup>3</sup>
- Endovascular infections are **associated with high mortality**<sup>2</sup>

### 1-yr mortality following TV-ICD system removal for infection<sup>2</sup>

Tarakji KG et al Europace 2014

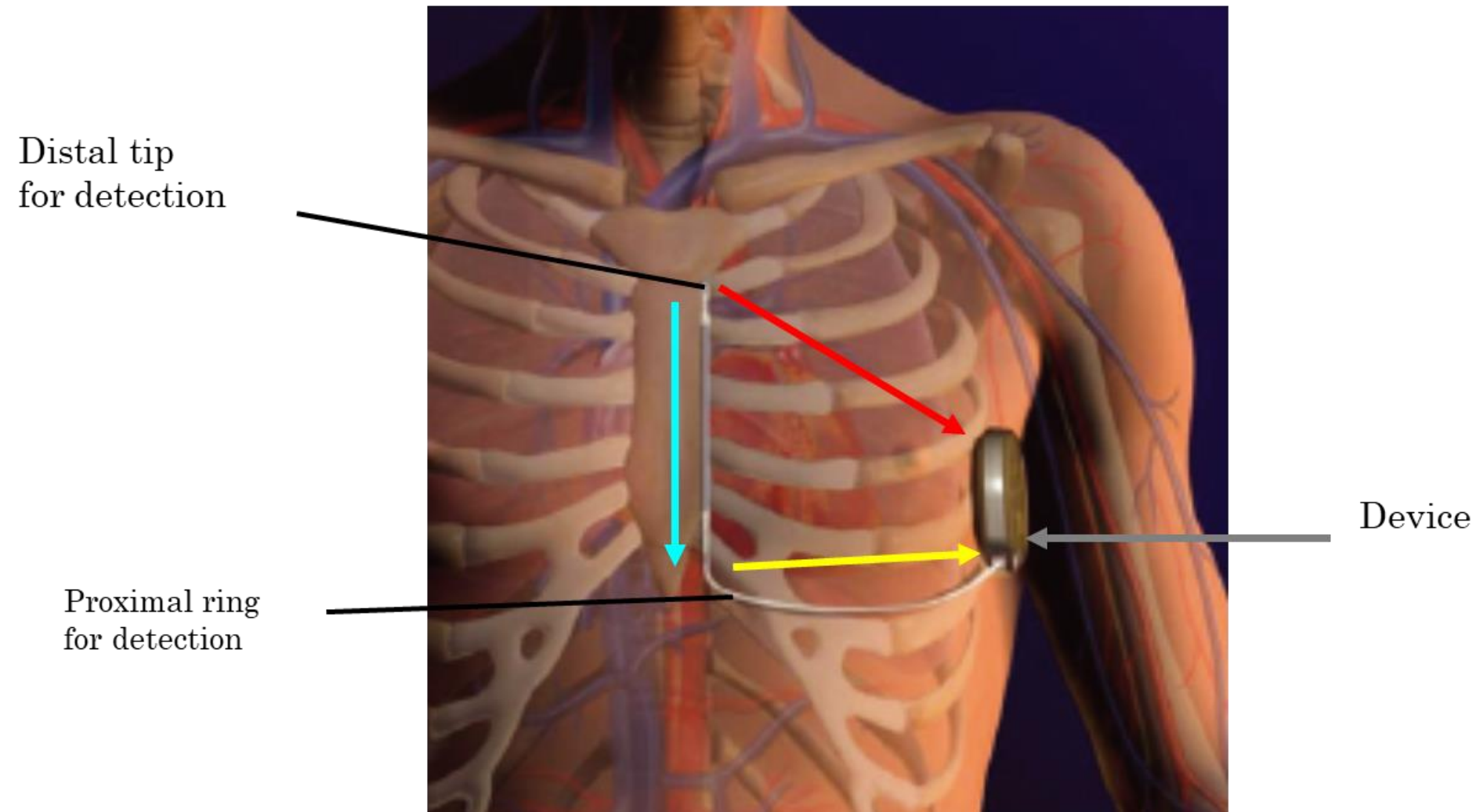


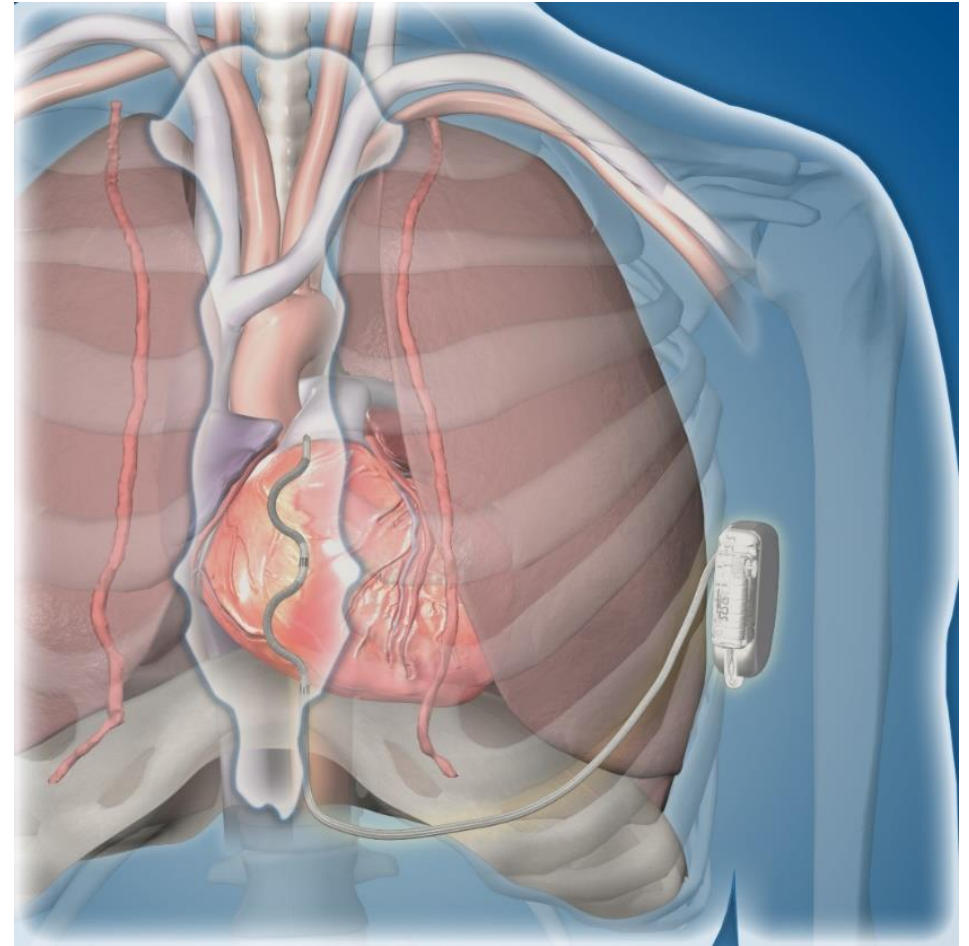
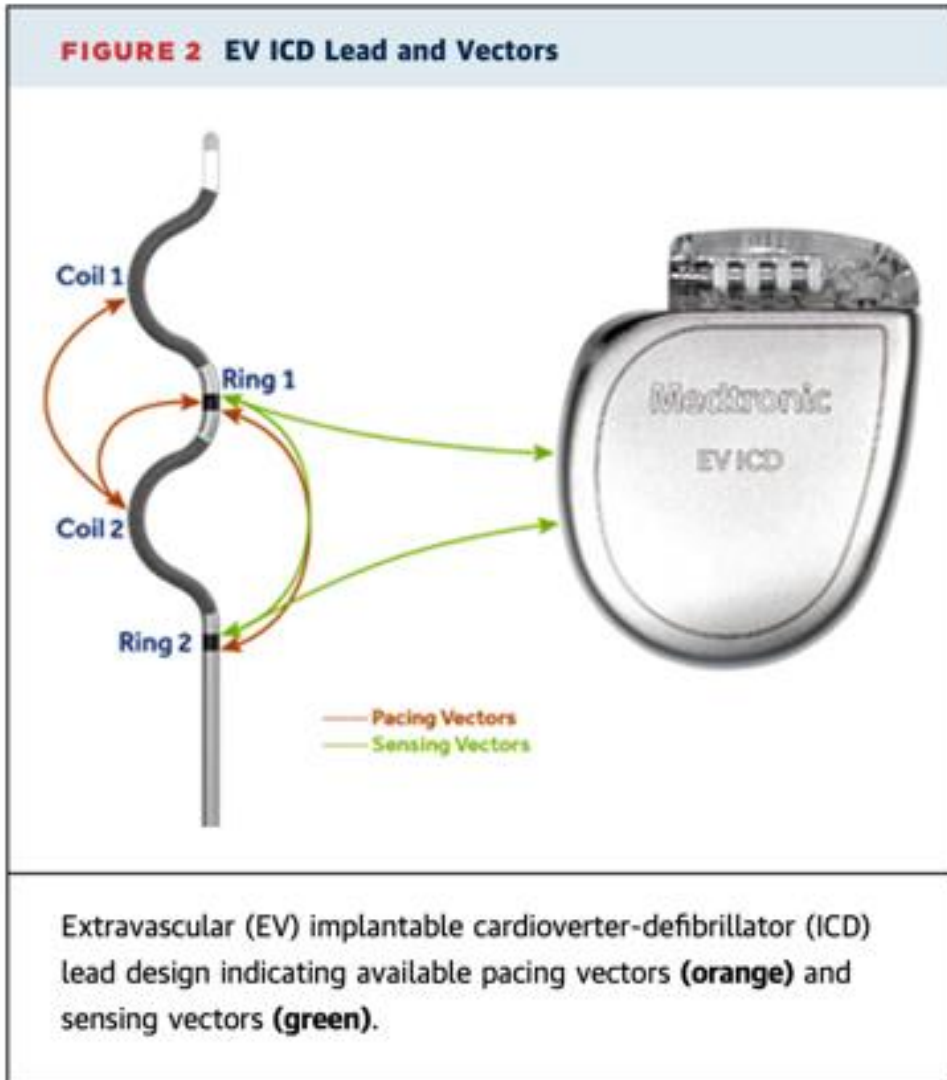
Number of patients at risk	0	60	120	180	240	300	360
Pouch	289	270	258	245	238	232	230
Endovascular	213	175	159	149	137	132	130

1. Borleff et al. Pace 2010 2. Kirkfeldt RE et al. Eu Hearth J 2013.  
 2. 2. Tarakji KG et al Europace 2014 3. JC Nielsen et al. European Heart Journal 2015.  
 3. 3. MC Burke, et al., JACC. 2015; 65:1605–15

# S-ICD

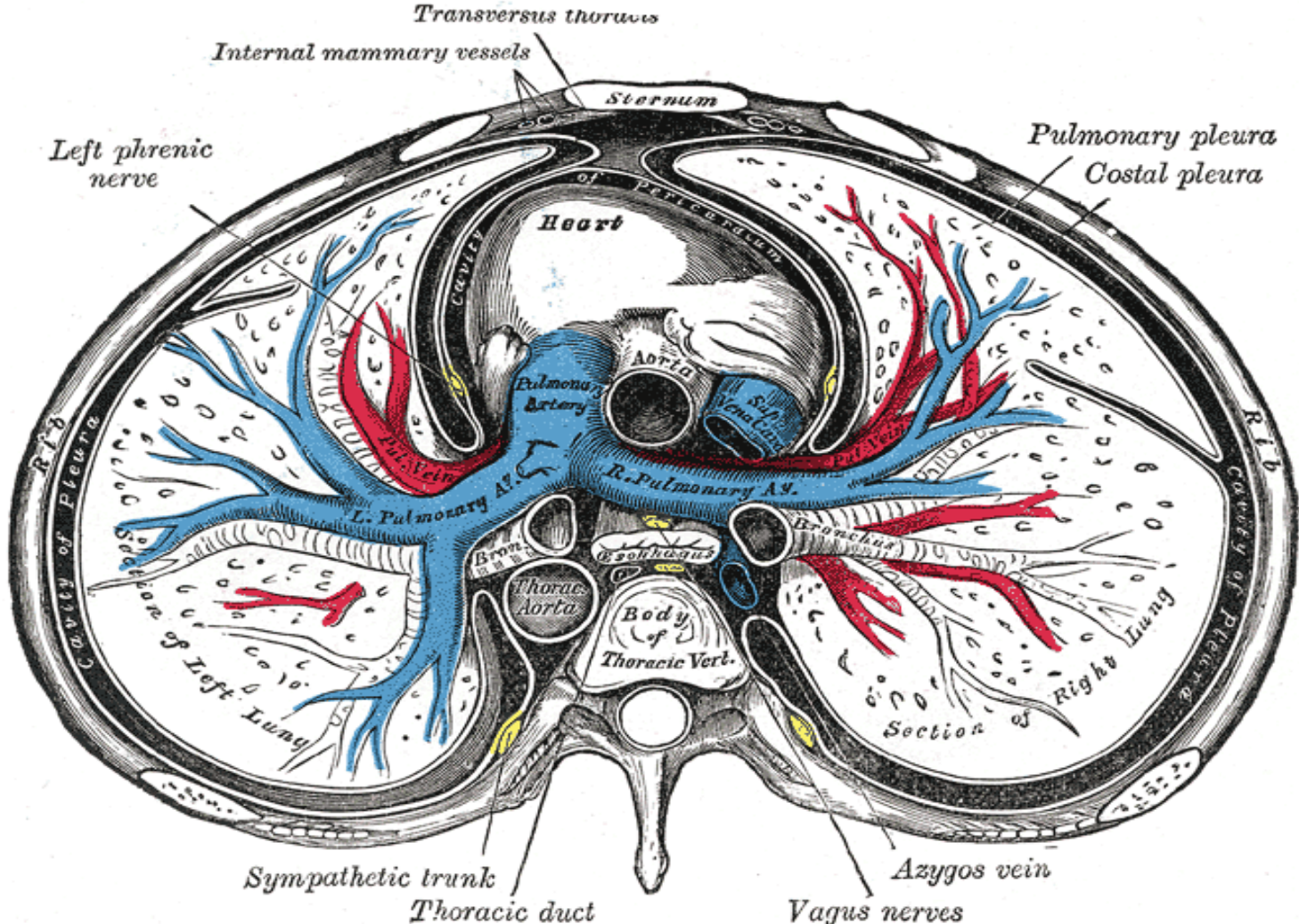
- 59,5 cc
- 80 J
- 7 years
- MRI
- télésurveillance
- No pacing No ATP





- 33 cc
- 40 J
- Longevité 11 ans
- Brady/ATP/choc
- IRM compatible / télésurveillance

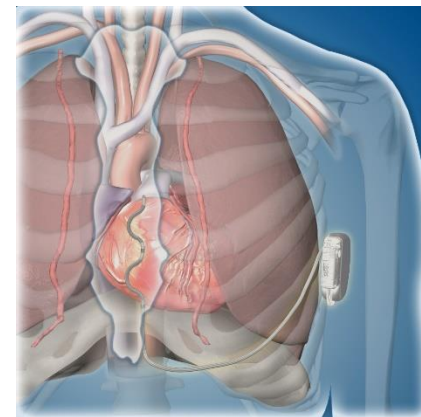
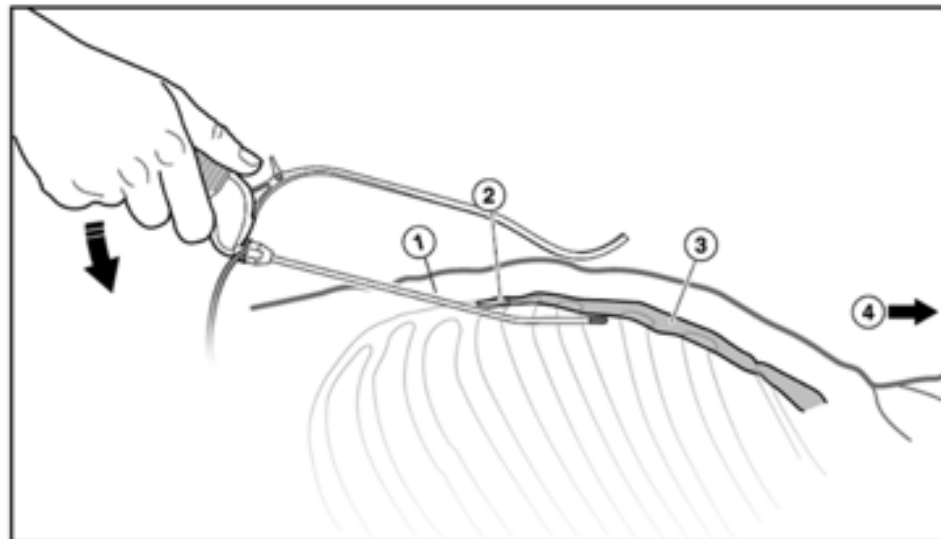
# Anatomy of the substernal space



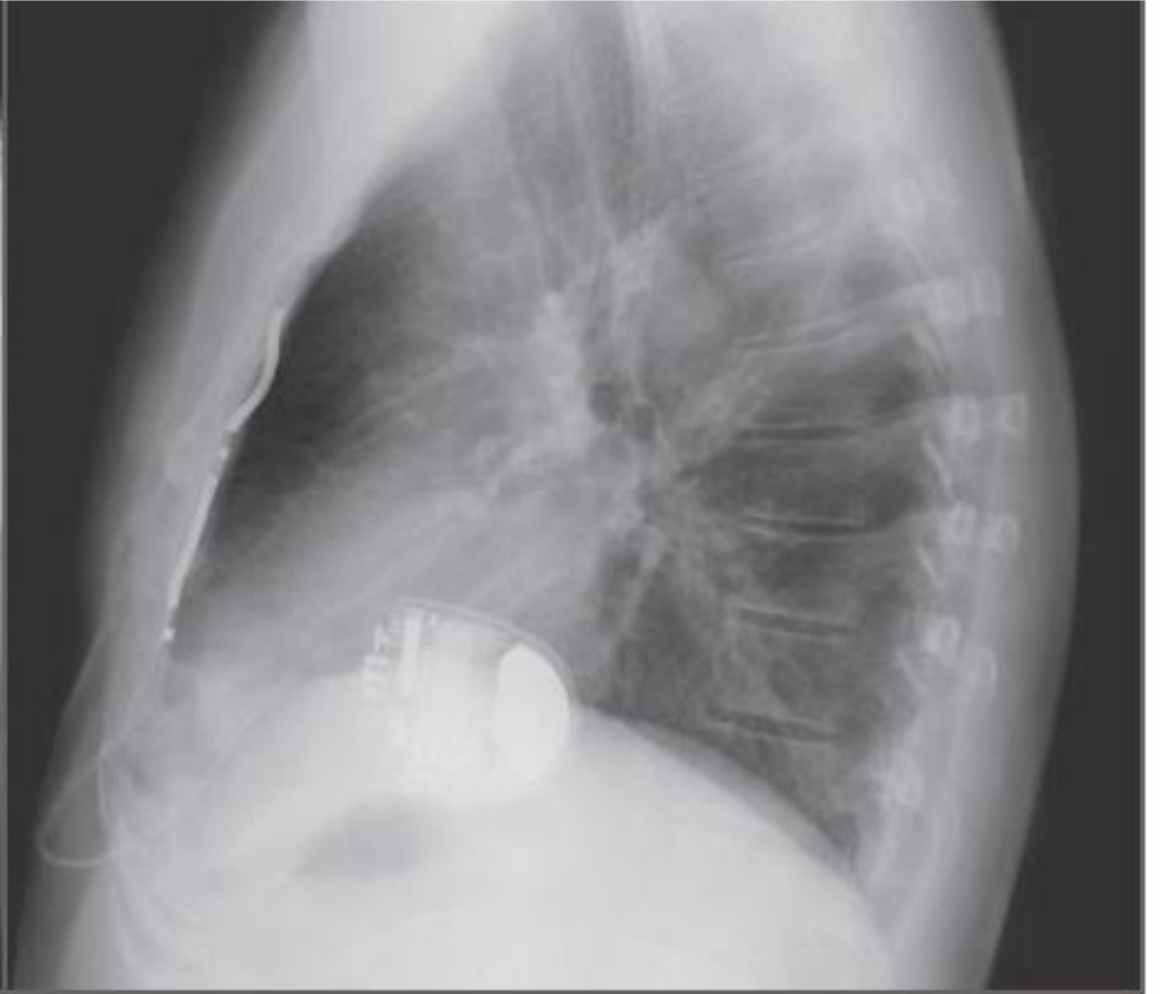
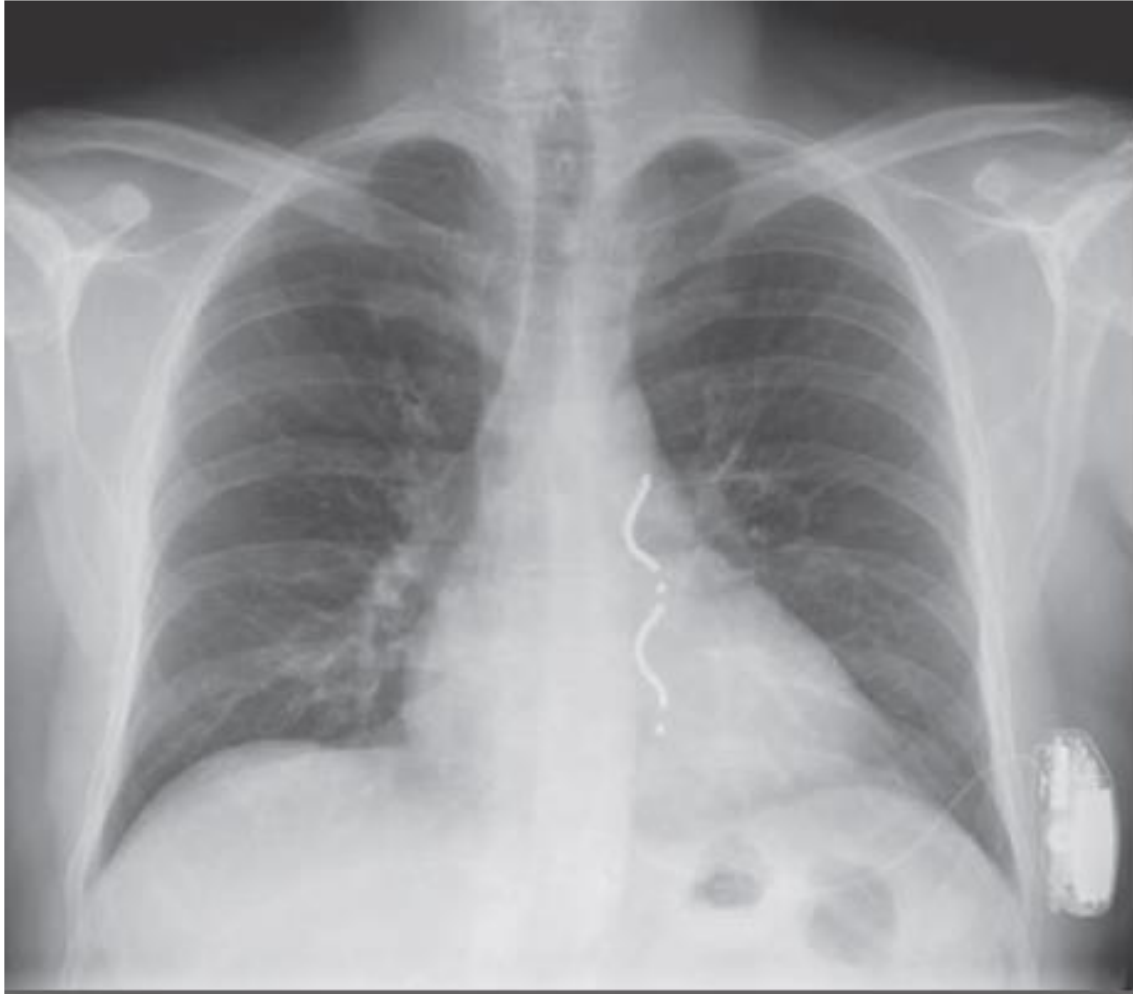
# Technique d'implantation

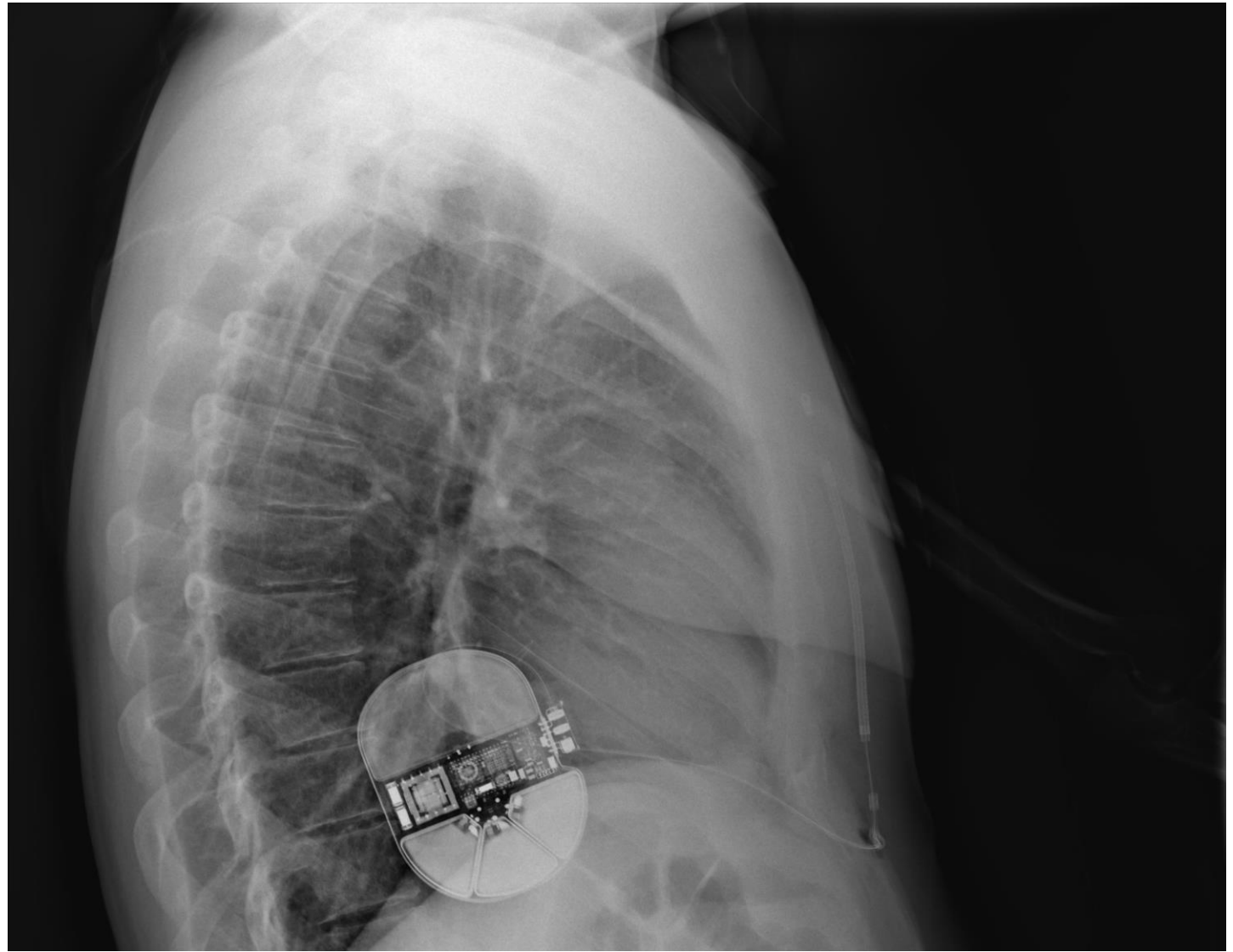
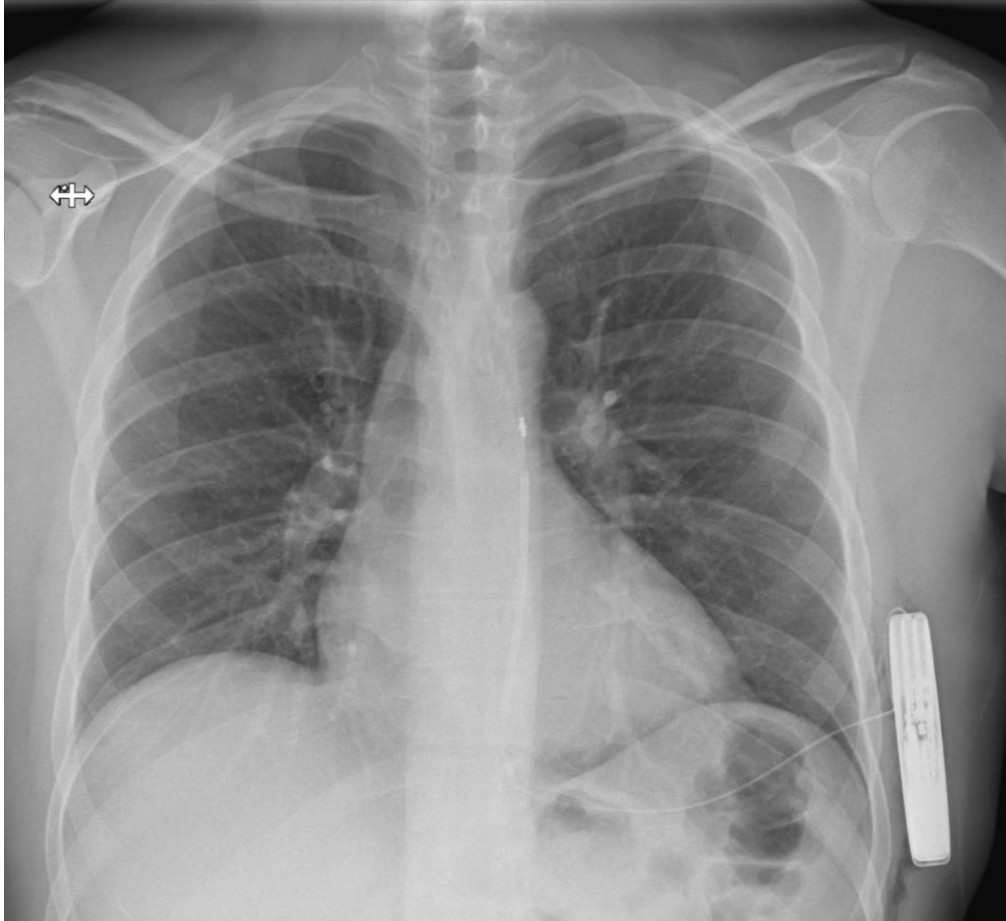
- Courbe d'apprentissage
- Peu de risque
- Rigueur implantation dépend efficacité défibrillation
- Sédation

- Courbe d'apprentissage
- Risque: espace sous-sternale
- Importance orientation sonde
- AG indispensable





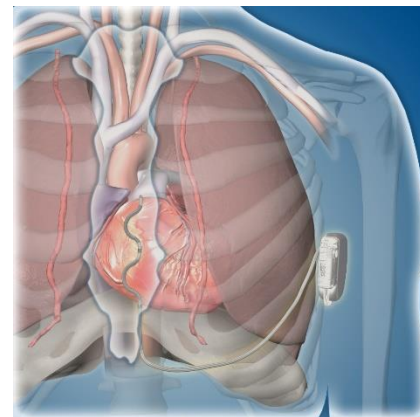




# Boitier

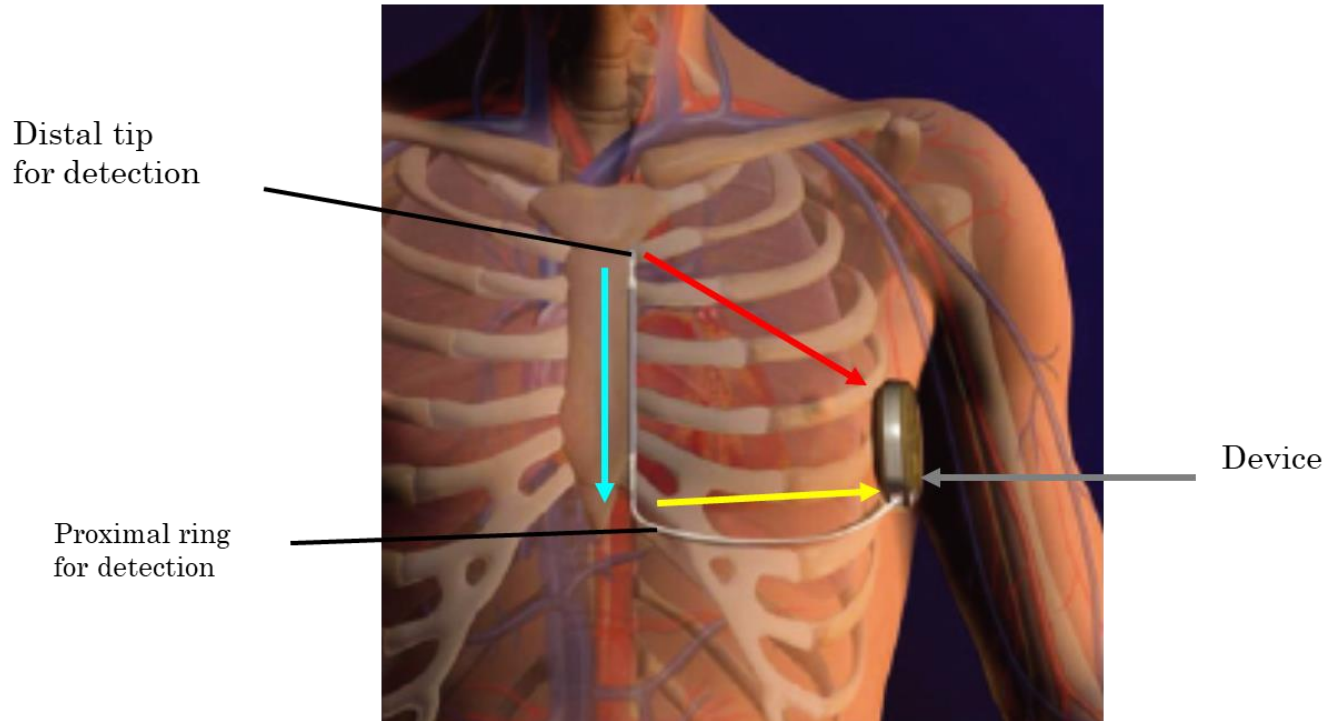
- 59,5 cc
- 80 J
- 7 ans
- Zones de choc
- « Boite à choc »

- 33 cc
- 40 J
- Longévité 11 ans
- Programmable comme un endocavitaire

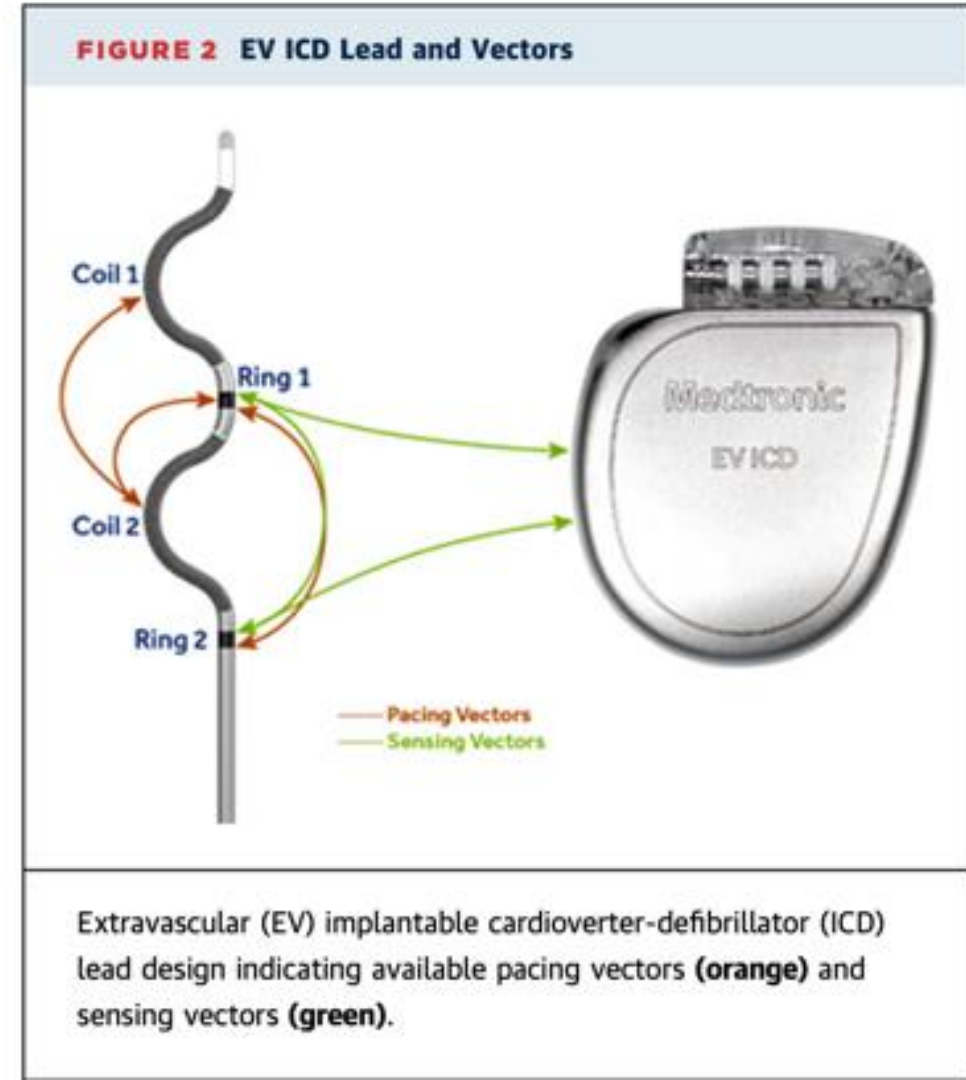


# Sécurité : détection

- 3 different vectors for sensing : primary (yellow), secondary (red) and alternate vector (blue)



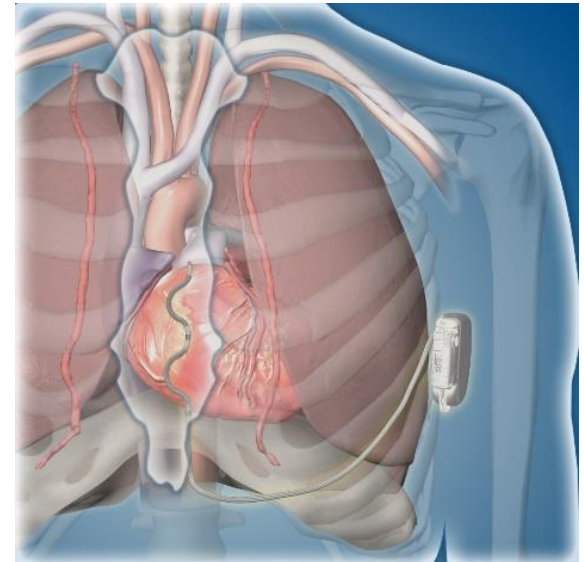
Moins d'interférences musculaires ?  
Influence du positionnement ?  
Ecoute atriale?



# Sécurité: défibriller

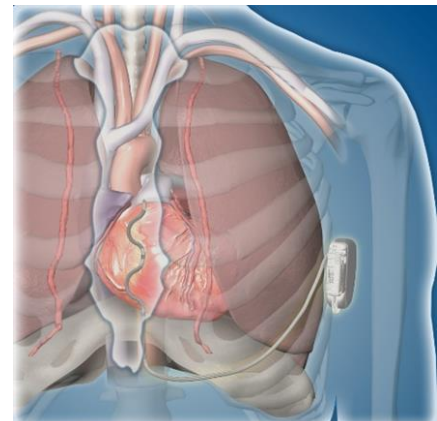
- 95 à 100% à 65 J au bloc
- 98% à 80J en suivi

- 98,7% à 30J au bloc
- Temps de traitement: 18 sec
- 100% en suivi
- ATP 50% succès



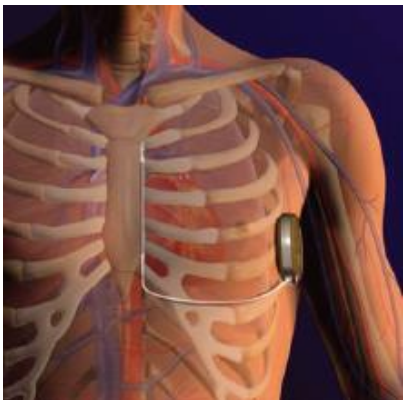
# POINTS POSITIFS

- Recul de 10 ans
- Fiable en terme de détection et de traitement
- Pas d'infection grave. Facile à traiter
- ATP et pacing possible
- « petit boîtier »
- Durée de vie boîtier



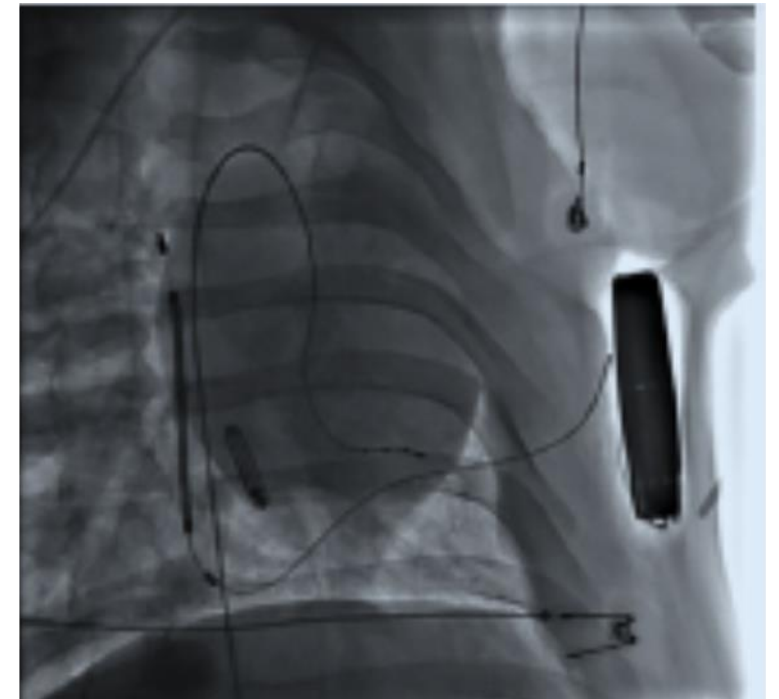
# POINTS NEGATIFS

- Coût
- Taille boîtier
- Pas d'ATP
- Chocs inappropriés sur du «bruit »
- Durée de vie boîtier
- Chocs inappropriés sur double écoute
- Stimulation douloureuse
- Position rétrosternale : abord / risques infectieux

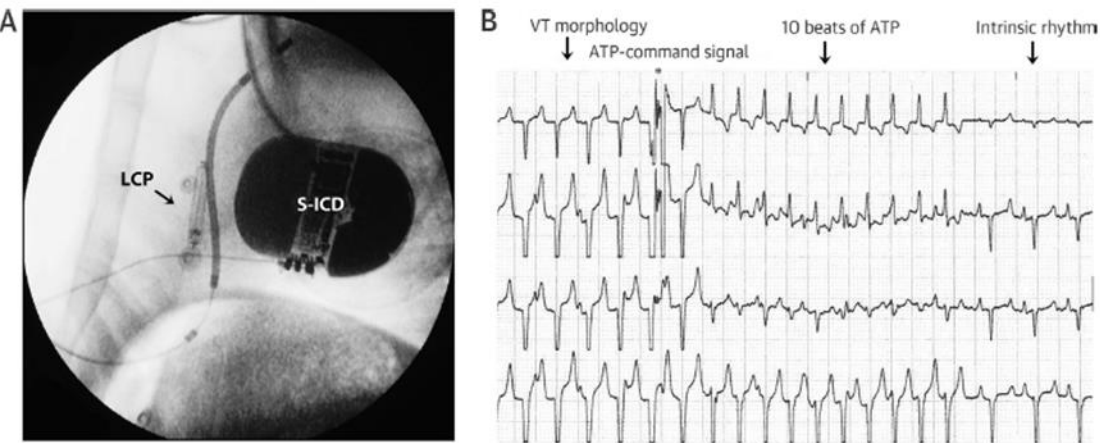


# AVENIR

- S-ICD: amélioration détection , durée de vie du boitier
- Thérapie modulaire
  
- EV ICD : développement En France



**FIGURE 1** Combined Implant of ATP-Enabled Leadless Cardiac Pacemaker and S-ICD



**(A)** Combined implantation of the leadless cardiac pacemaker (LCP) prototype in right ventricular apex and subcutaneous implantable cardioverter-defibrillator (S-ICD) in sheep. **(B)** Episode of simulated ventricular tachycardia (VT) (left ventricular pacing) followed by manually triggered S-ICD anti-tachycardia pacing (ATP)-command resulting in successful ATP-delivery by the LCP (10 beats, at 81% of coupling interval).



# CONCLUSION

Richesse : techniques alternatives  
s'adaptent aux besoin du patient