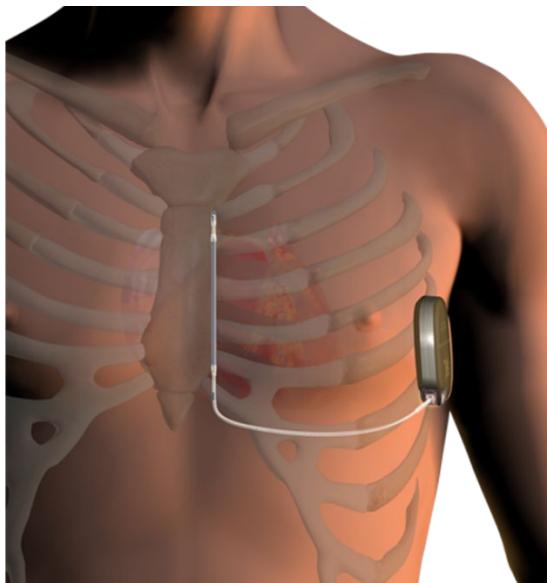


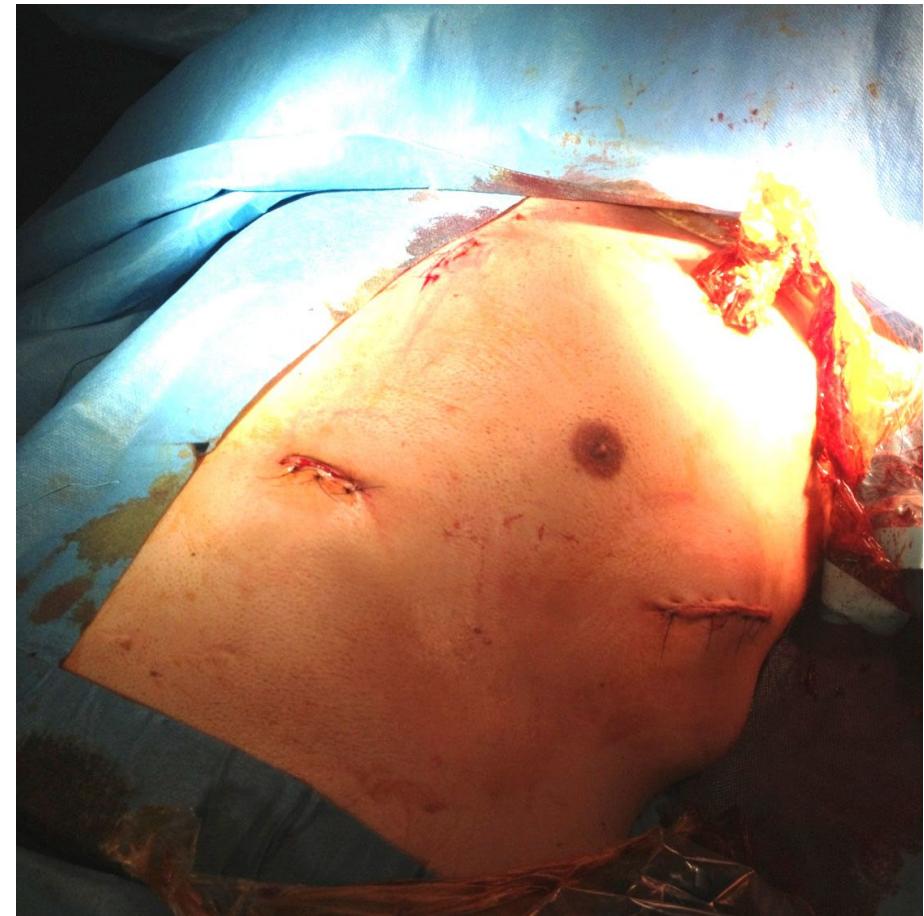
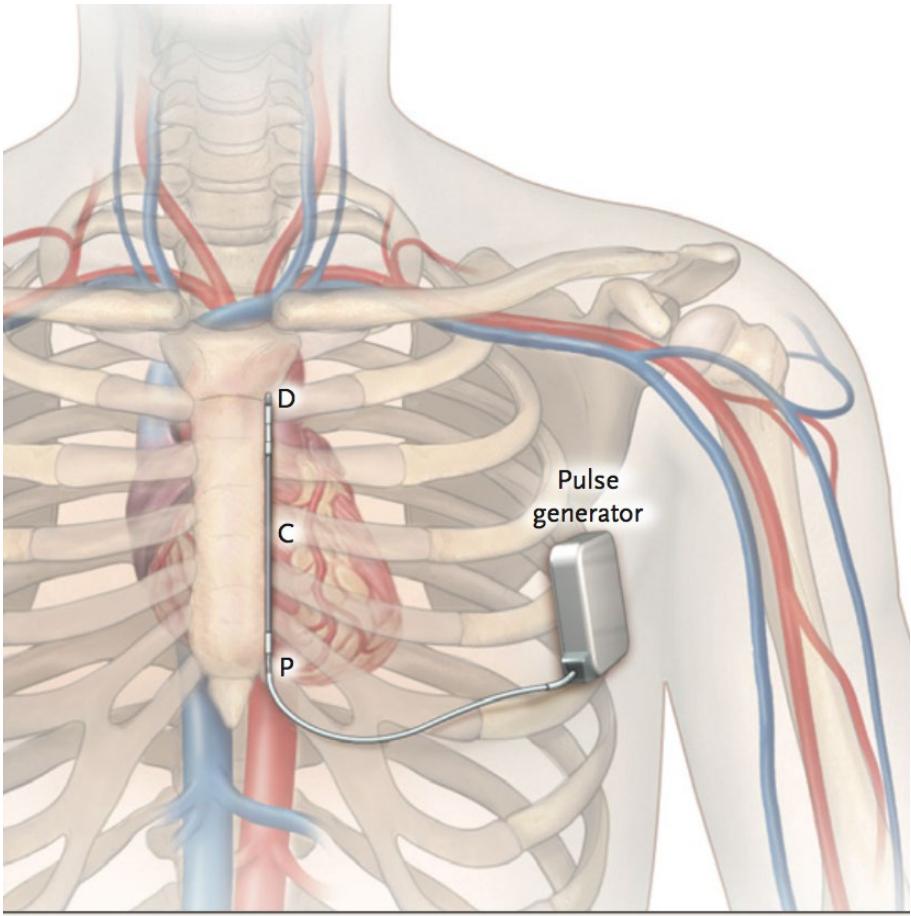


Evolution des techniques d'implantation du défibrillateur sous-cutané



Rim EL BOUAZZAOUI
CHU de Montpellier
Rythmologie

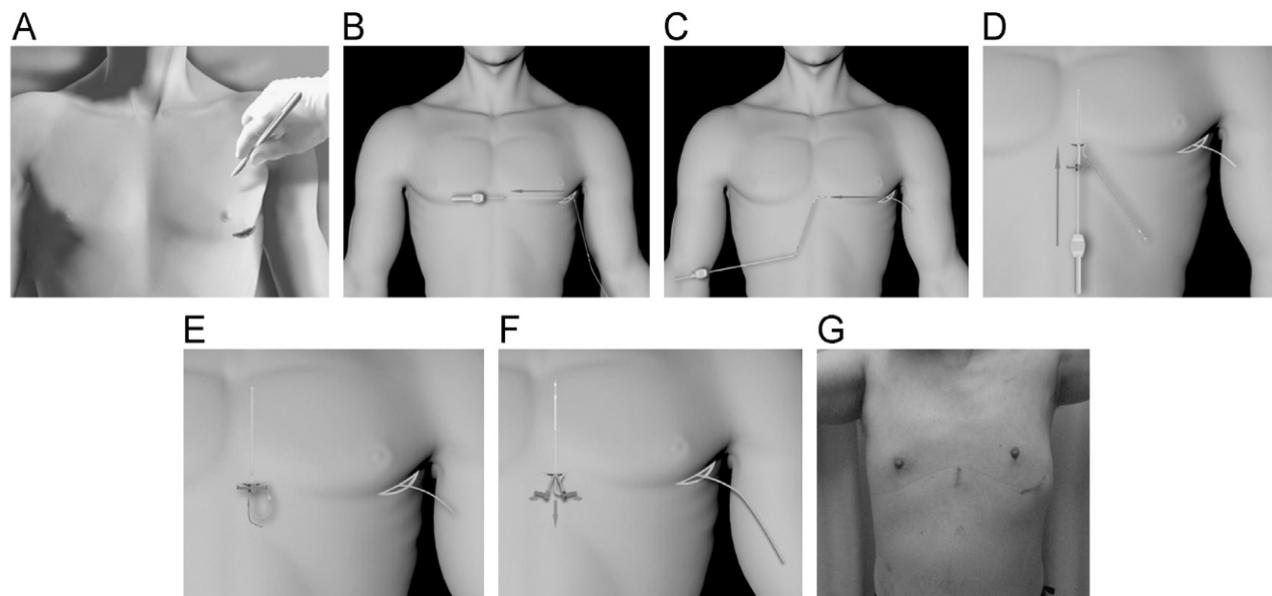
The subcutaneous ICD implantation



Bardy, NEJM 2010

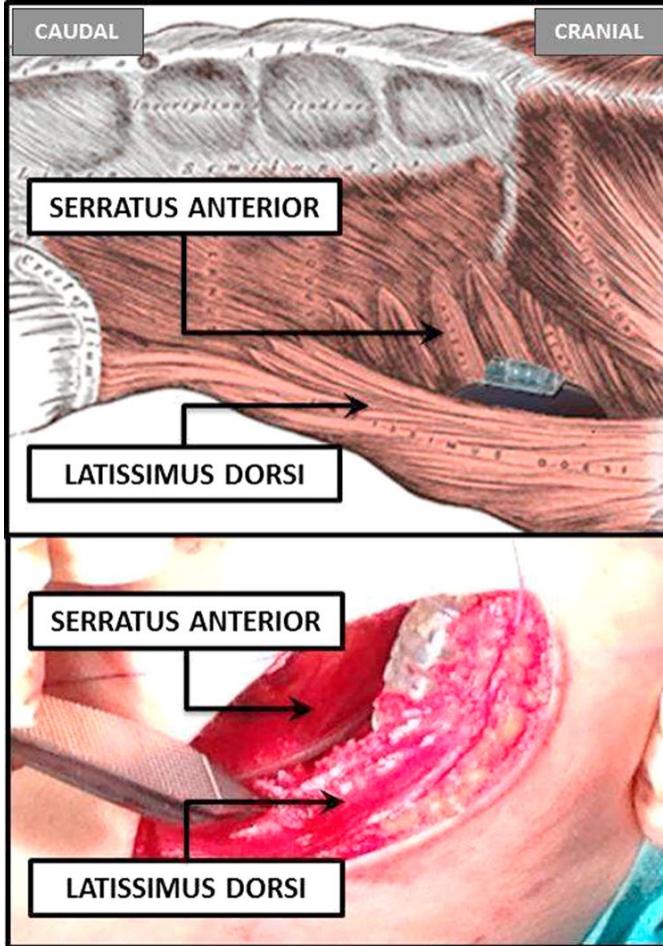
2 or 3 incision techniques

The 2 incision technique



	Patients		Episodes	
	No.	Percent	No.	Percent
Appropriate sensing				
Total number	4	10%	23	100%
Appropriate shocks	2	5.1%	18	78%
Nonsustained ventricular tachycardia	3	7.7%	5	22%
Inappropriate sensing				
Total number	5	13%	14	100%
Inappropriate shocks	4	10%	7	50%
Nonsustained event caused by inappropriate sensing	4	10%	7	50%
Cause				
T-wave oversensing	4	80%	11	79%
Noise sensing	1	20%	1	7.1%
TENS therapy	1	20%	2	14%
Complications				
Total number	2	5.1%		
Cause				
Skin erosion of device resulting in reposition	2	5.1%		

Intermuscular pocket

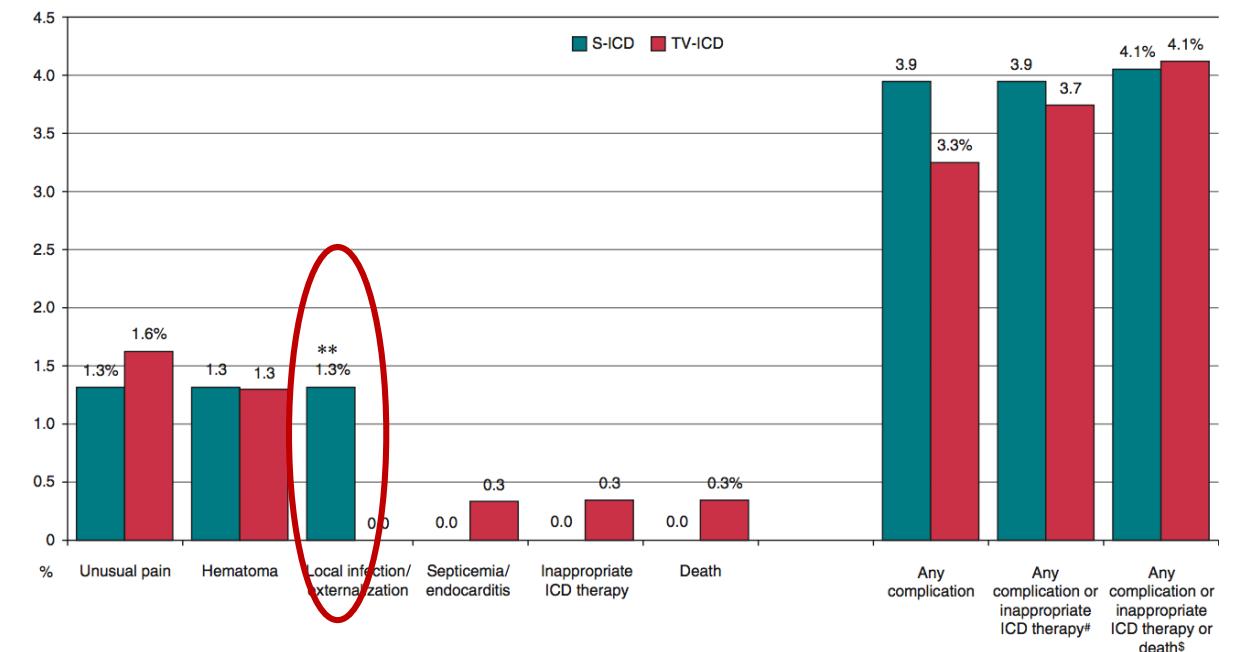


14 patients implanted with intermuscular pocket

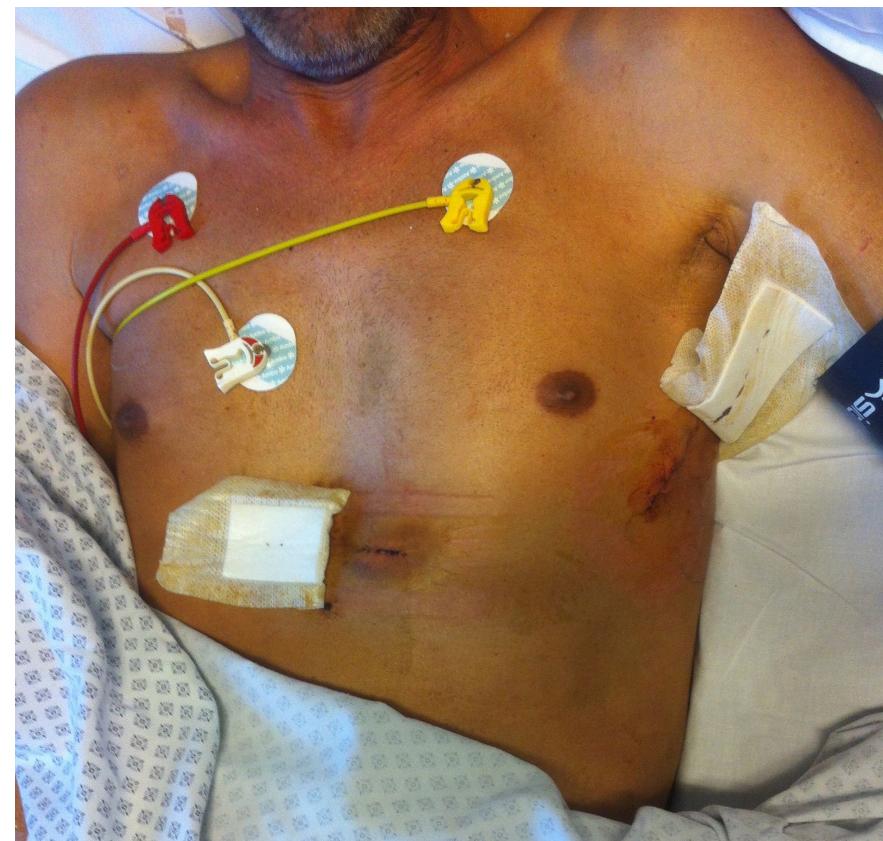
0 generator infection

Impact on local complications

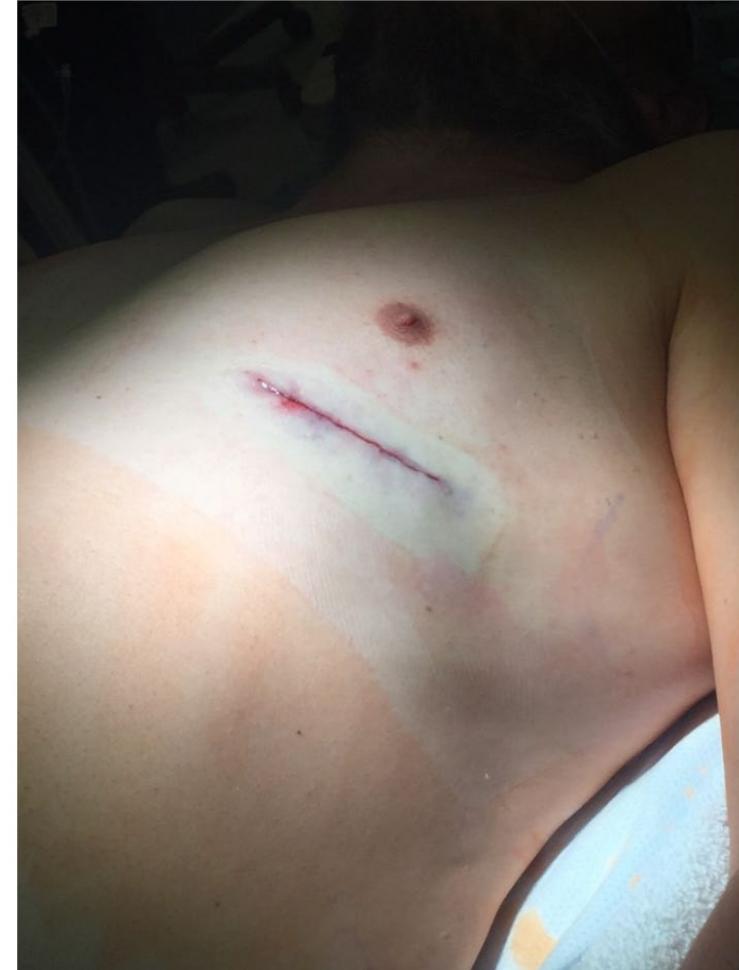
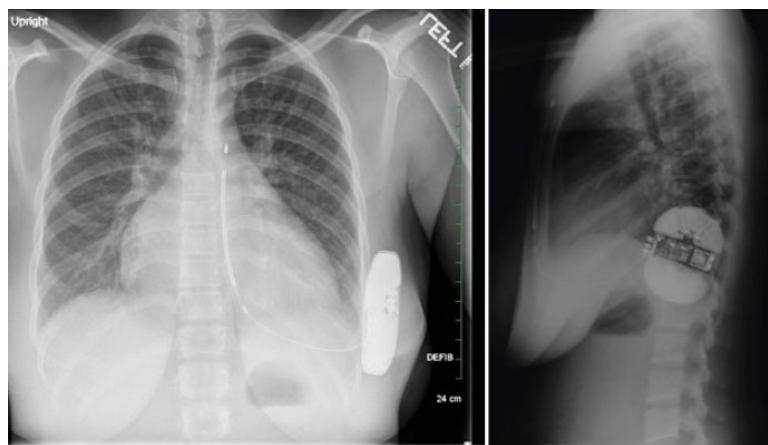
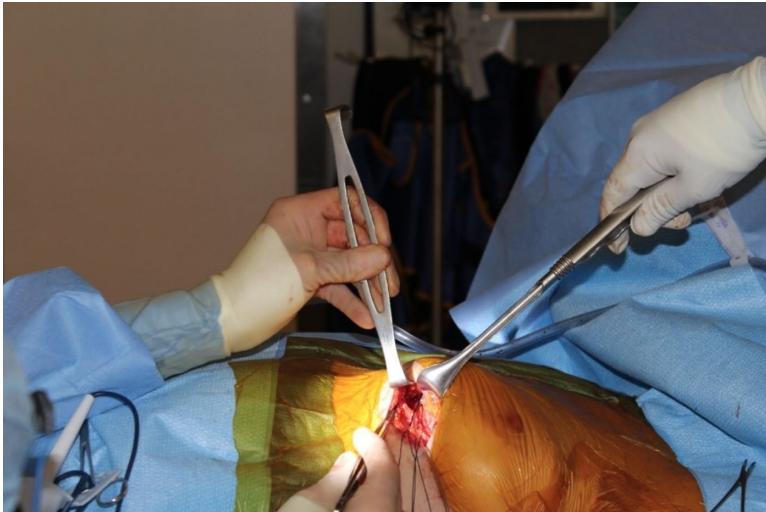
Complication	Number of events	Patients n (%)
Erosion or extrusion of implanted electrode or pulse generator	4	4 (0.9)
Haematoma	1	1 (0.2)
Failure to convert spontaneous VF episode	1	1 (0.2)
Inability to communicate with device	1	1 (0.2)
Inappropriate shock: oversensing	2	2 (0.4)
Incision/superficial infection	2	2 (0.4)
Near syncope/dizziness/shortness of breath/confusion	1	1 (0.2)
Pleural effusion	1	1 (0.2)
Pneumothorax	1	1 (0.2)
Premature battery depletion	1	1 (0.2)
Shock delivered for non-VT/VF	1	1 (0.2)
System infection	12	11 (2.4)
Suboptimal electrode position/electrode movement	5	5 (1.1)
Suboptimal pulse generator position	1	1 (0.2)
Suture discomfort	1	1 (0.2)
Total complications (% of 456)	35	29 (6.4)



Impact on cosmetic aspect



Single incision technique



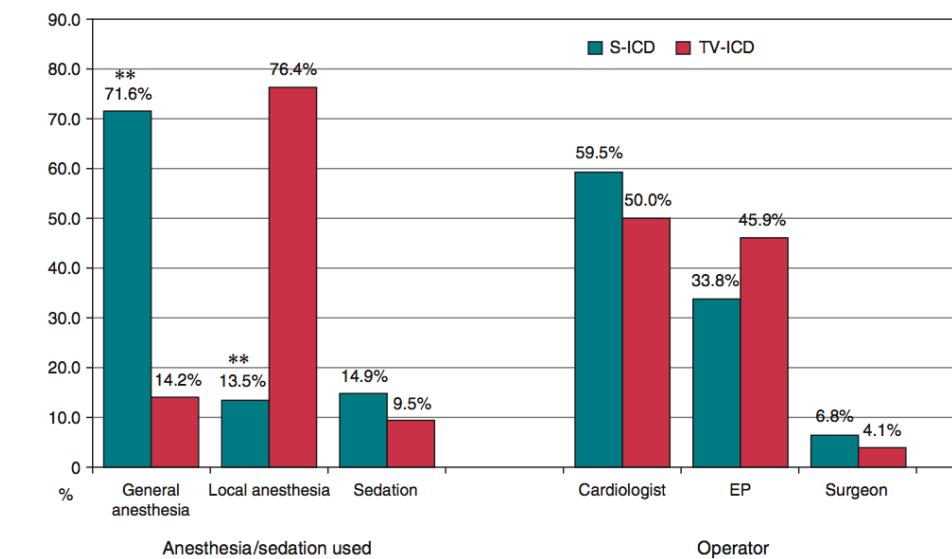
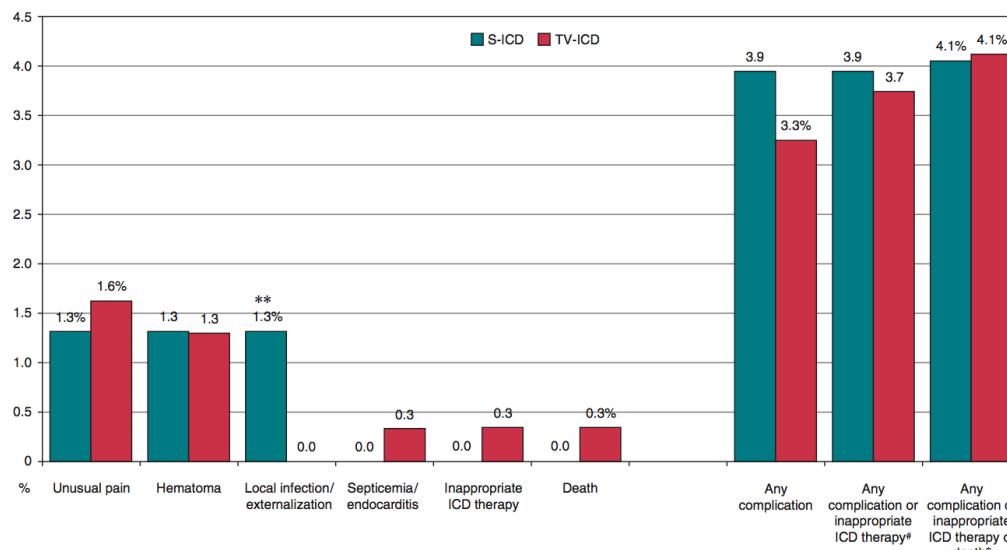
Single incision technique for implantation of subcutaneous implantable cardioverter defibrillators

Darrat Y et al. Pace 2018

Pain management

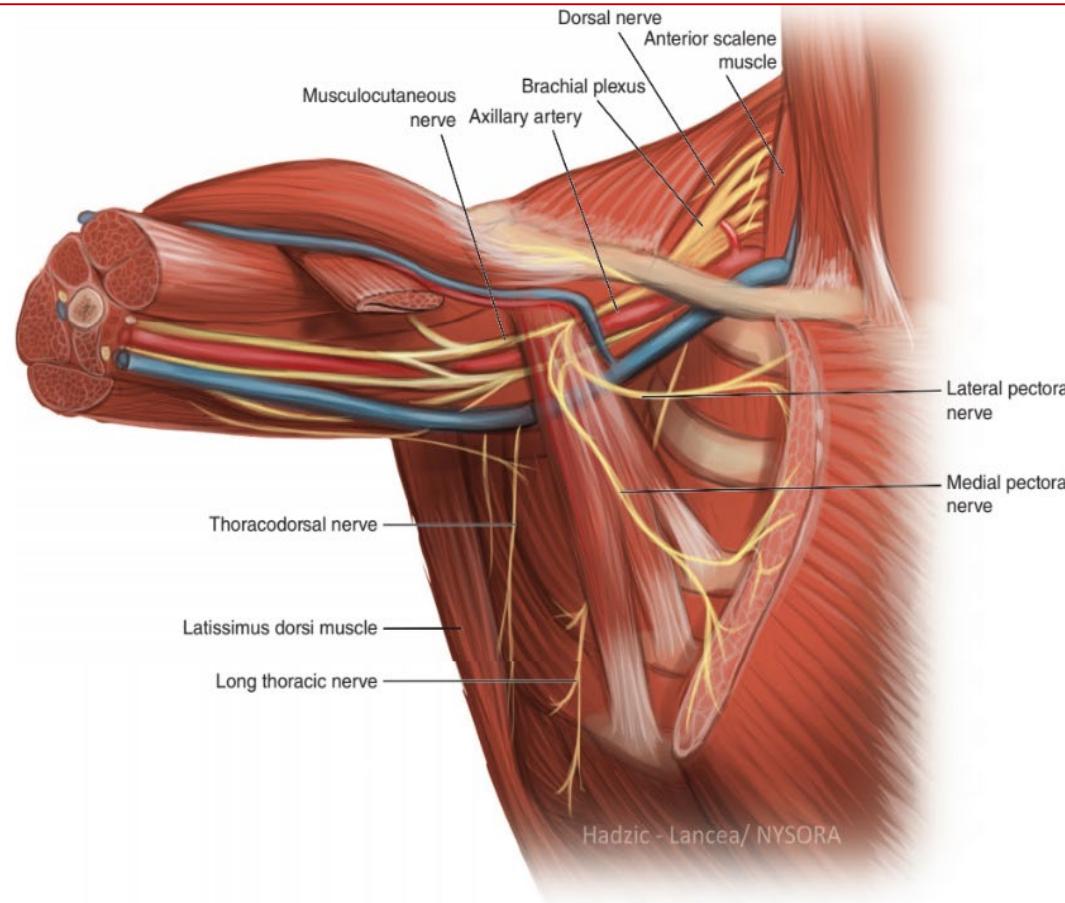
Peri-procedural routines, implantation techniques, and procedure-related complications in patients undergoing implantation of subcutaneous or transvenous automatic cardioverter-defibrillators: results of the European Snapshot Survey on S-ICD Implantation (ESSS-SICDI)

Radosław Lenarczyk^{1*}, Serge Boveda², Kristina H. Haugaa^{3,4}, Tatjana S. Potpara^{5,6}, Paweł Syska⁷, Ewa Jędrzejczyk-Patej¹, Michel Chauvin⁸, Nicolas Sadoul⁹, and Nikolaos Dagres¹⁰

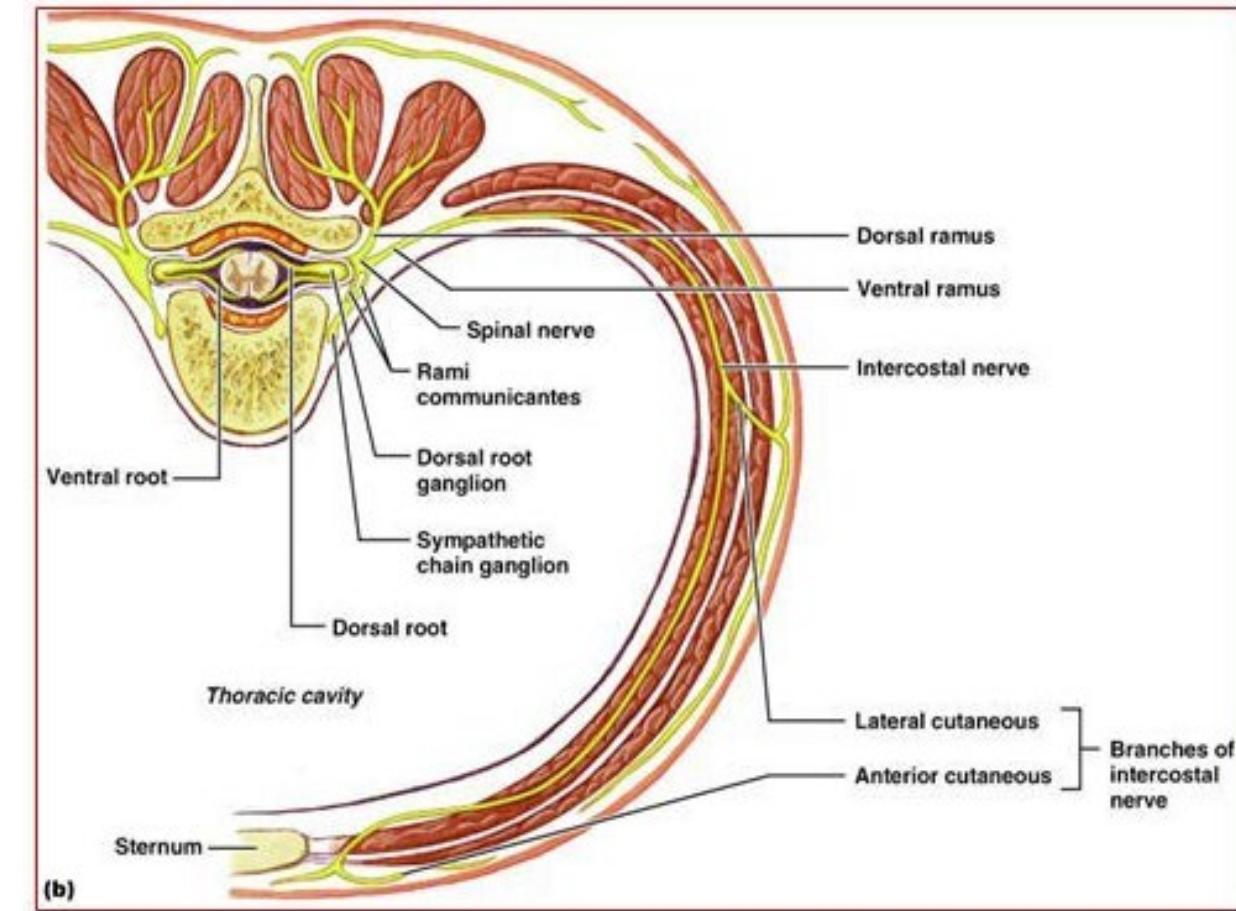


More than 71% of patients are implanted of S-ICD under general anesthesia

Thoracic wall innervation



Deep thoracic wall innervation



Superficial thoracic wall innervation

Serratus plane block: a novel ultrasound-guided thoracic wall nerve block

R. Blanco,¹ T. Parras,² J. G. McDonnell³ and A. Prats-Galino⁴

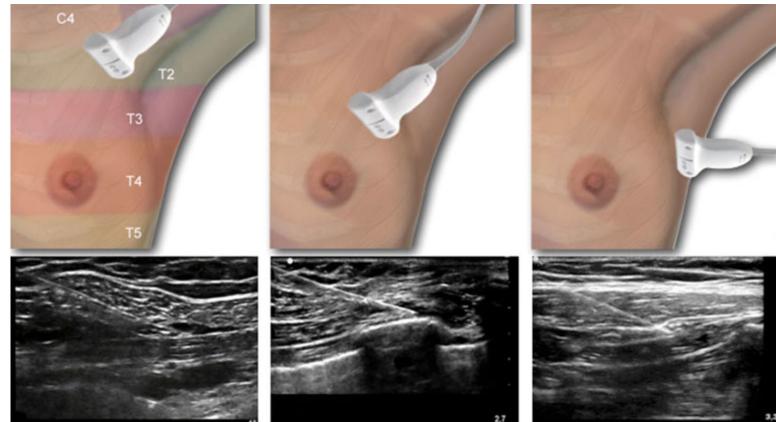
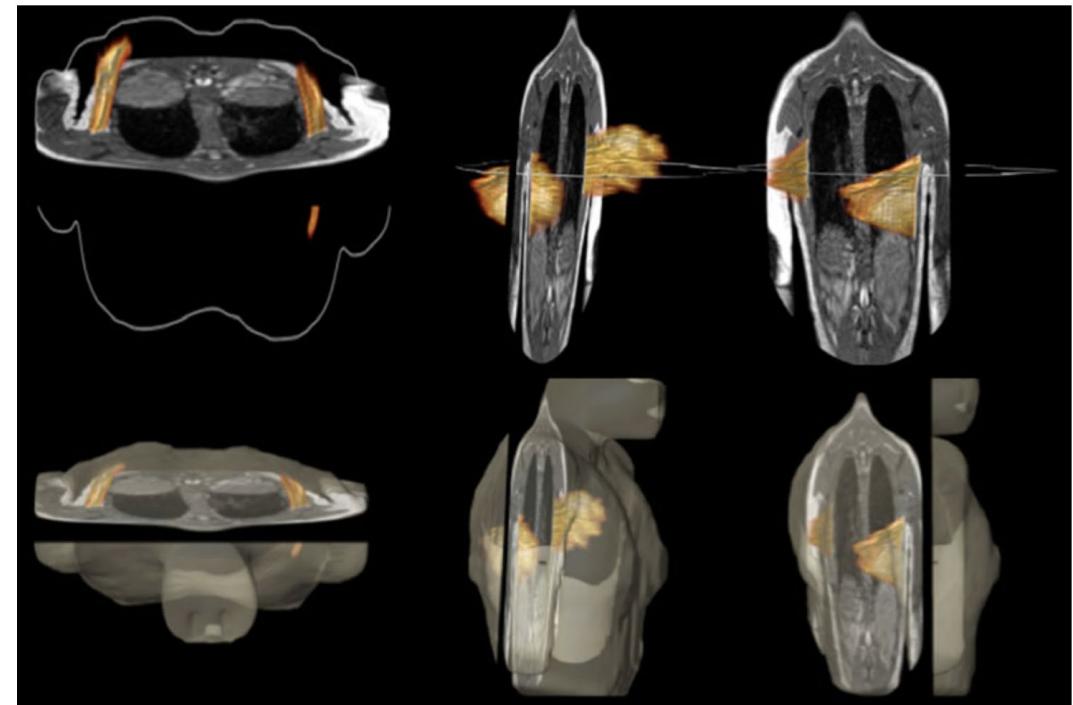
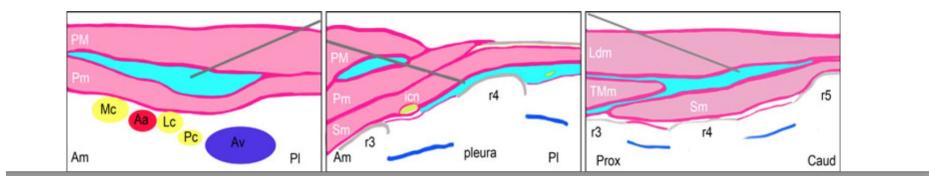


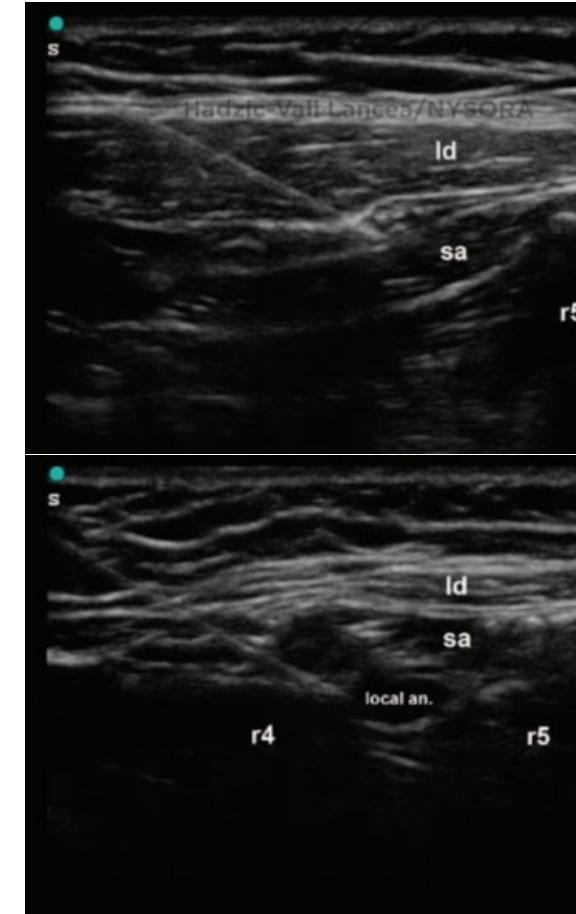
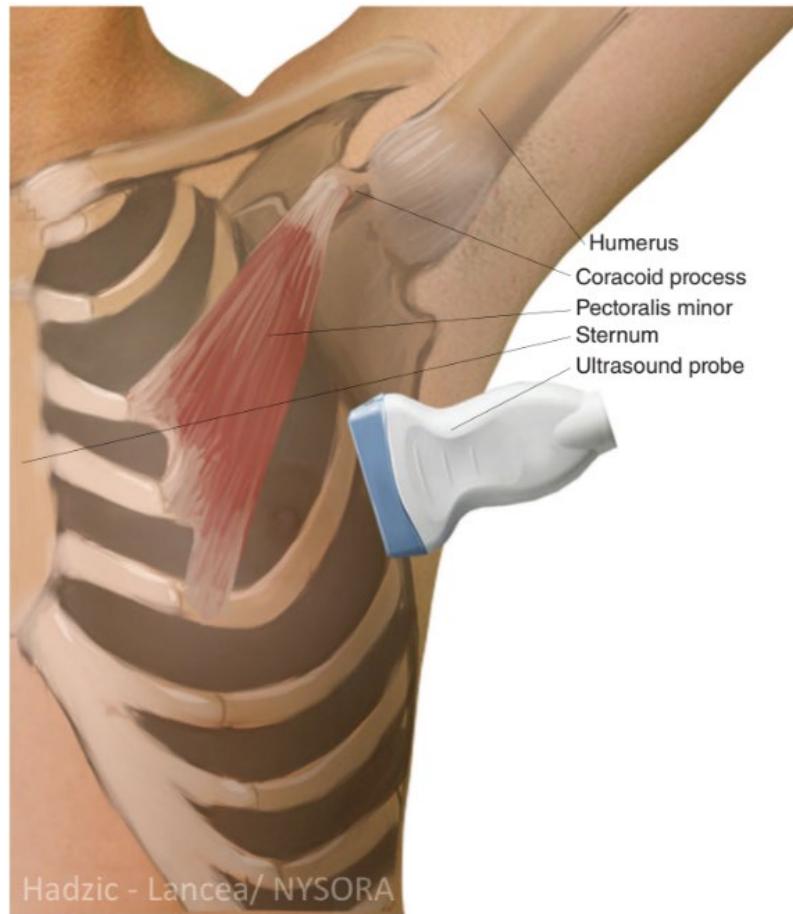
Figure 2 Graphic representing probe position and ultrasound image obtained during a Pecs I block (left), Pecs II block (middle) or a serratus plane block (right).



First description of the serratus plane block in 4 patients treated fort breast cancer by surgery

Anaesthesia 2013, 68, 1107-1113

Technical aspects



Injection between latissimus dorsi and serratus

Injection under the serratus muscle

Hydro dissection injection of few mL of saline solution follow by
Serratus plane block injection of 10 to 20 mL of local anesthetic agent

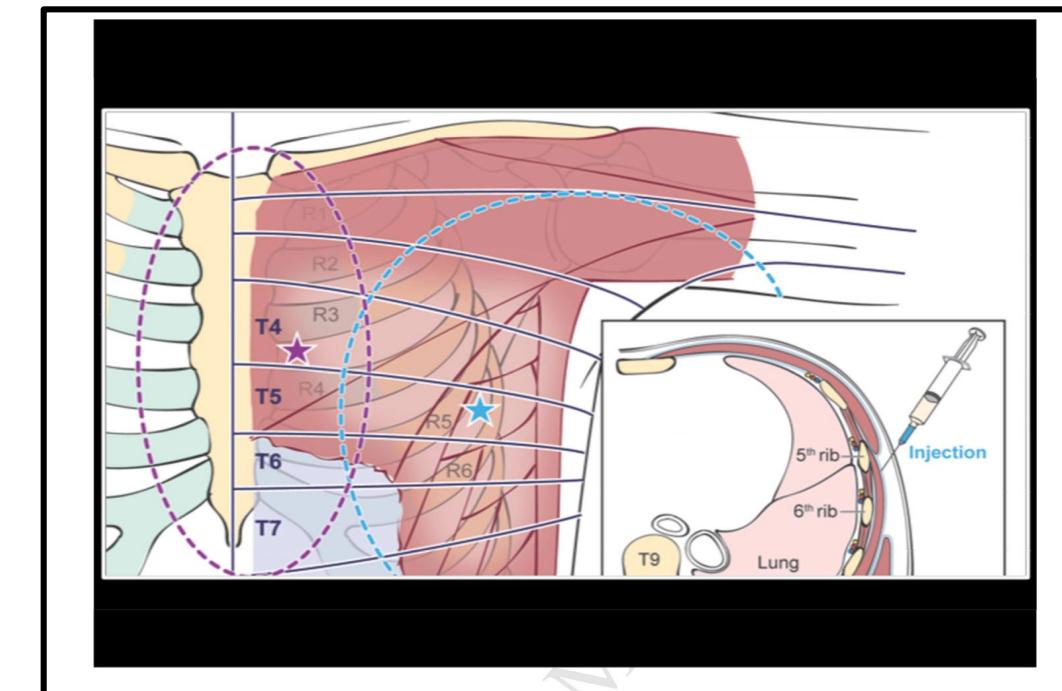
Implantation of the Subcutaneous Implantable Cardioverter-Defibrillator with Truncal Plane Blocks

Marc A. Miller, MD*¹; Himani V. Bhatt, DO, MPA*²; Menachem Weiner, MD²; Tom F. Brouwer, MD¹;
Alexander J. Mitnacht, MD²; Ali Shariat, MD²; Christina Jeng, MD²; Caroline Eden, BA²; Hung-Mo Lin,
PhD²; Benjamin Salter, DO²; Srinivas R. Dukkipati, MD¹; Vivek Y. Reddy, MD¹

¹Helmsley Electrophysiology Center in the Department of Cardiology and the ²Department of
Anesthesiology, Icahn School of Medicine at Mount Sinai, New York, New York

19 consecutive patients were implanted of an S-ICD under general anesthesia.
A serratus block and a sternal block were performed a the beginning of the procedure

1/19 patient needed oxydone and 2/19 patients intravenous morphinic
Between H12 and H24, no level 3 analgesic was needed



Ultrasound-Guided Serratus Anterior Plane Block Combined With The Two-Incision Technique For Subcutaneous ICD Implantation

Andrea Droghetti¹ MD, Erika Basso Ricci² MD, Paolo Scimia² MD, Fabiola Harizai² MD,
Massimiliano Marini^{3*} MD, FHRN, FESC.

12 patients were implanted with an S-ICD **under locoregional anesthesia and sedation**

Sedation protocole

- midazolam 1 à 3 mg
- fentanyl 0.025-0.075 mcg/Kg/min

Serratus plane block

Naropeine 0.75% under echographic contrôle 40 minutes before starting the procedure

11 patients

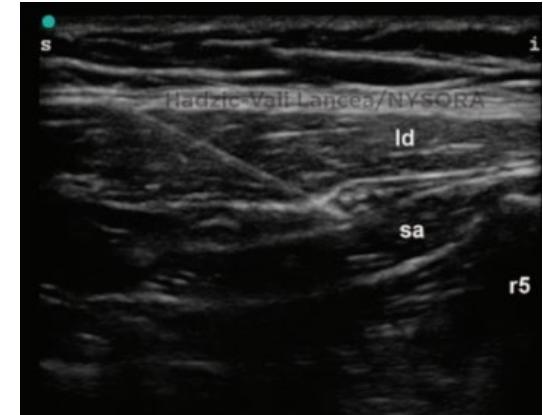
1 conversion in general anesthesia

S-ICD implantation and serratus block

Serratus plane block (naropine 10%) 40 minutes before implantation

Sedation with midazolam and sufentanyl

From April 2018, **21** patients prospectively included (5 women, 16 men)



Age (y.o.)	60
BMI (kg/m2)	24.6
Indication	
Primary prevention	15 (71%)
Secondary prevention	6 (29%)
History of cardiomyopathy	
Dilated cardiomyopathy	7 (33%)
Ischemic cardiomyopathy	13 (62%)
Hypertrophic cardiomyopathy	1 (5%)
Absence of cardiomyopathy	0

S-ICD implantation and serratus block

Conversion into general anesthesia	0
Mean duration of the procedure	45 minutes
Pain evaluation during the procedure* (/10)	2.7
Pain evaluation after the procedure (/10)	3.0
Use of opioids after the procedure	1 (5%)
 Complications	
Infection	0
Hematoma	1 (5%)

After median FU 4.5 months IQ (1.5- 7), no other side effect

3 patients had appropriate therapy (2 VT, 1 VF)

Conscious sedation

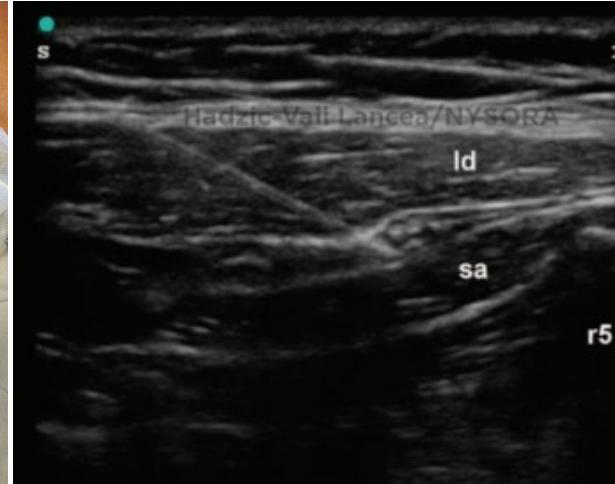
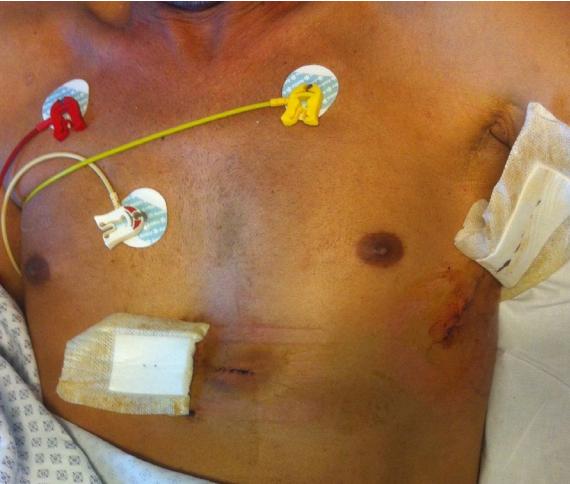
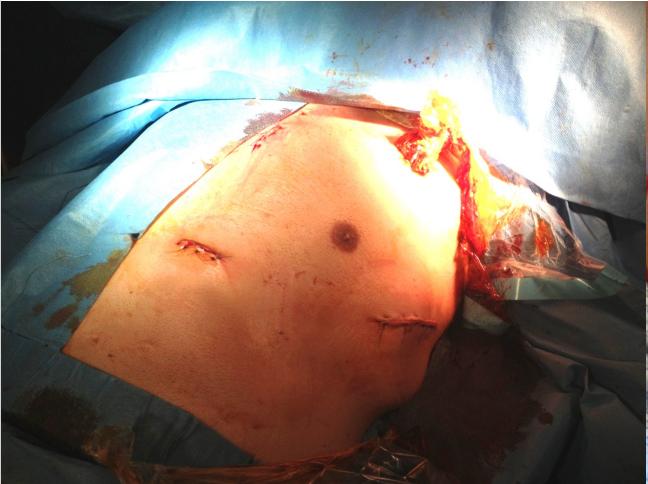
**Controlled sedation with midazolam and analgesia
with nalbuphine to alleviate pain in patients undergoing
subcutaneous implantable cardioverter defibrillator implantation**

Conscious sedation using midazolam, nalbuphin

Local anesthesia with xylocain

Mean pain score during the procedure 1.4 +/- 1.6

Conclusion



Lower local infection – improve cosmetic aspects

Improve accessibility

