



Evolution clinique rythmique & hémodynamique sur 12 ans...

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Clinique Saint George - NICE

Mr AB... 53 ans « aujourd'hui »...

10/1998

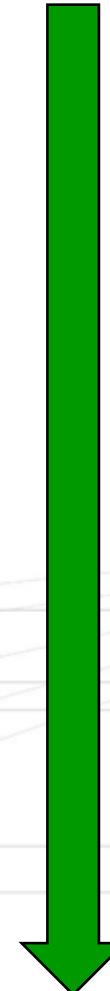
FV sur SCA ST + Inferieur
Stent « Wiktor » SII CDte dominante ++

NYHA I

EF 45% avec séquelle inferomédiane
IM grade II
Cusps aortiques calcifiées sans sténose

12/2006

Match de tennis : perte de connaissance ++



Mr AB... 53 ans « aujourd'hui »...

12/2006

Match de tennis : perte de connaissance ++

NYHA I

Coronarographie : « stable »

Stent SII CDte OK / 20% IVA

EF 42% avec sequelle INF identique

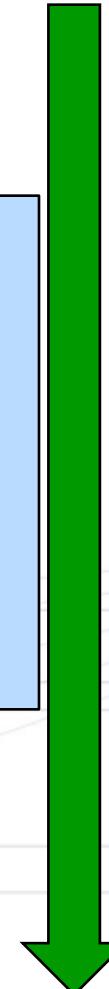
RAo « moyen » Sfce $1,4 \text{ cm}^2/\text{Grad}$ moy 25 mmHg

EEP : TRSC 110% / HV 55 ms / PLW 150/mn

SVP : Pas de TV inductible

Monitoring ECG prolongé 72 heures

« 1 jour de plus » 2 heures avant la sortie !!!



Mr AB... 53 ans « aujourd'hui »...

21/12/2006

189 MP



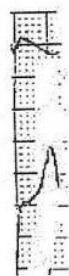
TX1432 21-Déc-2006 08:35:04
MES EASYSTOLTEC 21-Déc-2006 08:10:33 FC 3



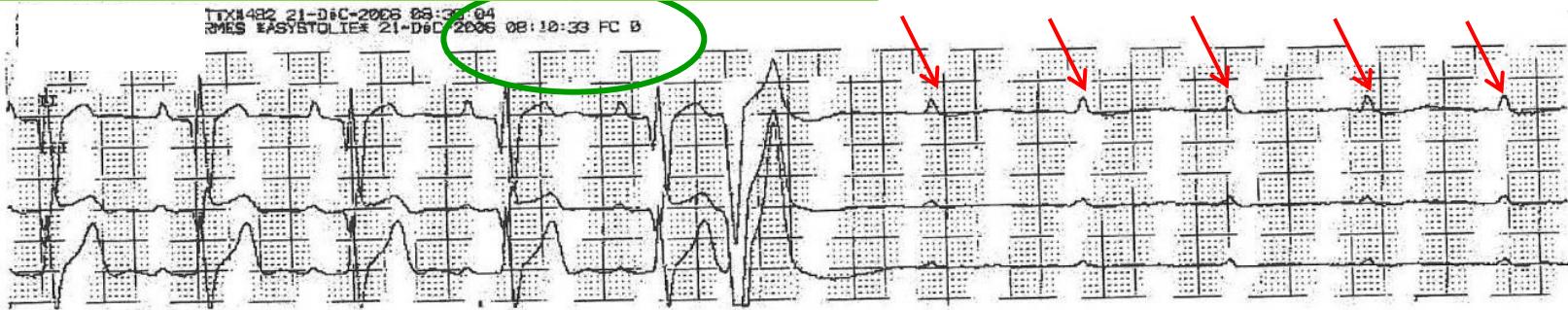
Mr AB... 53 ans « aujourd'hui »...

21/12/2006

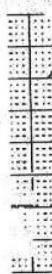
184 M



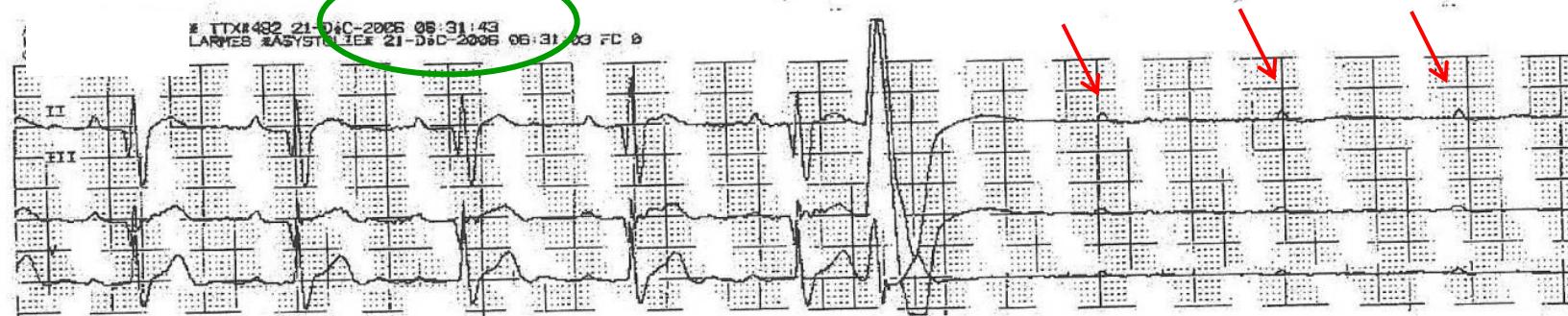
ITX1482 21-12-2006 08:31:44
LARMES EASTSTOLIER 21-12-2006 08:31:44 FC 0



USI
BRAD



ITX1482 21-12-2006 08:31:43
LARMES EASTSTOLIER 21-12-2006 08:31:43 FC 0





Pri

Mr AB... 53 ans « aujourd'hui »...

Parameters

Mode	AAIsafeR		Rate response	Off		Auto-sensing A/V	Monitor	Monitor
Basic Rate	50 min-1		Atrial Pacing	2,50 V	0,35 ms	Unipolar	Overdrive	Off
Max Rate	120 min-1		Vent Pacing	2,50 V	0,35 ms	Unipolar	Pause suppression	Off
Hysteresis	30 %		Atrial Sens.	0,30 mV	Bipolar		PAC acceleration	Off
AVD Rest/Exerc.	220 ms	80 ms	Vent Sens.	4,00 mV	Bipolar		Preprogrammed Settings	
AVD Extension	65 ms		PVAB	180 ms		Save	Erase	
Smoothing	Slow		AVB I commutation	Rest+Exer		Name		
ModeSwitch/AntiPMT	On	Reprog	Max PR/Pmax	350 ms	3 s	First interrog.		

Battery Status

Magnet Rate	96	min-1	Detail
Impedance	0,18	kOhm	1 kOhm 3 kOhm 10 kOhm
Time to ERI	122	months +/-8months	B.O.L = 96 min-1 E.R.I = 80,0 min-1

Lead Measurements

	A	Unipolar	V	Unipolar	
Impedance		434		530	Ohm
Voltage/Current	3,49	8,05	7,08	13,35	V/mA
Threshold		0,75		0,50	V

Measure

Measure

Statistics

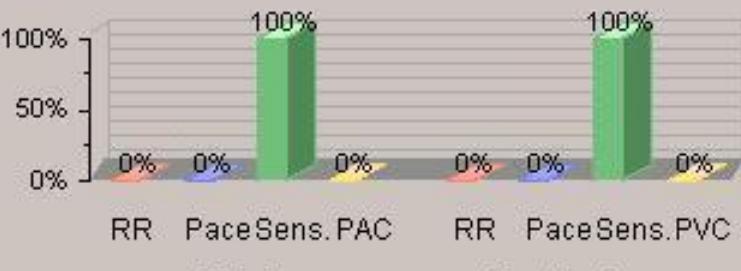
Since 28/June/2006

Detail

PMT : 0

Time in MS : 00s

ModeSwitch : 0



Interro.

Patient

Param.

AIDA+

Temp.

Thresh.

EGM

Sensor

AutoSens

NIPS

Prog.

Report

End



Pri

St

Mr AB... 53 ans « aujourd'hui »...

L1	x1
L2	x2
L3	x4

Therapy History and Data Review from 20/Dec/2006 to 17/Sep/2007

Diagnosis

PM

No. of AVB episodes : 14

Arrhythmias

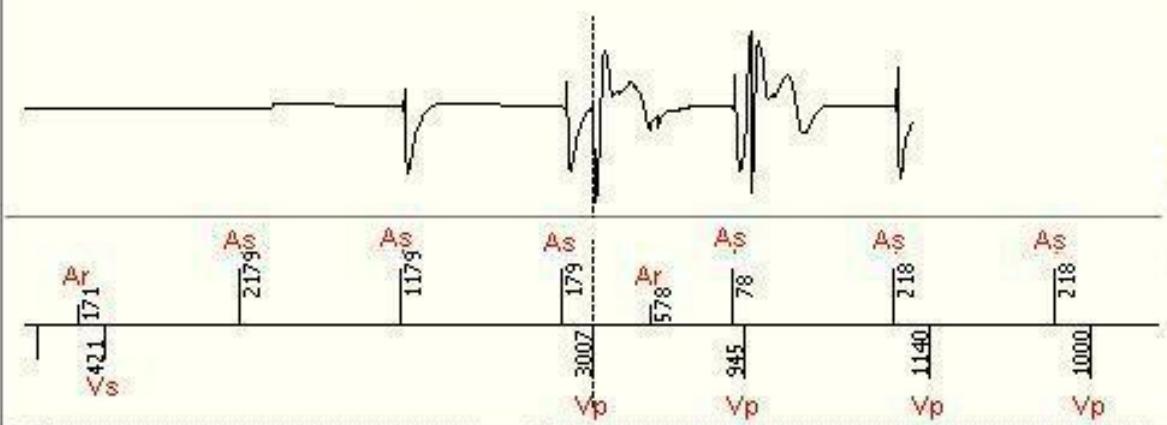
- The PM switches to DDD mainly on AVB III criteria.
- No circadian effect on AV block episodes.

AV conduct

Curves and Histograms

- Occurrence of AVB
- AV block episode history
- AV delay value distribution

Mode Switch AAI / DDD



Type	Start time
AVB III	26/Feb/2007 10:18
AVB III	29/Apr/2007 17:41
AVB III	27/June/2007 19:37
Pause	16/Aug/2007 06:48
Pause	10/Aug/2007 00:07

Interro.

Patient

Param.

AIDA+

Temp.

Thresh.

EGM

Sensor

AutoSens

NIPS

Prog.

Report

End

Pri

Sto

Mr AB... 53 ans « aujourd'hui »...

L1	x1
L2	x2
L3	x4

Therapy History and Data Review from 17/Sep/2007 to 11/Sep/2008

Diagnosis

PM

Arrhythmias

AV conduct.

Parameters Current Proposed Ok

Time spent in AAI mode: 100%
Total of the ventricular pacing: 0%

Curves and Histograms

- Statistics
- Mean rate curves
- Heart Rate curve
- Autosensing

Press Magnifying Glass Icon To View Details

Interro.

Patient

Param.

AIDA+

Temp.

Thresh.

EGM

Sensor

AutoSens

NIPS

Prog.

Report

End



Pri

Mr AB... 53 ans « aujourd'hui »...

Parameters

Mode	AAlsafeR	Rate response	Off	Auto-sensing A / V	Monitor	Auto
Basic Rate	50 min-1	Atrial Pacing	2,50 V 0,35 ms	Unipolar	Overdrive	Off
Max Rate	120 min-1	Vent Pacing	2,50 V 0,35 ms	Unipolar	Pause suppression	A+V
Hysteresis	30 %	Atrial Sens.	0,30 mV	Bipolar	PAC acceleration	Off
AVD Rest/Exerc.	220 ms	Vent Sens.	4,00 mV	Bipolar	Preprogrammed Settings	
AVD Extension	65 ms	PVAB	180 ms		Save	Erase
Smoothing	Slow	AVB I commutation		Rest+Exer	Name	
ModeSwitch/AntiPMT	On Reprog	Max PR/Pmax	350 ms	2 s	First interrog.	

Battery Status

Magnet Rate	96	min-1	1 kOhm	3 kOhm	10 kOhm	Detail
Impedance	0,24	kOhm				
Time to ERI	102	months +/-9months	B.O.L = 96 min-1	E.R.I = 80,0 min-1		

Lead Measurements

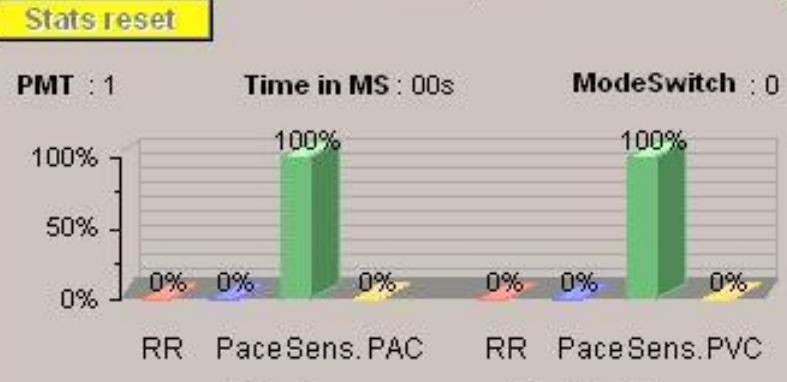
	A	Unipolar	V	Unipolar	
Impedance		389		505	Ohm
Voltage/Current	2,44	6,27	2,51	4,97	V/mA
Threshold		0,50		0,50	V

Measure

Measure

Statistics

Since 17/Sep/2007

Detail

Atrial

Ventricular

Interro.

Patient

Param.

AIDA+

Temp.

Thresh.

EGM

Sensor

AutoSens

NIPS

Prog.

Report

End



Pri

St

Mr AB... 53 ans « aujourd'hui »...

L1	x1
L2	x2
L3	x4

Therapy History and Data Review from 17/Sep/2007 to 11/Sep/2008

Diagnosis

PM

No. of AVB episodes : 18

Arrhythmias

The PM switches to DDD mainly on AVB III criteria.

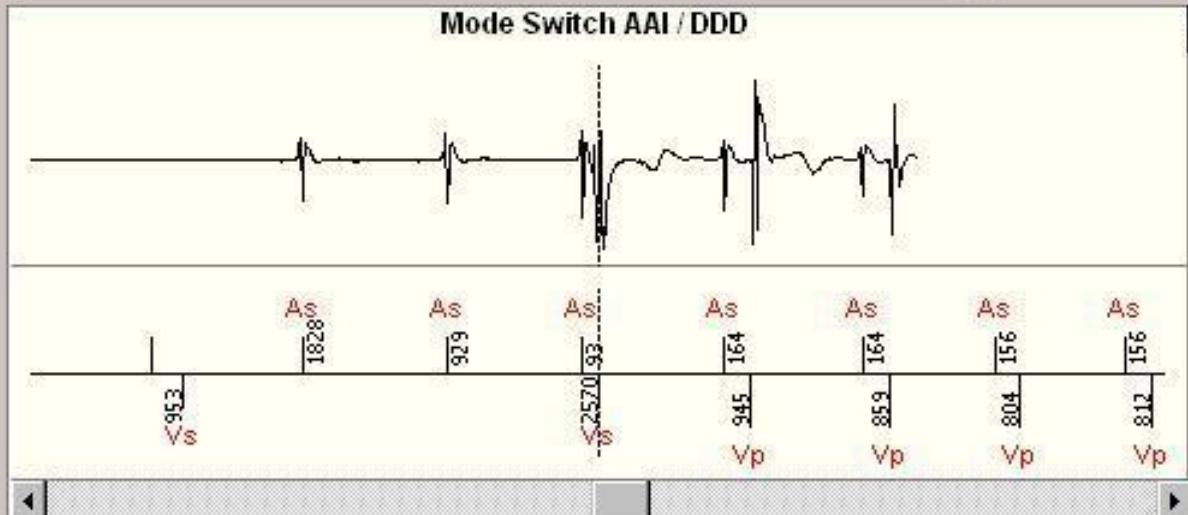
AV conduct

No circadian effect on AV block episodes.

Curves and Histograms

 Occurrence of AVB AV block episode history AV delay value distribution

Mode Switch AAI / DDD



Type	Start time
AVB III	25/May/2008 07:21
AVB III	15/Apr/2008 09:50
AVB III	02/Apr/2008 10:24
AVB III	27/Mar/2008 02:53
AVB III	13/Feb/2008 11:00
AVB III	09/Dec/2007 12:05
Pause	04/Nov/2007 05:59
Pause	02/Apr/2008 06:08

Interro.

Patient

Param.

AIDA+

Temp.

Thresh.

EGM

Sensor

AutoSens

NIPS

Prog.

Report

End

Reduce Unnecessary Ventricular Pacing (1)

- **2007 ESC Guidelines**
- "...Ventricular pacing alone can no longer be recommended. Furthermore, dual-chamber pacing increases quality-adjusted life expectancy at a cost that is generally considered acceptable."
- "... 26 crossover randomized controlled trials, there was a statistically significant trend towards dual-chamber pacing being more favorable..."
- Algorithm for minimization of pacing in ventricles:
 "... the trend is towards dual-chamber pacing with minimization of right ventricular stimulation ..."

Reduce Unnecessary Ventricular Pacing (2)

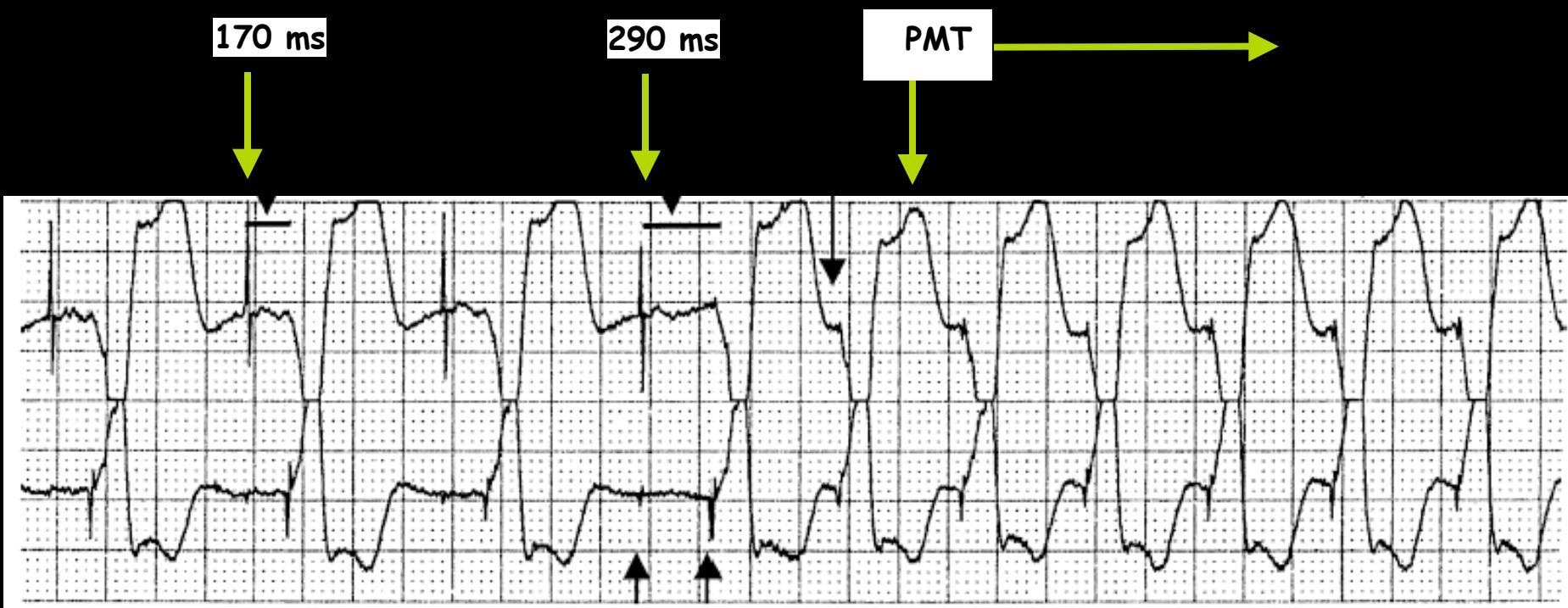
ACC/AHA/HRS Guidelines for Device-Based Therapy 2008

- Section 2.6.7. Importance of Minimizing Unnecessary Ventricular Pacing
 - Programming a dual chamber device to the conventional DDD mode with a maximally programmable AV delay or with AV search hysteresis does not eliminate frequent ventricular pacing in a significant fraction of patients.¹
 - Accordingly, several pacing algorithms that avoid ventricular pacing except during periods of high-grade AV block have been introduced recently.¹
 - These new modes dramatically decrease the prevalence of ventricular pacing in both pacemaker and defibrillator patients.¹

1. Epstein et al., ACC/AHA/HRS Guidelines for Device-Based Therapy of Cardiac Rhythm Abnormalities, JACC Vol. 51, No. 21, 2008 May 27, 2008:e1-62

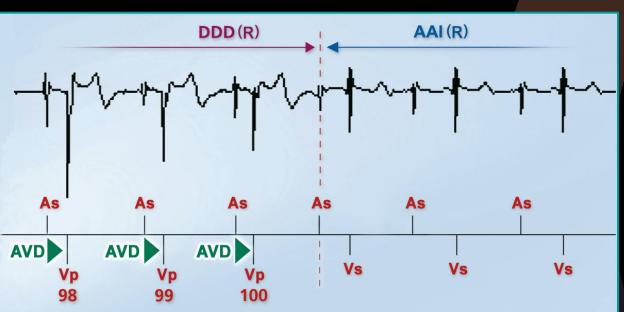
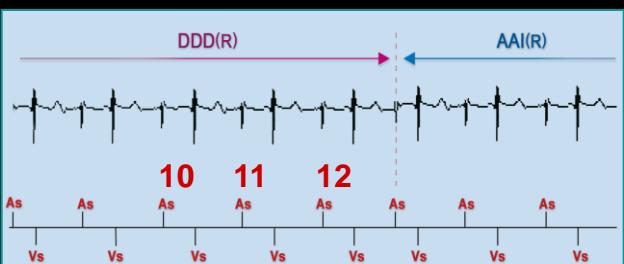
AV hysteresis algorithms limitations

- Specific AV hysteresis algorithm extends AV-delay by max. 120ms
- Extended AVD favors retrograde conduction, triggering Endless Loop Tachycardias ¹

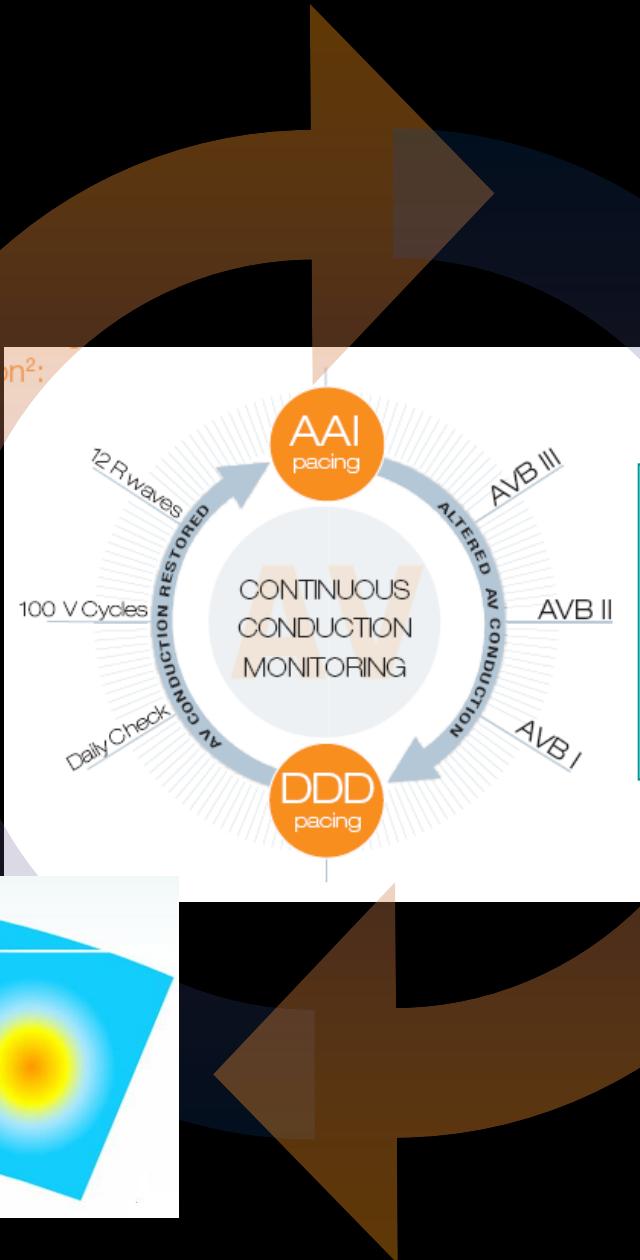
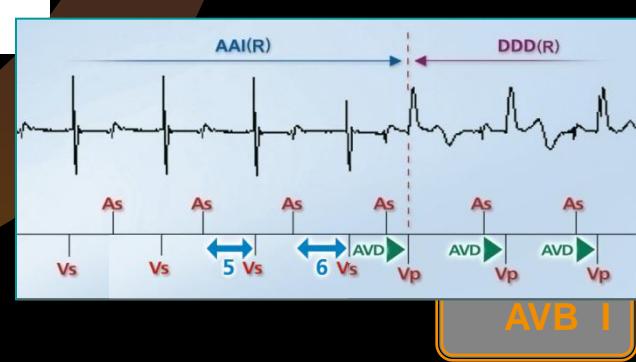
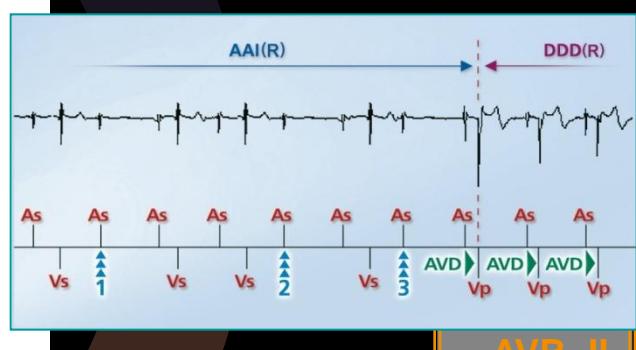
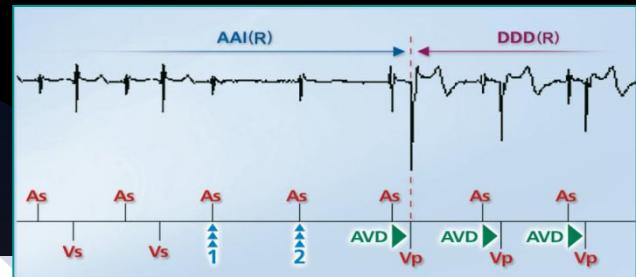


1. Dennis M; PACE, Jun 2004; 27 (Pt. 1):824-826

DDD \Rightarrow AAI

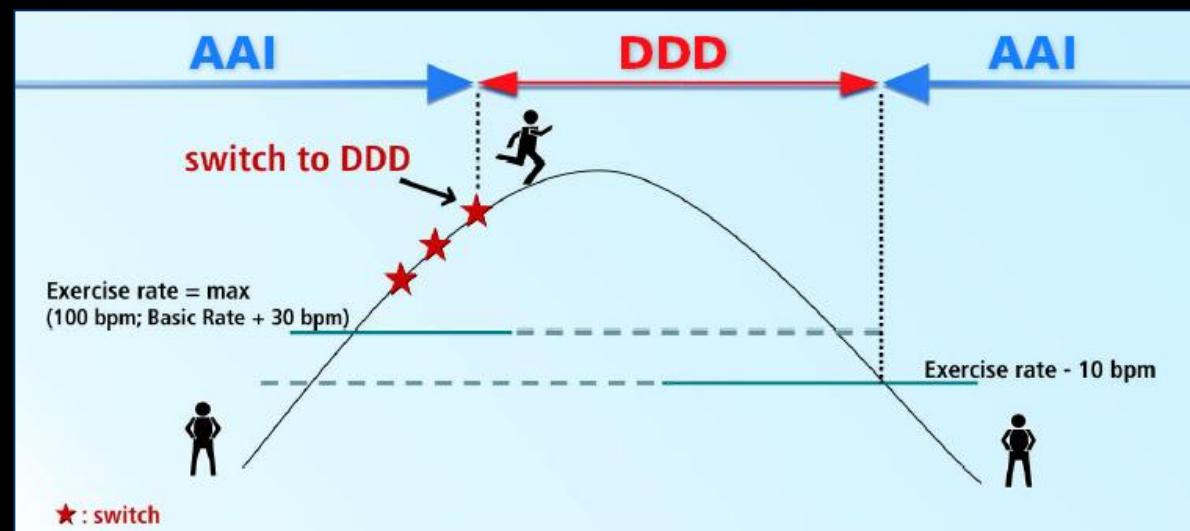


AAI \Rightarrow DDD



Adaptation to Exercise Capacity - Clinical Aspects

- Some patients present conduction disturbances during exercise.
- Studies¹ show a lack of AV conduction adaptation to exercise in chronotropically incompetent patients, even in those with otherwise normal AV conduction.
- SafeR can automatically pace in DDD during exercise: maintaining AV synchrony, efficiently improving exercise tolerance



1- Continuous monitoring of the native atrio-ventricular conduction in a dual chamber device D.Gras¹, J.Victor², F.Anseyme, P.Defaye³, Ph.Mabo⁴, D.Galley⁵, A.Amblard⁶, L.Graindorge⁶. ¹ Nouvelles Cliniques Nanataises, Nantes, ²Angers, Rouen, ³Grenoble, ⁴Rennes, ⁵Albi, University Hospitals, France

Mr AB... 53 ans « aujourd'hui »...

12/2006



Pratique tennis

Discrete lipothymie matinale :

- Délai attente 3 sec / 2 sec
- PR max 350 ms à 250 ms

2008/2009

BAV III permanent

Pas de rythme echappement

Mode DDD avec suppression switch



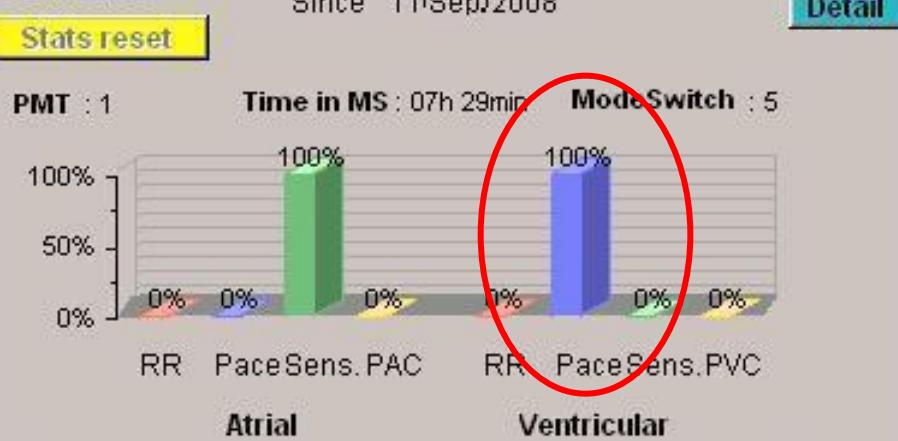
Pri

St

Mr AB... 53 ans < aujourd'hui >...

Parameters

Mode	DDD	Sensor	Twin Trace		V AutoThresh	Off
Basic Rate	60 min-1	RR / Activity	Learn	Low	Auto-sensing A / V	Monitor Monitor
Rest Rate	60 min-1	Atrial Pacing	2,50 V	0,35 ms	Bipolar	Overdrive Off
Max Rate	130 min-1	Vent Pacing	3,00 V	0,35 ms	Unipolar	Pause suppression A
Hysteresis	30 %	Atrial Sens.	0,60 mV		Bipolar	PAC acceleration On
AVD Rest/Exerc.	155 ms	Vent Sens.	4,00 mV		Bipolar	Preprogrammed Settings
AVD Extension	65 ms	PVAB	150 ms			Save Erase
Smoothing	Fast					Name
ModeSwitch/AntiPMT	On					First interrog.
	Reprog					08/Nov/2010-17:08

Battery Status**Statistics****Lead Measurements**

	A Bipolar	V Unipolar	
Impedance	578	492	Ohm
Voltage/Current	2,53	4,38	V/mA
Threshold	1,00	1,00	V
	Measure	Measure	

Interro.

Patient

Param.

AIDA+

Temp.

Thresh.

EGM

Sensor

AutoSens

NIPS

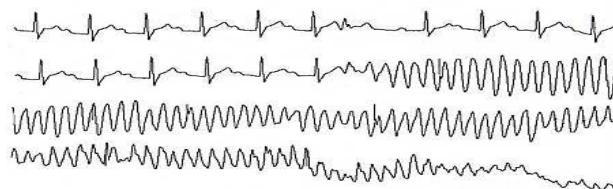
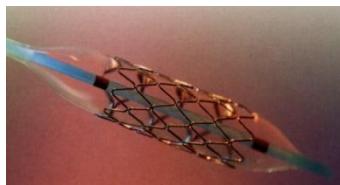
Prog.

Report

End

Mr AB... 53 ans « aujourd'hui »...

10 / 1998



NYHA I

12 / 2006

AAI \Rightarrow DDD pour BAV III paroxystique



2008/2009

DDD pour BAV III permanent
Pas de rythme échappement
100% VD "pacing" sur FE 42%...

NYHA II

12/2009

SubOAP : majoration sténose aortique $0,8 \text{ cm}^2$
Role du « pacing VD permanent » dans CHF ?

NYHA III

Mr AB... 53 ans « aujourd'hui »...

12/2009

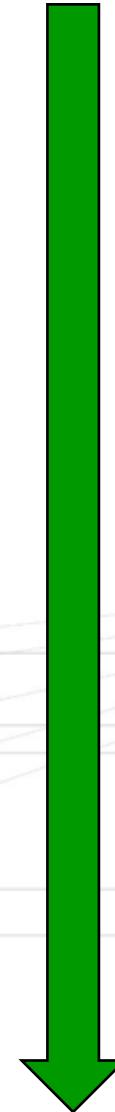
SubOAP : majoration sténose aortique $0,8 \text{ cm}^2$
Role du « pacing VD permanent » dans CHF ?

NYHA III

ETT :

Gradient moyen Vg-Ao 47 mmHg
DIV 15 ms malgré QRS « pacing » 160 ms

Remplacement valvulaire aortique ?



Mr AB... 53 ans « aujourd'hui »...

12/2009

Pas de desynchronisation BiV en ETT
DIV 15 ms malgré 100% QRS « pacing » 160 ms

NYHA III

RVAO bioprothèse SANS modification PM DDD

09/2010

Récidive ICC avec bioprothèse Aortique OK
100% VP sur QRS > 180 ms / EF 40%
ETT : DIV 115 ms...

NYHA II

NYHA III

NYHA I

« up grade » DDD pour DAI-CRT

kk kt
Ex: 1/1
Se: 1/1
Im: 0
4 Im

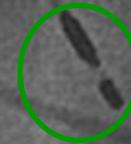
cli st george
26/10/2010
15:30:00

OD



H H

VD



VG

1ére sonde RV apex
(2006)

OAG35°

L: 128
W: 256
Zoom: 178%
512 x 512

Mr AB... 53 ans < aujourd'hui >...

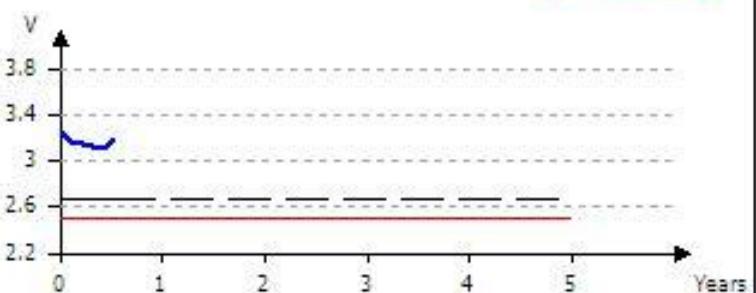
ECG II

Adjust

WARNINGS : 0

System Status

E.R.I. (2.66 V) E.O.L. (2.50 V)



Voltage

3.2 V

Last charge time

11.0 s

>>

Magnet Rate

96 min-1

Last shock imped.

57 ohm

Leads

Threshold
(V)P/R Waves
(mV)Impedance
(ohm)

>>

A - -

3.7

25/Oct/10

597

09/Oct/10

RV 0.50

23/Sep/10

15.1

08/Oct/10

544

25/Oct/10

LV 0.75

23/Sep/10

702

25/Oct/10

RV Coil Continuity

386 ohm

21/Oct/10

>>

Parameters

60 min-1 120

Mode

DDD

RV Sens 0.4 mV

120 160 220 min-1

Zones

Slow VT OH

VT OH

VF OH

Detection

PARAD+

>>

ATP 1

OFF

3 BURST+SCAN

ATP 2

OFF

3 RAMP

Shock 1

OFF

22 J

42 J

Shock 2

OFF

42 J

42 J

42J Shock

OFF

4 x 42 J

4 x 42 J

Statistics

Reset

% cycles

As: 50%

Ap: 0%

Vs: 0%

Vp: 100%

>>

No. of Mode Switches

3

Time in MS 17d 02h 18min

Since

23/Sep/10

Last treated ep.

Deleterious ATP

Total shocks since implant

0 2

Episodes

No.

Treated

ATP

Shocks

Success

FVT / VF

0

0

0

0

0

0

VT

0

0

0

0

0

0

Slow VT

0

0

0

0

0

0

Other

0

0

0

0

0

0

Total

0

>>

0

>>

0

>>

Interro.

Overview

Test
AssistingDiagnos.
AIDA

Param.

Tests
EGM

Report

Patient

Prog.

End

Mr AB... 53 ans « aujourd'hui »...

12/2009

→ RVAo bioprotése **SANS** « up grade »

NYHA II

09/2010

→ « Up-grade » PM DDD pour CRT-DAI

NYHA I

11/2010

→ Récidive subOAP avec BNP > 1 500
Malgré 100% stimulation BiV patient
dépendant et 100% de stimulation VG +++...

NYHA III

Therapy History and Data Review from 23/Sep/2010 to 25/Oct/2010

Prog. AIDA

Summary

PMMCD

Arrhythmias/Treatments

PhD - Clinical status

Diagnosis

Atrial arrhythmia number = 3

Total time in Mode switch = 17d 02h

18min (53.8%)

In Fallback Mode Switch, the ventricular rate is paced at 100 %

The ventricular mean rate in mode switch is 75 min-1

 Fallback history

Stored episodes : 2

Type	Date	Treatment	Duration
<input checked="" type="checkbox"/> Mode Switch	09/Oct/2010 05:02		
<input checked="" type="checkbox"/> Mode Switch	28/Sep/2010 12:01		3min 42s

« Commentaire » :

100% de stimulation ventriculaire
(BAV III dépendant sans rythme échappement)
100% de resynchronisation BiV +++

Perte resynchronisation AuriculoVentriculaire car TSV

24/Sep/2010	17:02:11	Entry into Mode Switch
	Invalid DateTime.	End of Mode Switch
	17:04:17	Entry into Mode Switch
	17:05:01	End of Mode Switch
	17:05:37	Entry into Mode Switch
	17:09:19	End of Mode Switch
	17:10:09	Entry into Mode Switch
	17:11:01	End of Mode Switch
	17:11:19	Entry into Mode Switch
	05:03:09	End of Mode Switch
28/Sep/2010	12:01:11	Entry into Mode Switch
	12:04:49	End of Mode Switch
	12:08:55	Entry into Mode Switch
	19:21:21	End of Mode Switch
	05:02:49	Entry into Mode Switch

2(Vitesse : 25 mm/s)

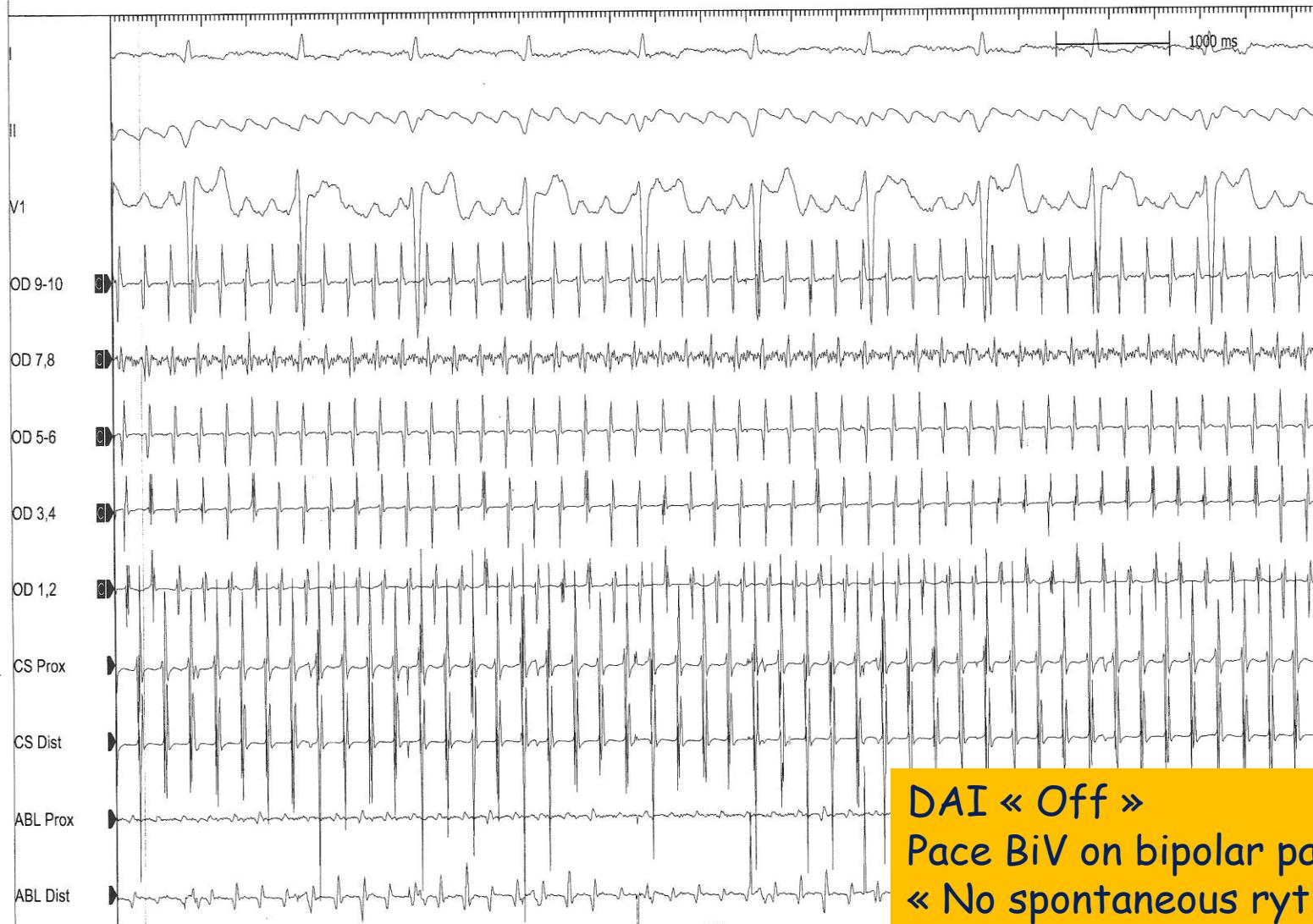
DR VIDAL



15:52:58 15:53:00 15:53:02 15:53:04 15:53:06

(Vitesse : 25 mm/s)

DR VIDAL

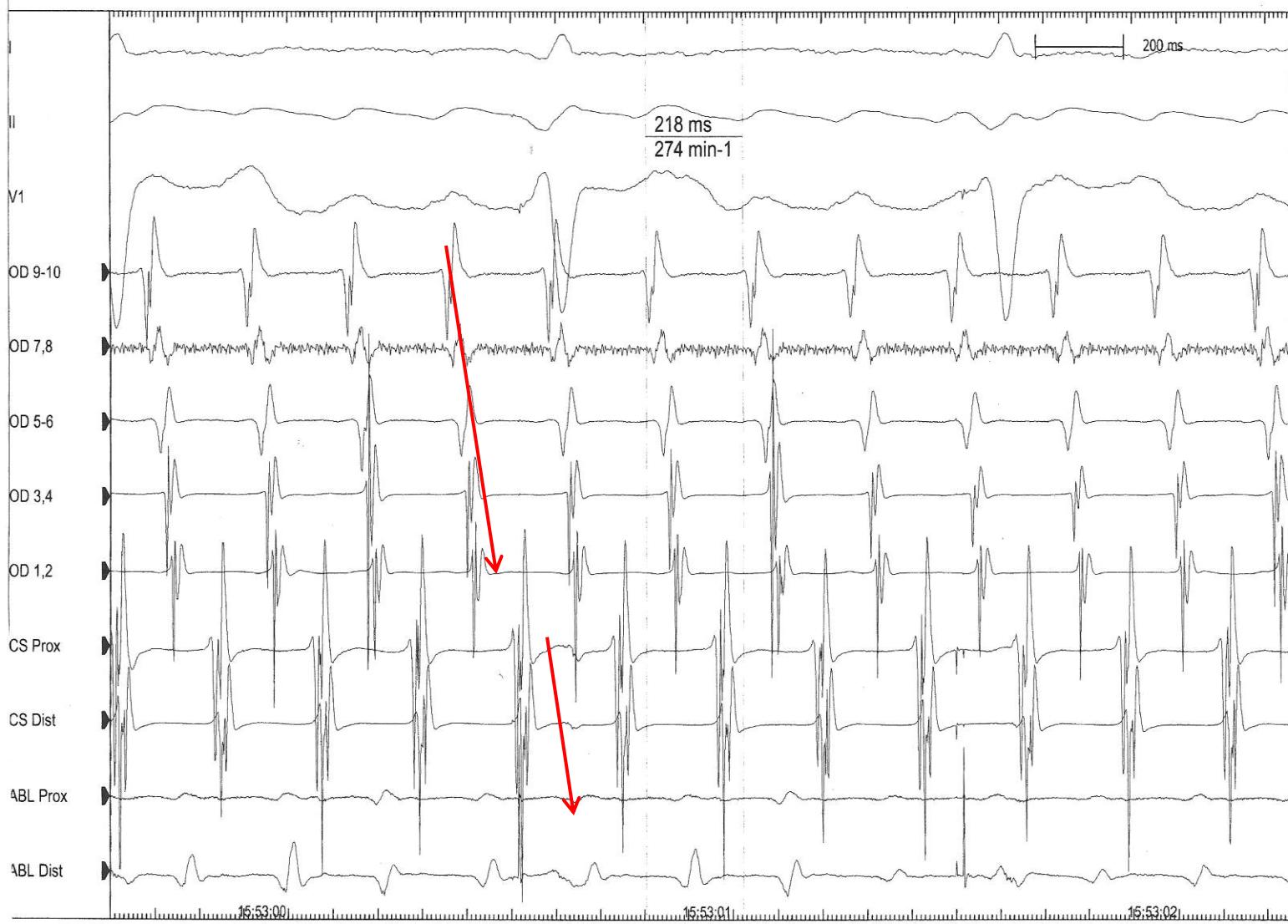


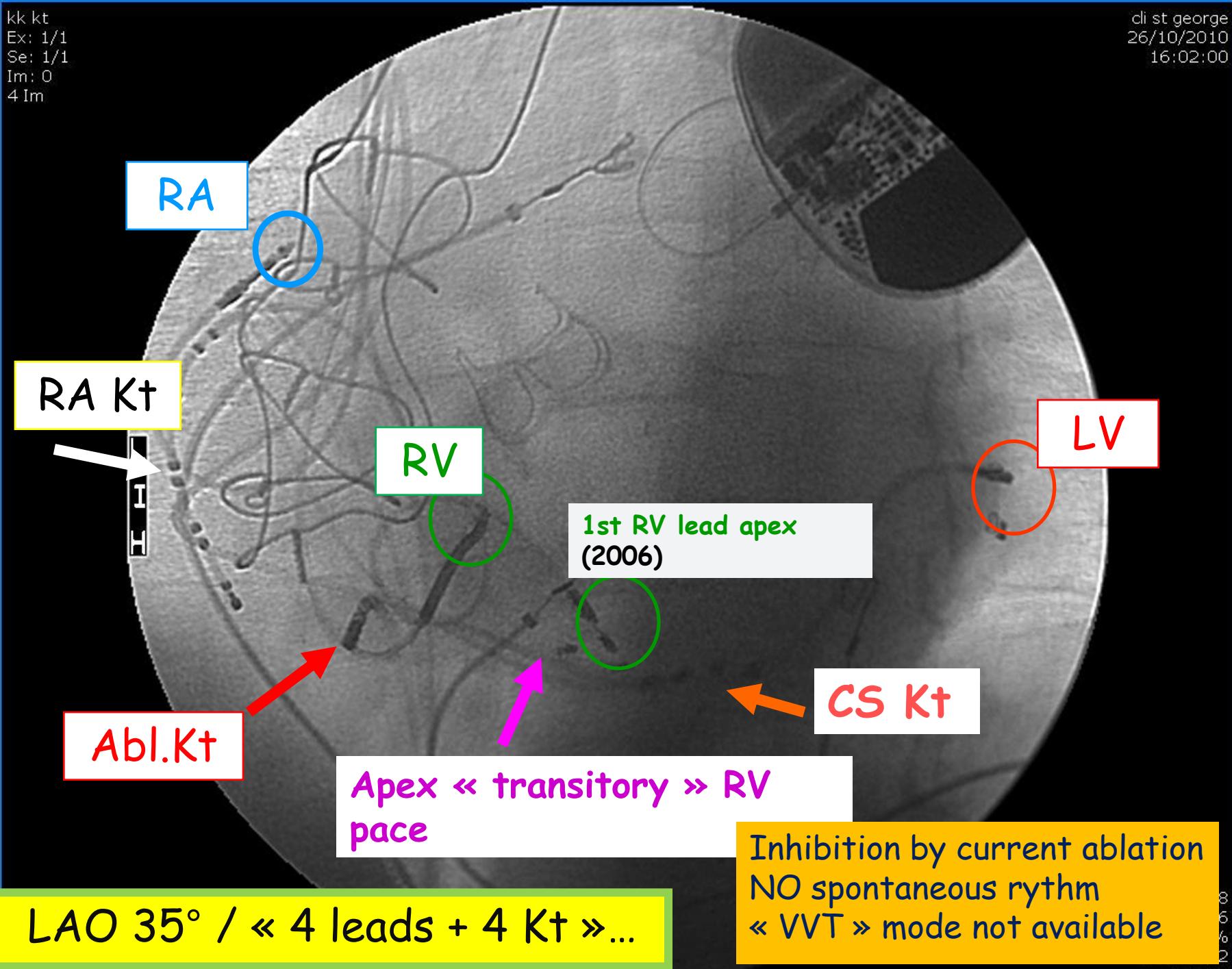
DAI « Off »
Pace BiV on bipolar pace
« No spontaneous rythme »
CCW Flutter

26/10/2010 15:53:00(Vitesse : 100 mm/s)

Clinique St GEORGE

DR VIDAL





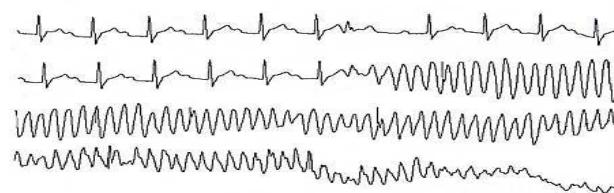
DR VIDAL
Cliché : Consultation 1: Page 2

Pace RV during ablation isthmus



Mr AB... 53 ans « aujourd'hui »...

10/1998



NYHA I

12/2006

AAI \Rightarrow DDD BAV III parox.



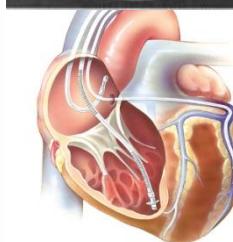
2008/2009

DDD BAV III permanent



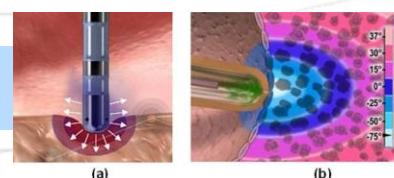
12/2009

RVAo



09/2010

CRT-DAI



11/2010

Ablation RF

Vie normale avec 115 Kg...et BNP 110

NYHA I