Erasmus MC
Universitair Medisch Centrum Rotterdam

CHADS score: interactive case presentation (CHA_2DS_2-VASC)

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About case presentation....

"Classically, the formal oral presentation is given in 7 minutes or less. Although it follows the same format as a written report, it is not simply regurgitation. A great presentation requires style as much as substance; your delivery must be succinct and smooth. No time should be wasted on superfluous information; one can read about such matters later in your admit note. Ideally, your presentation should be formulated so that your audience can anticipate your assessment and plan; that is, each piece of information should clue the listener into your thinking process and your most likely diagnosis."

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How often do you deal in your medical practice with patients with atrial fibrillation and an implanted cardiac rhythm device (pacemaker or ICD)?

1, almost never

2, sporadically (few times a year)

3, regularly (on a monthly basis)

4, frequently although it is not my subspeciality

5, I am an cardiac electrophysiologist

Q1

Case presentation- Past Medical History

Mr. B. - 76-year-old man, with atrial fibrillation and an ICD

	Appendectomy (time: unknown)
	Hypertension
	History of significant alcohol intake
-1999	Palpitations
2001	Stroke
2002 sept	Acute MI (inferior) - EF 23%
2002 oct	Recurrent chest pain- coronary angiogram
2002 nov	Acute cardiac failure- paroxysmal atrial fibrillation
2003 sept	Syncope – considered as orthostatic reaction
2003 oct	Ventricular tachycardia

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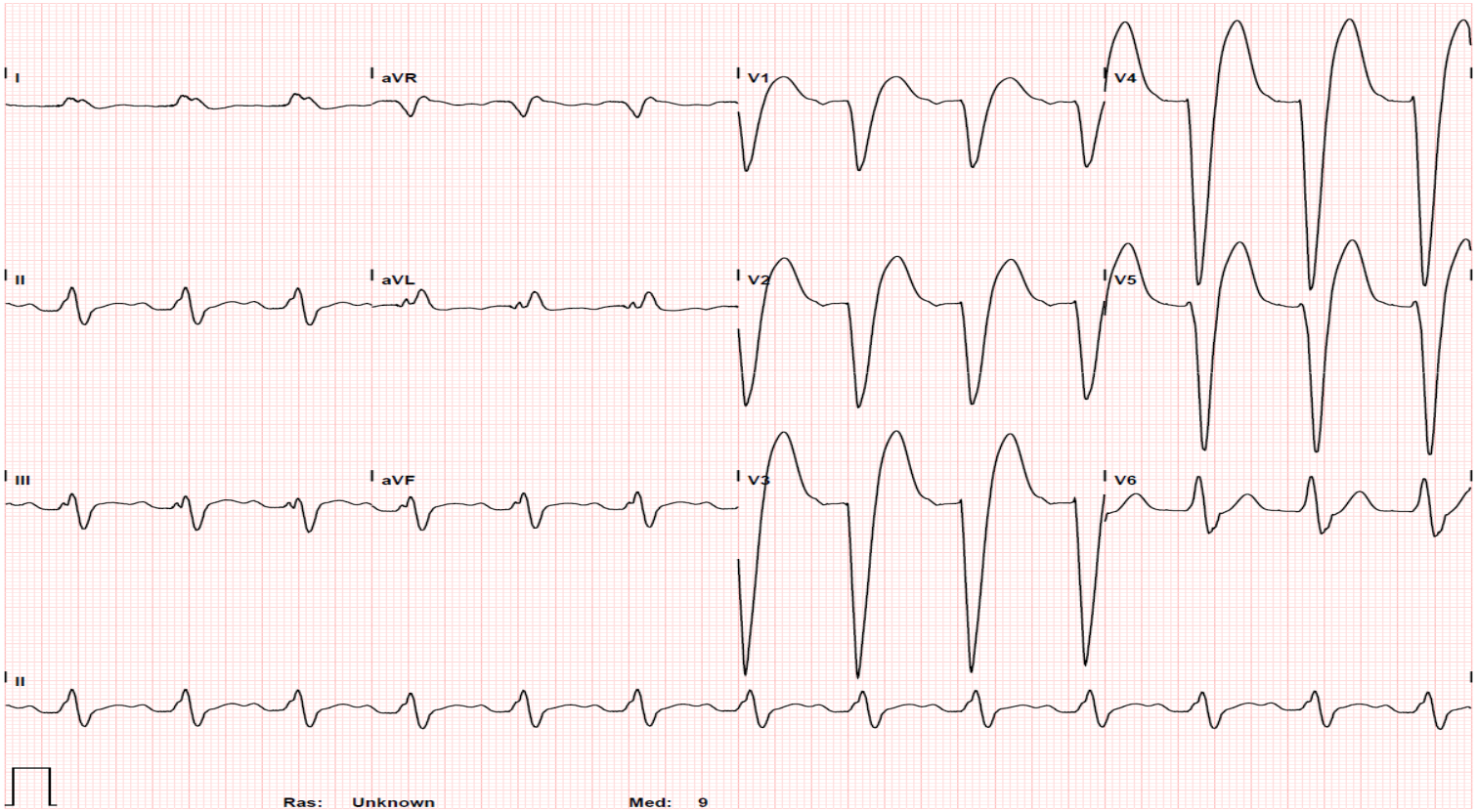
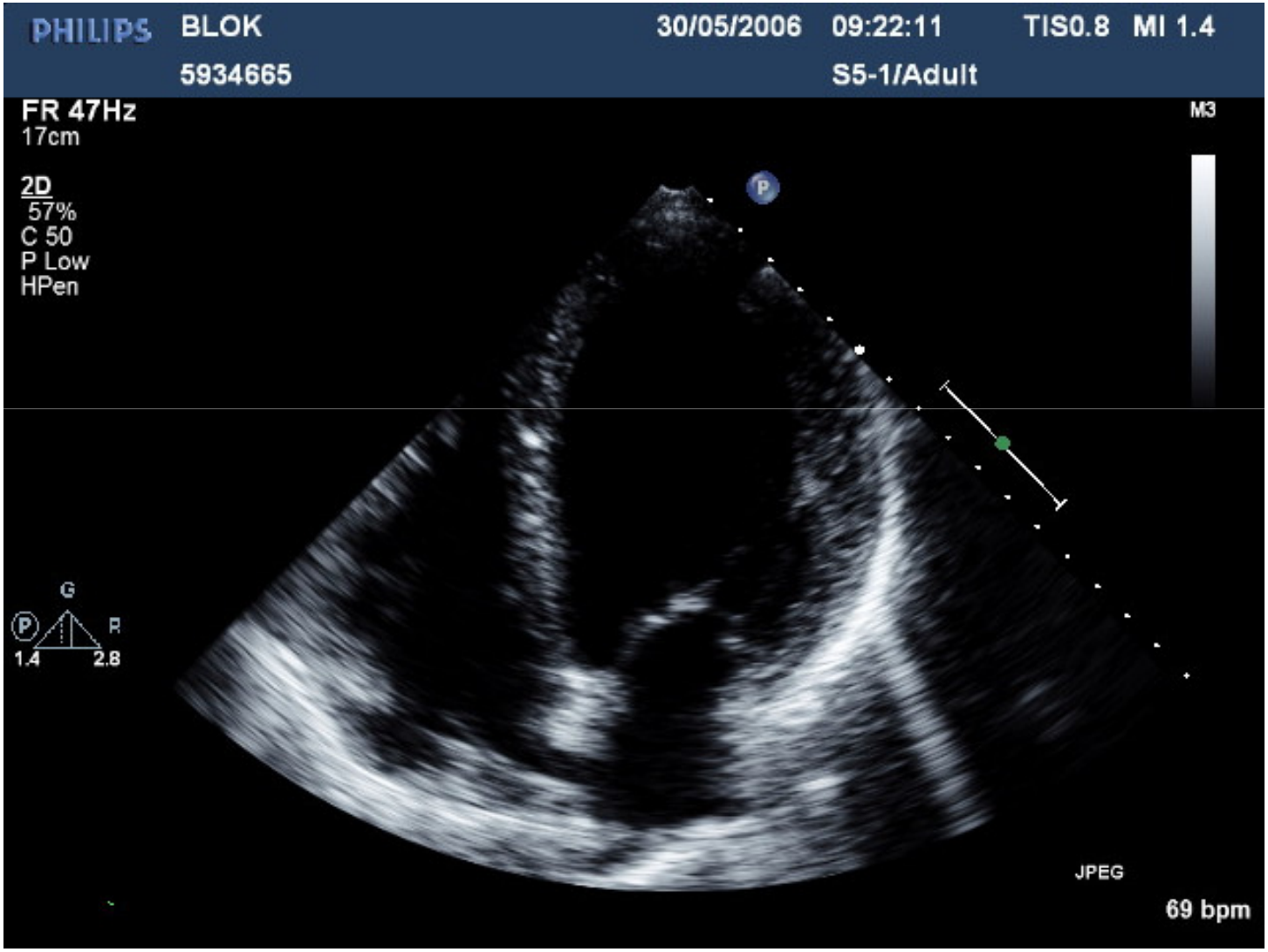
ECG
2006



Echocardiogram



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What would be the core elements of your strategic treatment plan?

1, Optimization of medical therapy

2, Cardiac resynchronization

3, Implantable cardiac defibrillator

4, All of the above mentioned treatment modalities

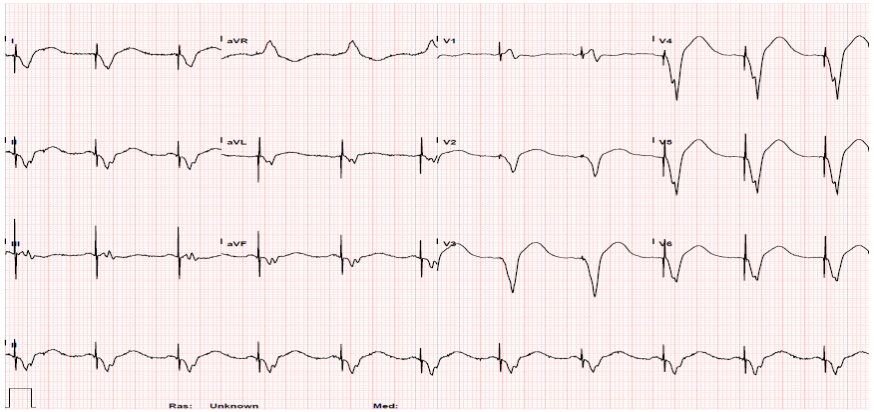
Q2

Past Medical History

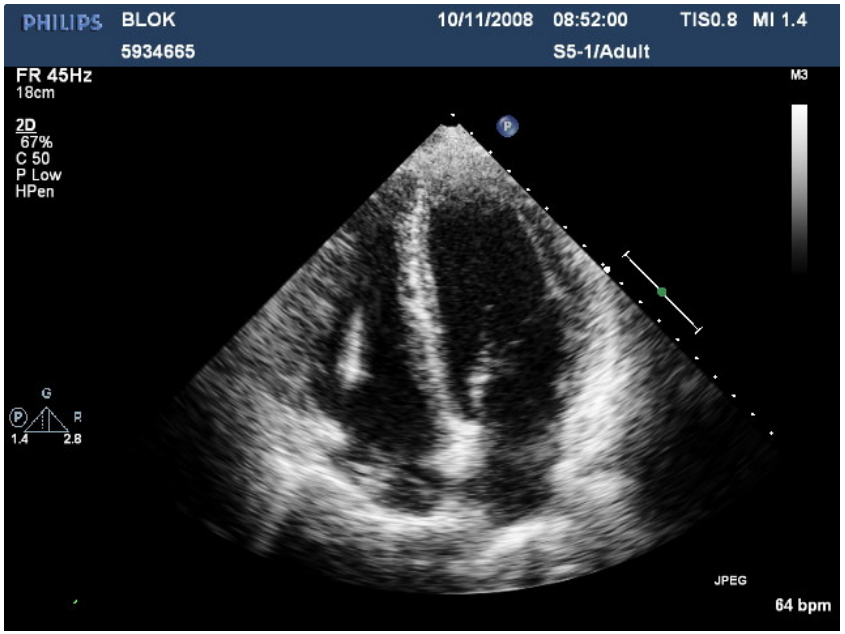
2005-2006	Optimization of medical therapy
2006 may	BiV ICD impl.
2006 jul	Right ventricular electrode dislocation re-operation, pocket hematoma
2006 aug	Pocket and lead revision due to major pocket bleeding, pneumothorax

Follow up- 2008

ECG



Echocardiogramm



Case presentation- Current Medical History

- No any symptoms (he feels great as compared to recent years, he is in NYHA functional class I)
- He carries a BiV- ICD and arrives for a regular technical checkup for the outpatient clinic, 2012 february
- This time only technical control is scheduled
- The ICD-PM technician reveals that the device is in ERI mode – elective replacement indication

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Which perioperative anticoagulation strategy would you use

1, Stop anticoagulation because of previous major bleeding

2, Unfractionated heparine bridging: provides flexibility for fast interruption- increases safety- decreases bleeding

3, LMWH bridging: provides possibility of 1 day hospital stay- proven to be safe

4, Continue oral anticoagulation and adjust INR < 2

5, Continue anticoagulation and keep INR above 2

Q3

On his long journey from Troy, Ulysses had to navigate the Strait of Messina. On the Italian side was the rock monster Scylla, on the Sicilian side was the whirlpool Charybdis. To navigate between these obstacles in this perilous passage, it was essential that Ulysses would steer a steady course, lest he, his ship, and all his sailors either be sucked to a watery grave by coming too close to the whirlpool Charybdis or be devoured by the monster Scylla.

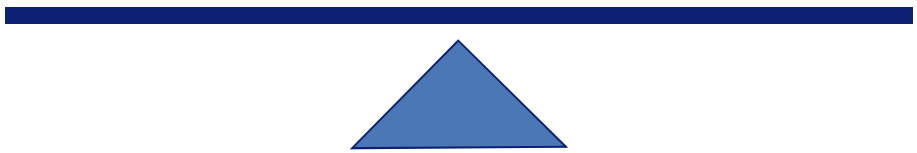
James Gillray 1793

Henry Fuseli,1794/6

Scylla and Charybdis

- 106 PubMed hits

Thromboembolic events *Bleeding*



Efficacy *Safety*

Ablation for atrial fibrillation ⟷ *Device implantation*

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CHA_2DS_2-VASc Score for Atrial Fibrillation Stroke Risk

Calculates stroke risk for patients with atrial fibrillation

Age?	•< 65 years old +0 •65-74 years old +1 •≥ 75 years old +2
Congestive Heart Failure History?	Yes +1
Hypertension History?	Yes +1
Stroke/TIA/Thromboembolism History?	Yes +2
Vascular Disease History? (previous MI, peripheral arterial disease or aortic plaque)	Yes +1
Diabetes Mellitus?	Yes +1
Female?	Yes +1
Score	

HAS-BLED Score for Major Bleeding Risk

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Estimates risk of major bleeding for patients on anticoagulation to help determine risk-benefit in atrial fibrillation care.

Hypertension History? (uncontrolled, >160 mmHg systolic)	Yes+1
Renal Disease? (Dialysis, transplant, Cr >2.6 mg/dL or >200 µmol/L)	Yes+1
Liver Disease? (Cirrhosis, Bilirubin >2x Normal, AST/ALT/AP >3x Normal)	Yes+1
Stroke History?	Yes+1
Prior Major Bleeding or Predisposition to Bleeding?	Yes+1
Labile INR? (Unstable/high INRs,	Yes+1
Age ≥65?	Yes+1
Medication Usage Predisposing to Bleeding? (Antiplatelet agents, NSAIDs)	Yes+1
Alcohol Usage History?	Yes+1

Please calculate the CHA_2DS_2VASC score of this patient in order to assess his stroke risk

Case presentation- Past Medical History

	Appendectomy (time: unknown)
	Hypertension
	History of significant alcohol intake
-1999	Palpitations
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2003 oct	Ventricular tachycardia

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What is the CHA_2DS_2VASC score of this patient?

1, 1

2, 3

3, 5

4, 7

5, 9

Q4

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Please calculate the HAS- BLAD score of this patient in order to assess his bleeding risk

Case presentation- Past Medical History

	Appendectomy (time: unknown)
	Hypertension
	History of significant alcohol intake
-1999	Palpitations
2001	Stroke
2002 sept	Acute MI (inferior) - EF 23%
2002 oct	Recurrent chest pain- coronary angiogram
2002 nov	Acute cardiac failure- paroxysmal atrial fibrillation
2003 sept	Syncope – considered as orthostatic reaction
2003 oct	Ventricular tachycardia

Past Medical History

2005-2006	Optimization of medical therapy
2006 may	BiV ICD impl.
2006 jul	Right ventricular electrode dislocation
	re-operation, pocket hematoma
2006 aug	Pocket and lead revision, pneumothorax

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What is the HAS-BLAD score of this patient?

1, 0

2, 2

3, 4

4, 6

5, 8

Q5

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Physical and Laboratory examination at admission

Severe obesity (BMI: 33.38)

NYHA I functional class

Heart-Lung-Abdomen: no abnormalities

Labs: No any abnormality- INR: 1.2

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Treatment plan:
Elective BiV ICD device change
Day admission
Based on his CHA_2DS_2-VASC score: LMWH
bridging therapy
Antithrombotics (aspirine) continuation
Early restart of oral anticoagulation

Box change: no complication, no significant bleeding was obsreved although the medical report says: multiple sources of pin-point bleedings

Readmission in 5 days due to painful hematoma
1 day later- bleeding continues: INR 3.6, heparine still on board
Patient develops fever 38.9 degrees

What would you do in the current situation?

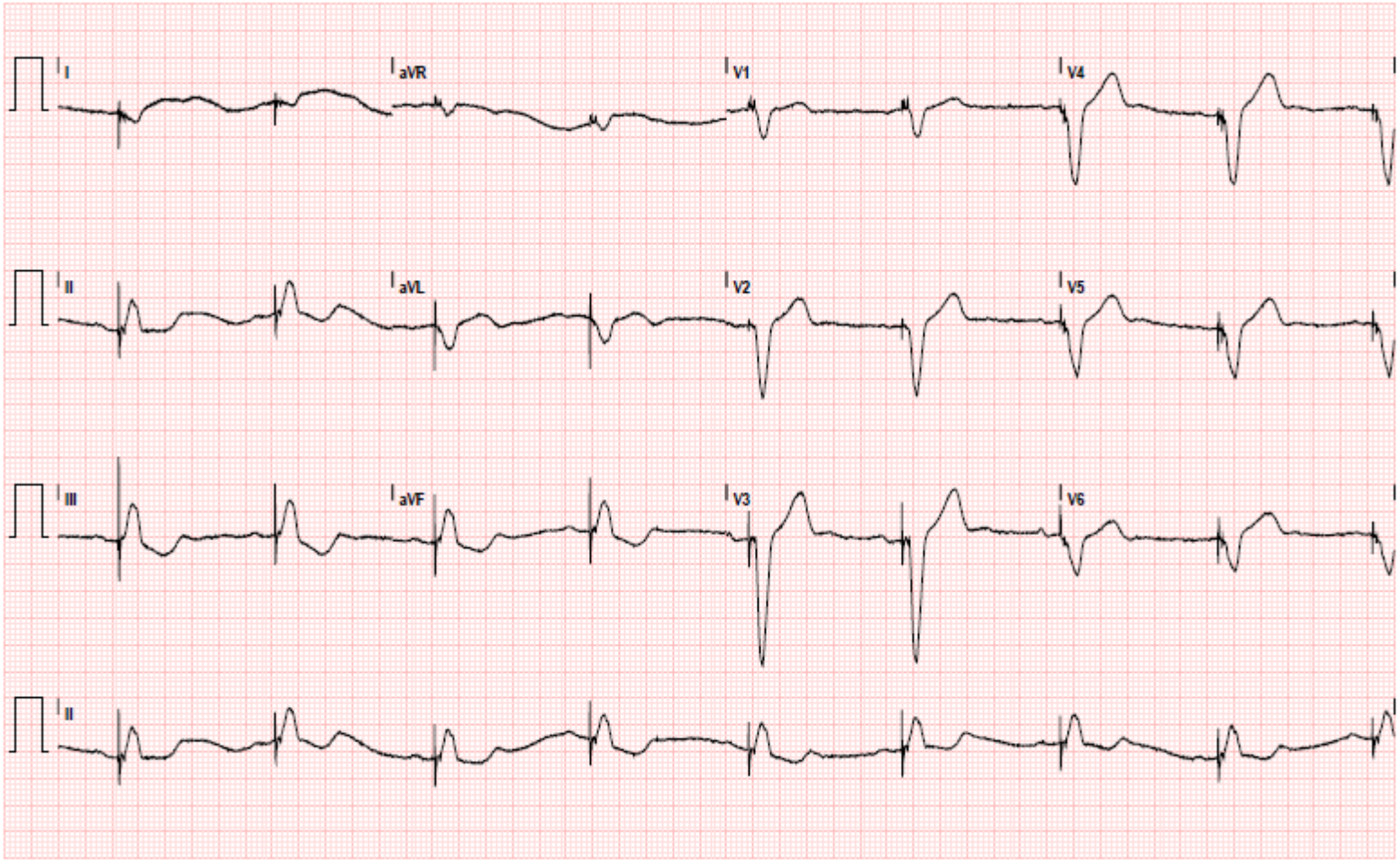
1, Conservative treatment -Long course antibiotics

2, Full system removal

3, Pocket revision

Q6

ECG- post-re-implantation of CRT



(your judgement of us....)

Was it a medical DEFECT or was it an unavoidable complication?

1, Defect

2, Unavoidable complication

Q7

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Annually around 300 000 pts receive ICD/ PM/ CRT (US+ Eur)

Approxymately 45% is having OAC and/or antiplatelet therapy

What is the risk for perioperative thromboembolism?
What is the risk of postoperative bleeding?

What is the best perioperative strategy?

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Table 1. Risk stratification for perioperative arterial or venous thromboembolism according to the American College of Chest Physicians, Eighth Edition.

Risk category	Prosthetic heart valve	Atrial fibrillation	Venous thromboembolism
High	Prosthetic mitral valve, Starr–Edwards, Bjork Shiley AVR, stroke or TIA within 6 months	$CHADS_2$ score: 5 or 6, recent stroke or TIA within 3 months, mitral stenosis	Recent event within 3 months, thrombophilia deemed high risk (e.g., APLA)
Moderate	St Jude bileaflet AVR and AF, prior stroke, or TIA or $CHADS_2$ ≥1	$CHADS_2$ score of 3 or 4	Recent event 3–12 months, low-risk thrombophilia (e.g., factor V Leiden), recurrent VTE active malignancy
Low	St Jude bileaflet AVR alone	$CHADS_2$ score 0–2	Single episode of VTE >12 months prior

LMWH or UHF bridging

Ramirez et al., Exp Rev, 2011

What is the risk for perioperative thromboembolism?

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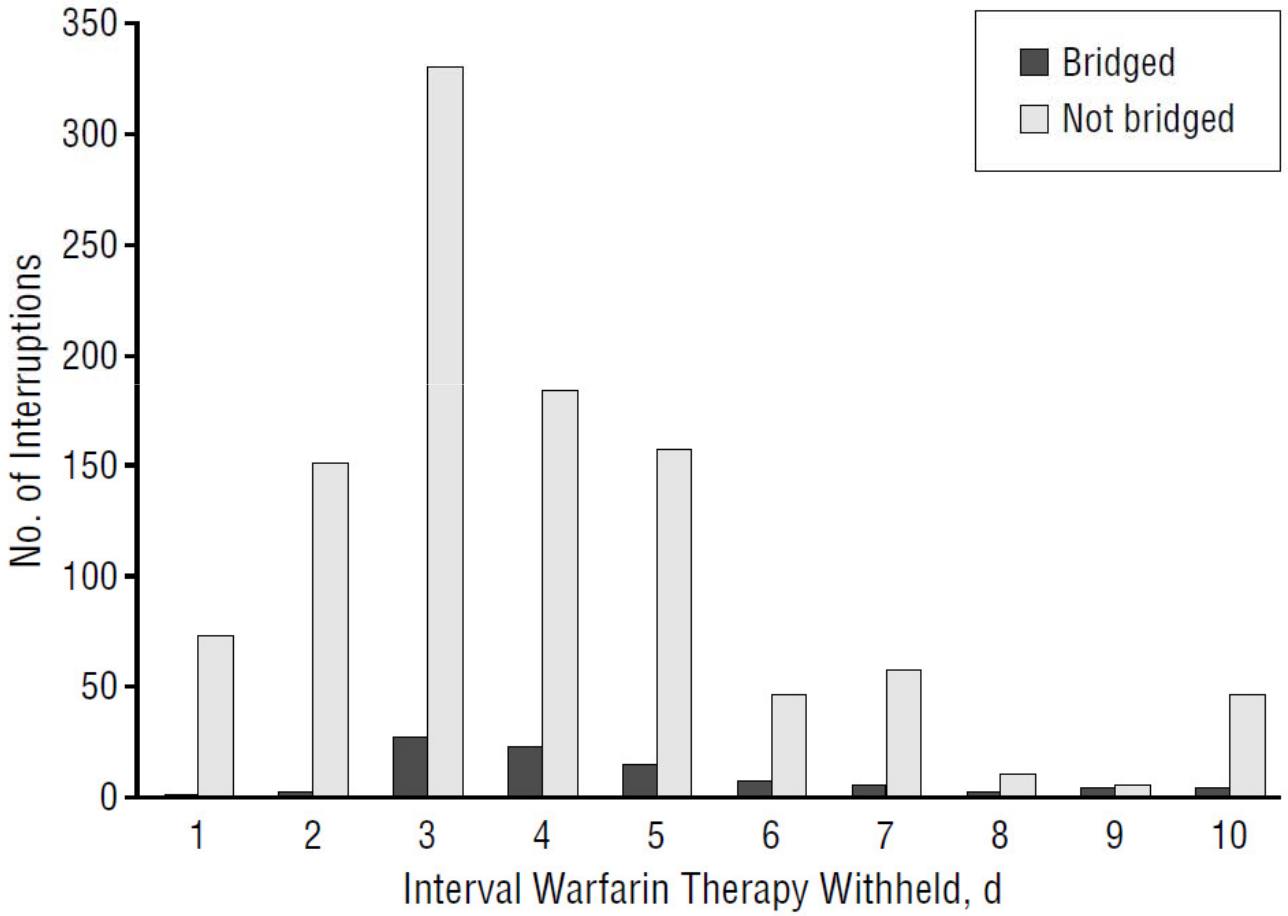
Risk of thromboembolism with short-term interruption of warfarin therapy

- Prospective observational cohort study
- 101 sites in the US
- Enrollment between 2000 and 2002
- 1293 episodes of warfarin therapy interruption
- Outcome: thromboembolic event or clinically significant bleeding within 30 days

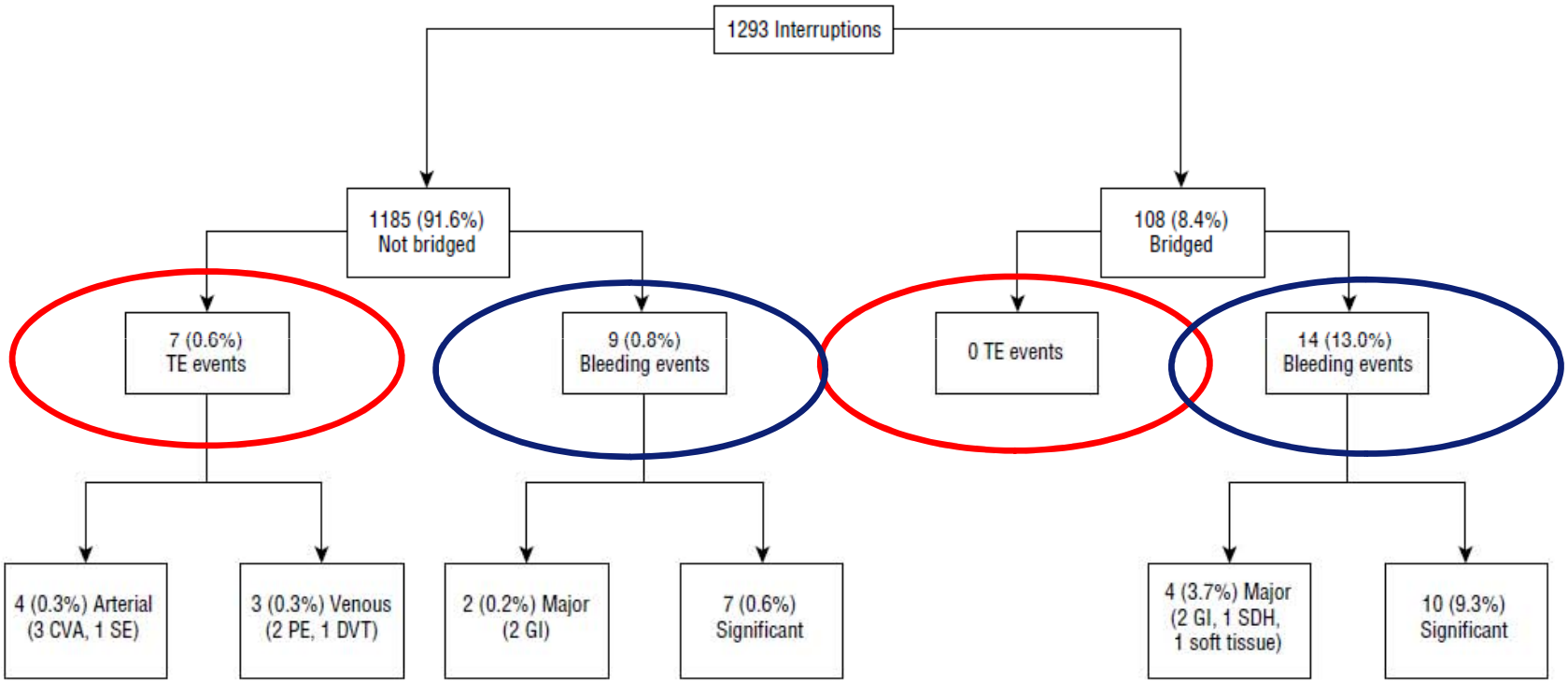
Garcia et al, Arch Intern Med, 2008

Duration and frequency of interruption of warfarin therapy



Garcia et al, Arch Intern Med, 2008

Risk of thromboembolism with short-term interruption of warfarin therapy



Garcia et al, Arch Intern Med, 2008

What is the risk for post-operative bleeding complications?

Evaluation of pocket hematoma after PM/ ICD impl

Enrollment between 1990-2002 (retrospective)

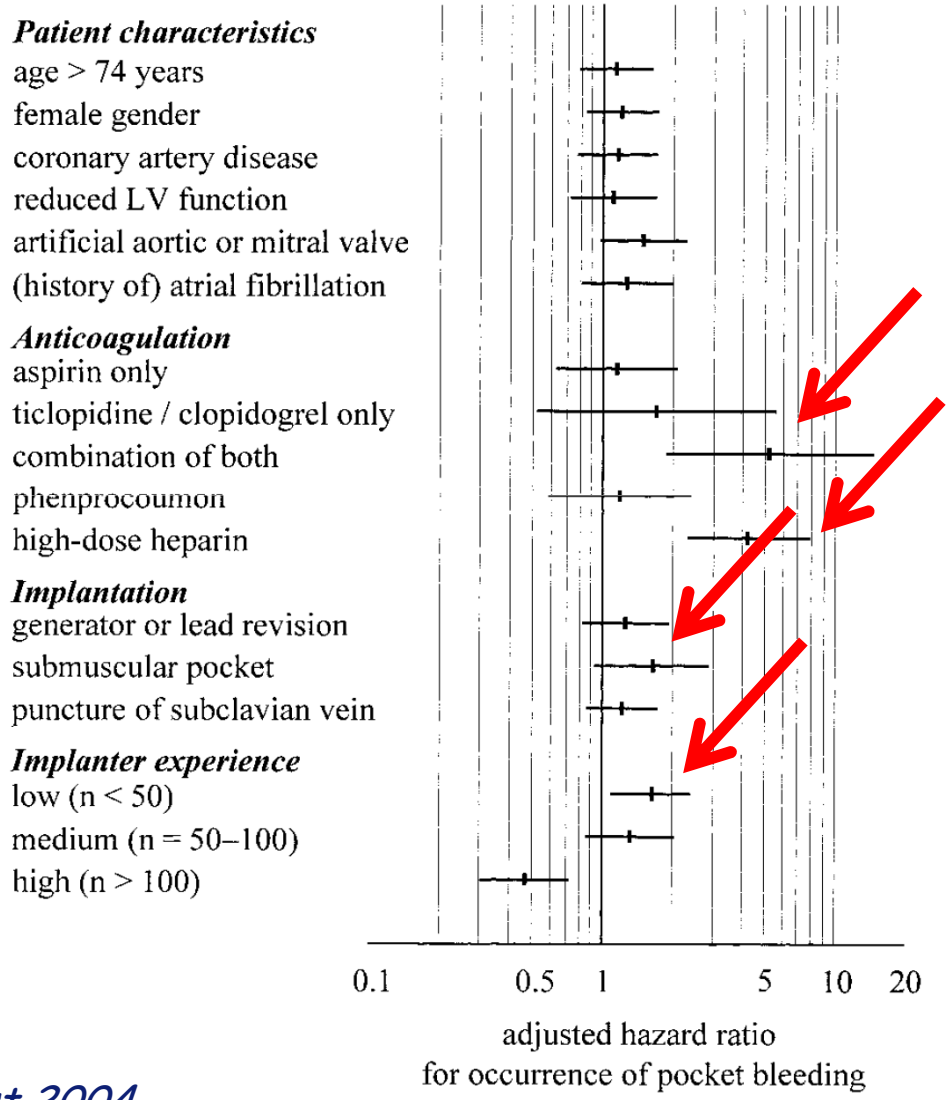
Predictors were determined prospectively

3164 Implantations

Operator experience was evaluated too (graded as <50, between 50 and 100 and >100)

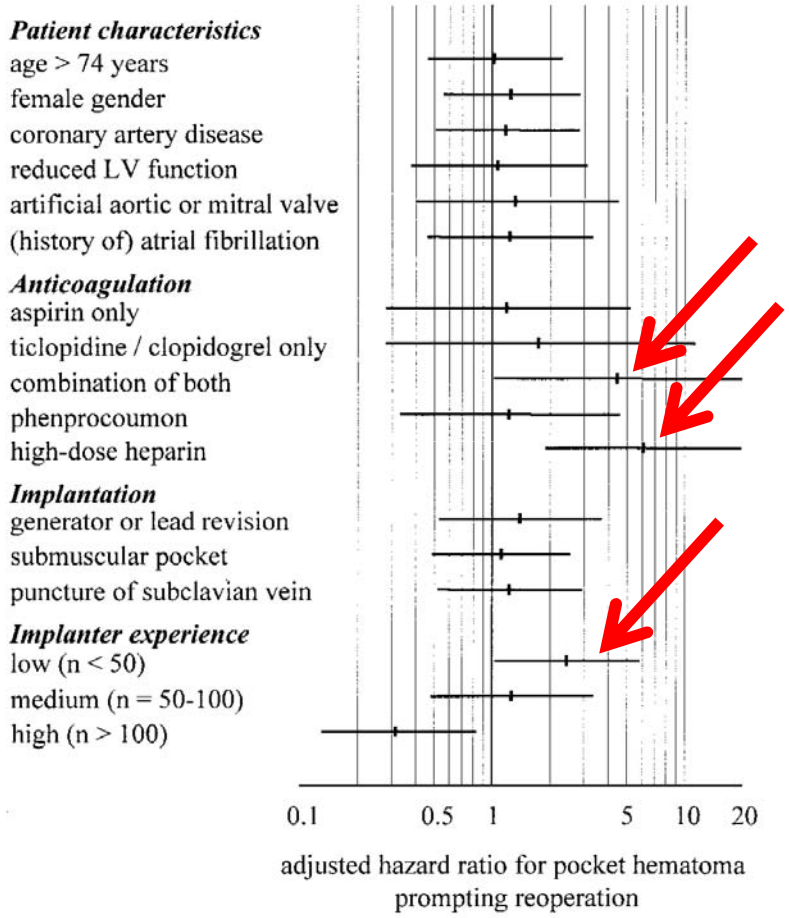
Wiegand et al, Chest 2004

Pocket hematoma after PM and ICD surgery



Wiegand et al, Chest 2004

Pocket hematoma prompting re-operation



Wiegand et al, Chest 2004

Postoperative use of heparine increases morbidity of device implantation

Retrospective

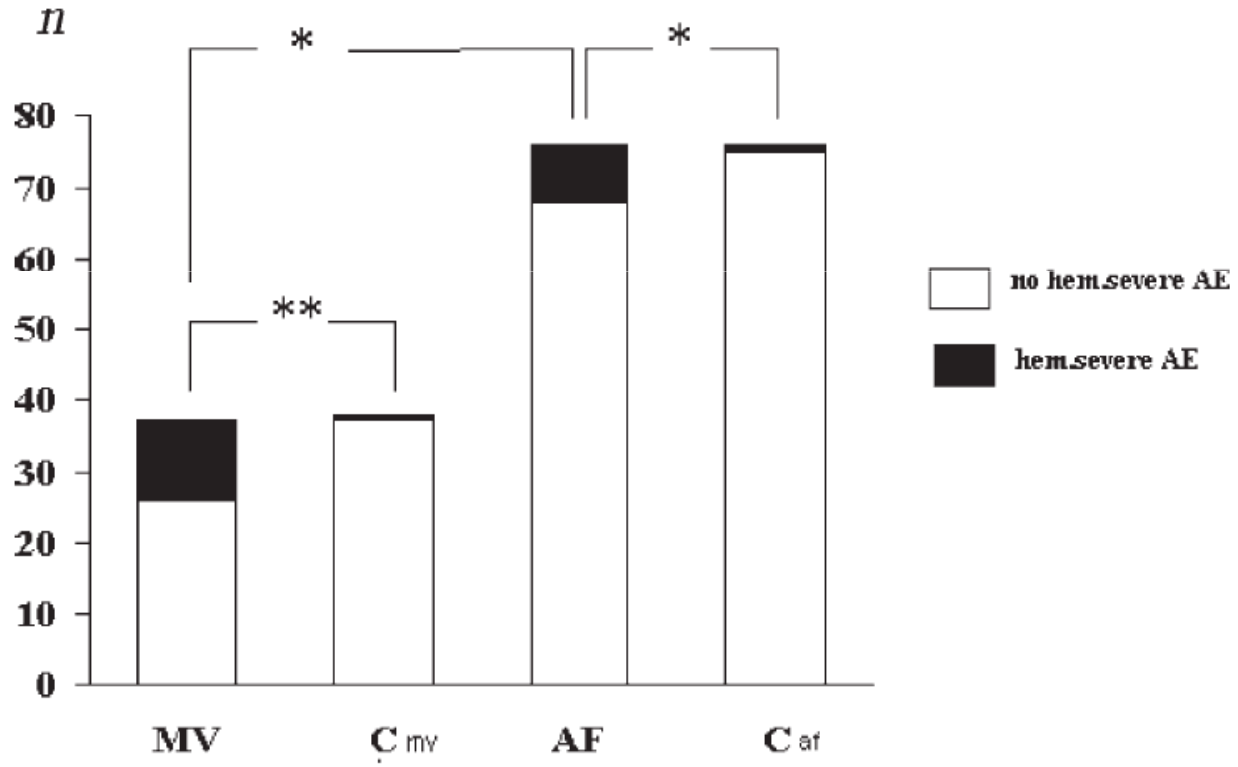
Case controlled

38 patients with MV and 76 Afib

114 age and sex matched controls

Marquie et al, Europace 2006

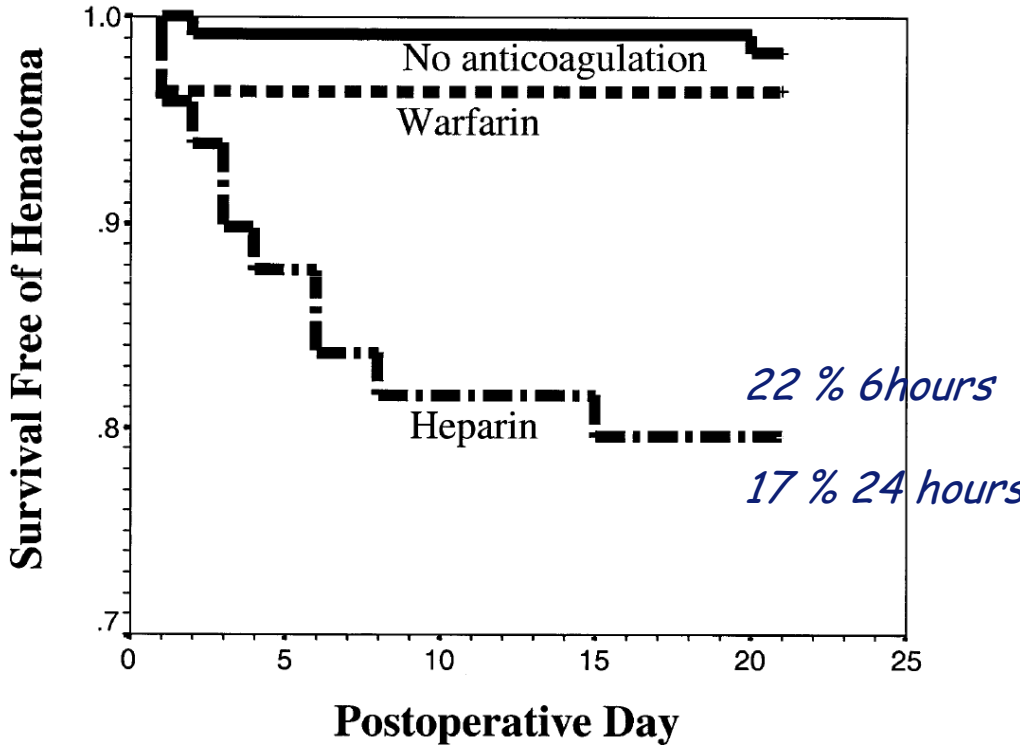
Postoperative use of heparine increases morbidity of device implantation



Marquie et al, Europace 2006

Postoperative use of re-initiation of heparine after device implantation

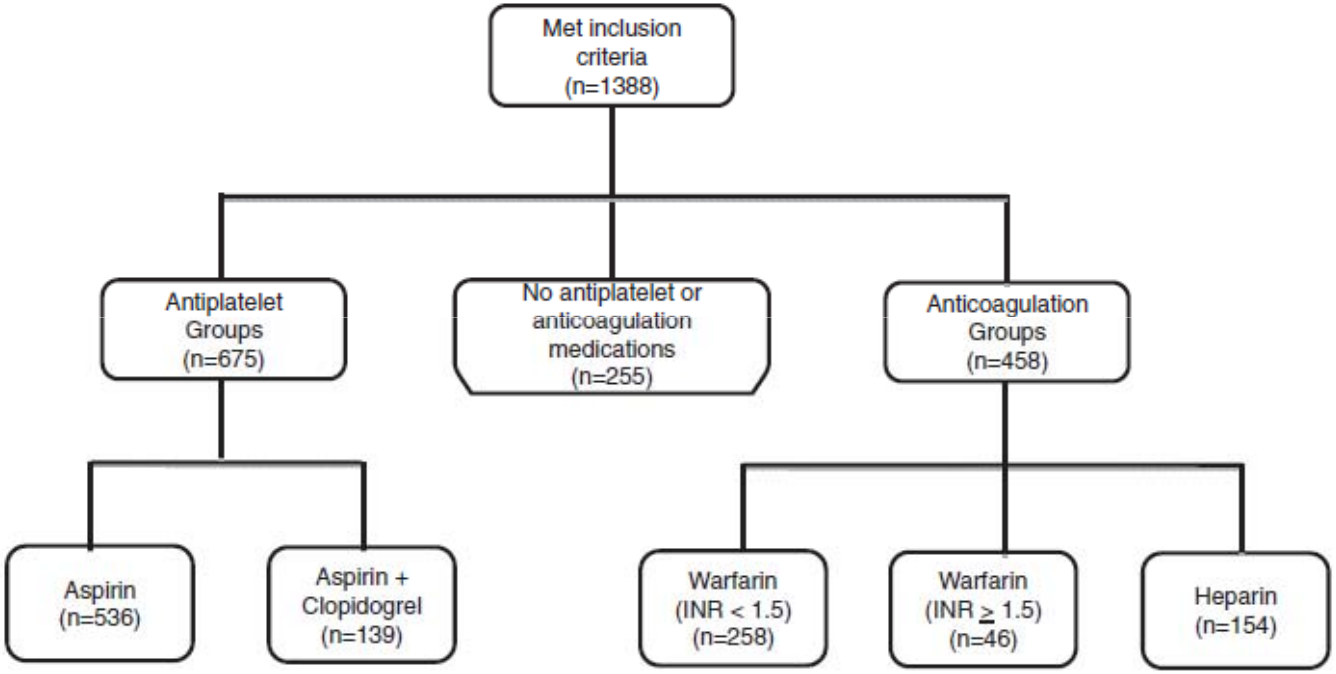
49 pts
Randomized
3 arms study:
6 hours
24 hours
no OAC



Michaud et al, JACC 2000

Bleeding risk and antiplatelet therapy?

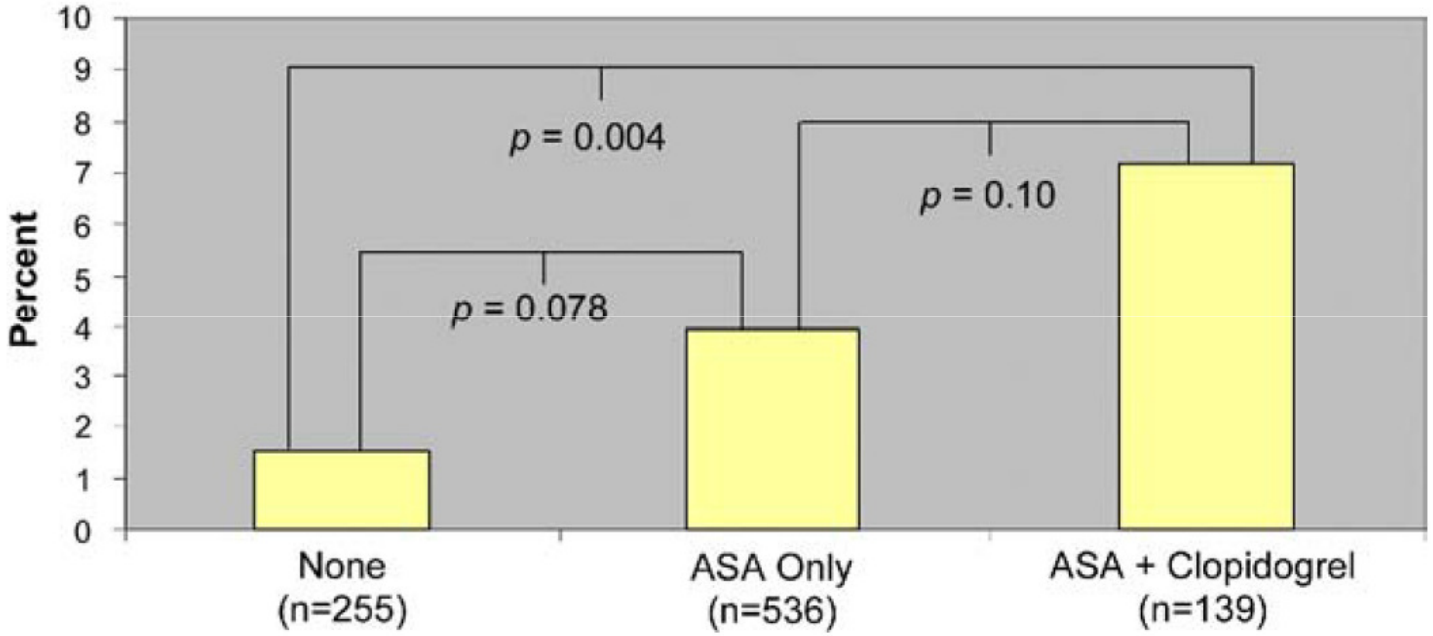
Dual antiplatelet and heparine increases bleeding risk



Primary endpoint: significant bleeding defined as need for pocket exploration and/ or blood transfusion

Tompkins, JACC, 2010

Dual antiplatelet and heparine increases bleeding risk



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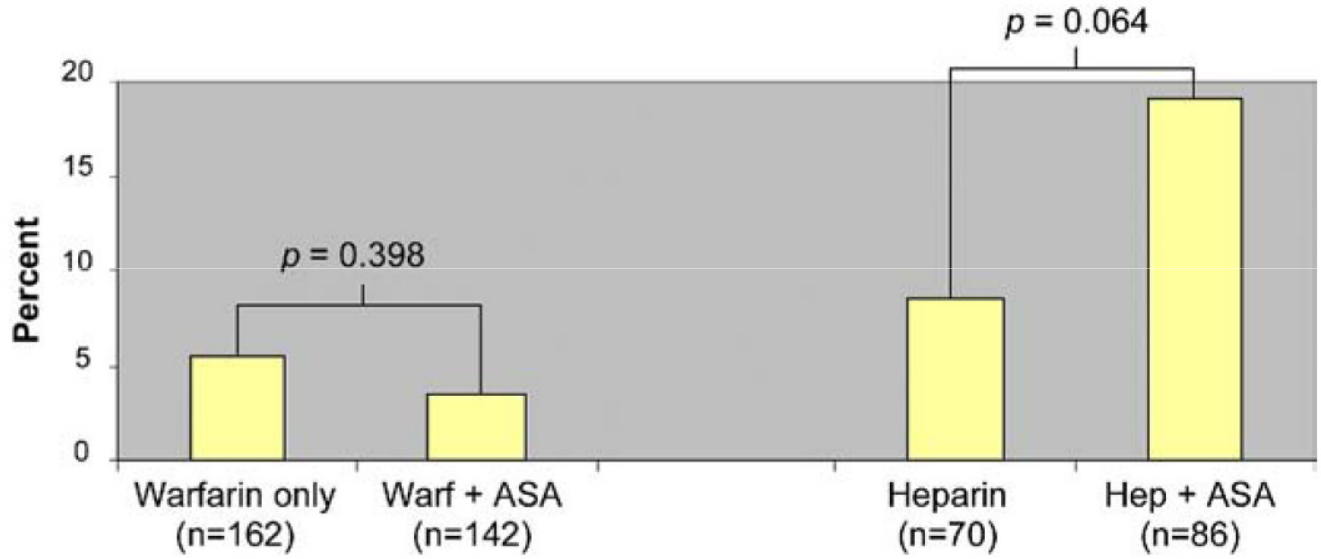

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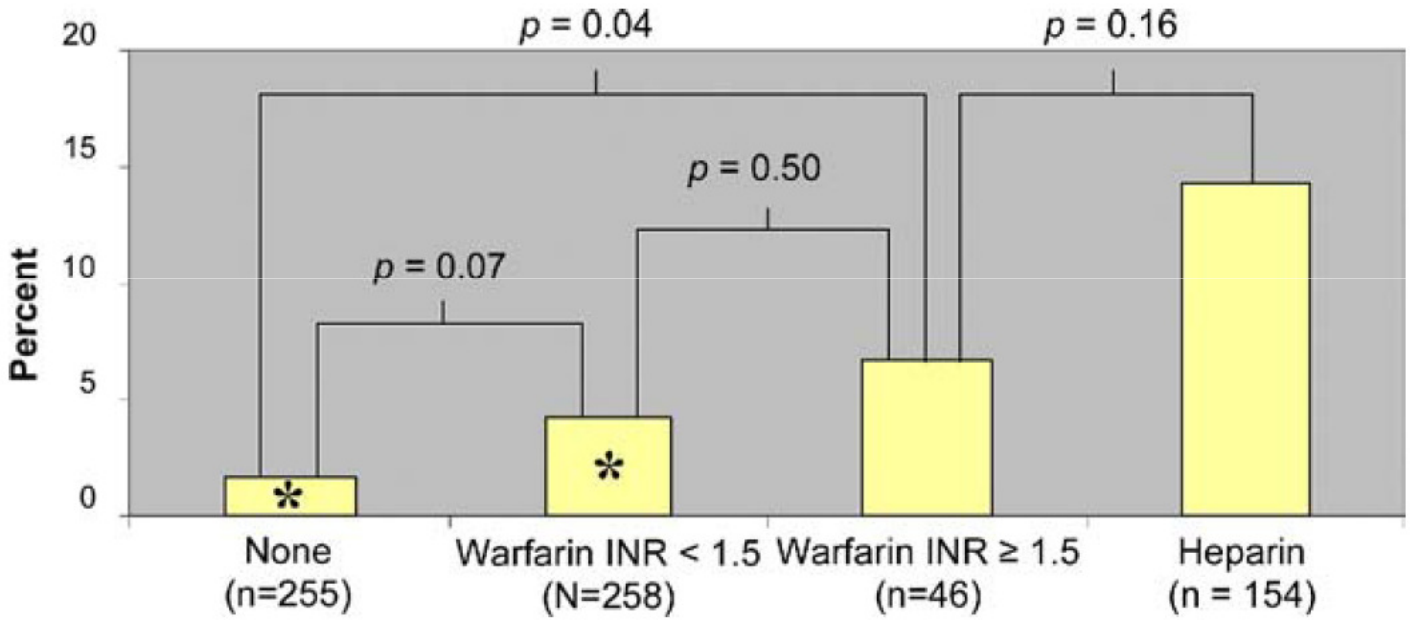
Dual antiplatelet and heparine increases bleeding risk



Primary endpoint: significant bleeding defined as need for pocket exploration and/ or blood transfusion

Tompkins, JACC, 2010

Controversial results with DA therapy

Complications

	Control	DA-Therapy	P-Value
Hematoma [n (%)]	3 (0.9)	1 (0.9)	0.581
Pneumothorax [n (%)]	2 (0.6)	0	0.986
Hemothorax [n]	0	0	–
Lead perforation [n (%)]	2 (0.6)	0	0.986
Lead dislodgement [n (%)]	1 (0.3)	1 (0.9)	0.986
Infection [n (%)]	2 (0.6)	0	0.986

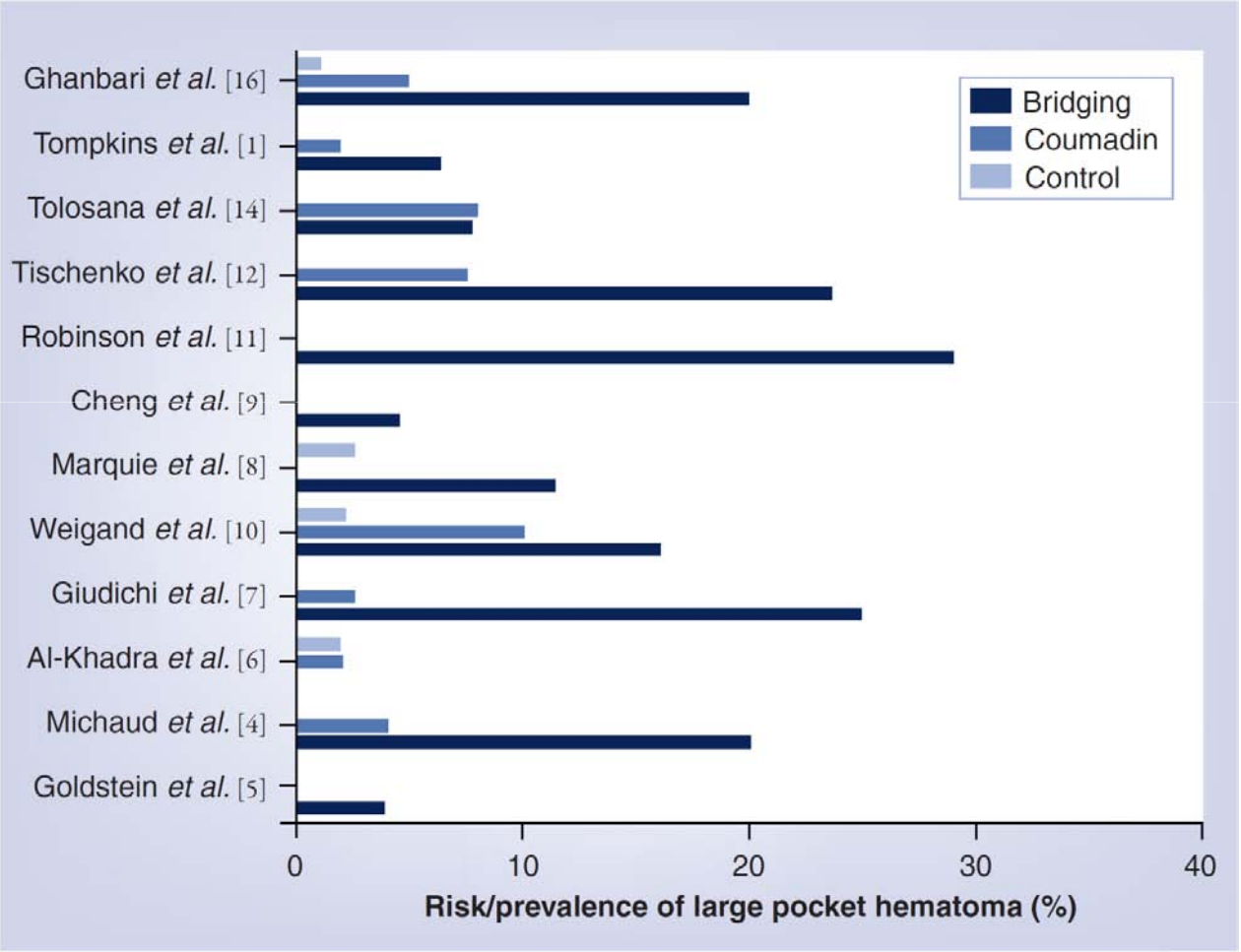
109 patients

Dreger et al, PACE, 2010

Specific CRT results

Does CRT differ from other device implantations

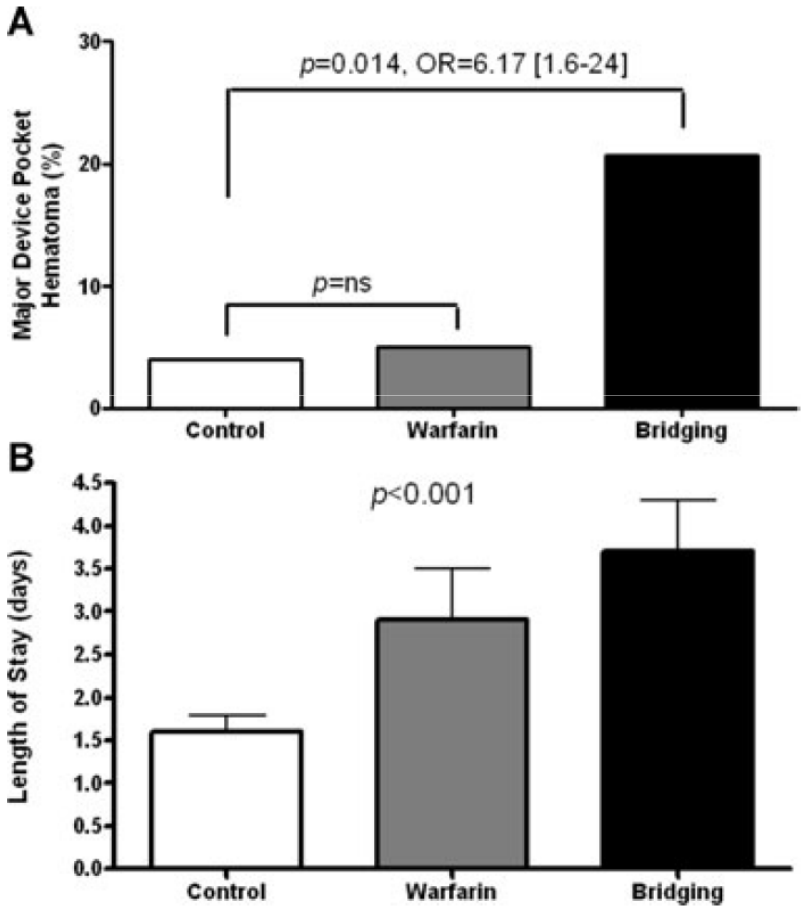
CRT →



There is no fundamentally important difference

CRT and therapeutic INR

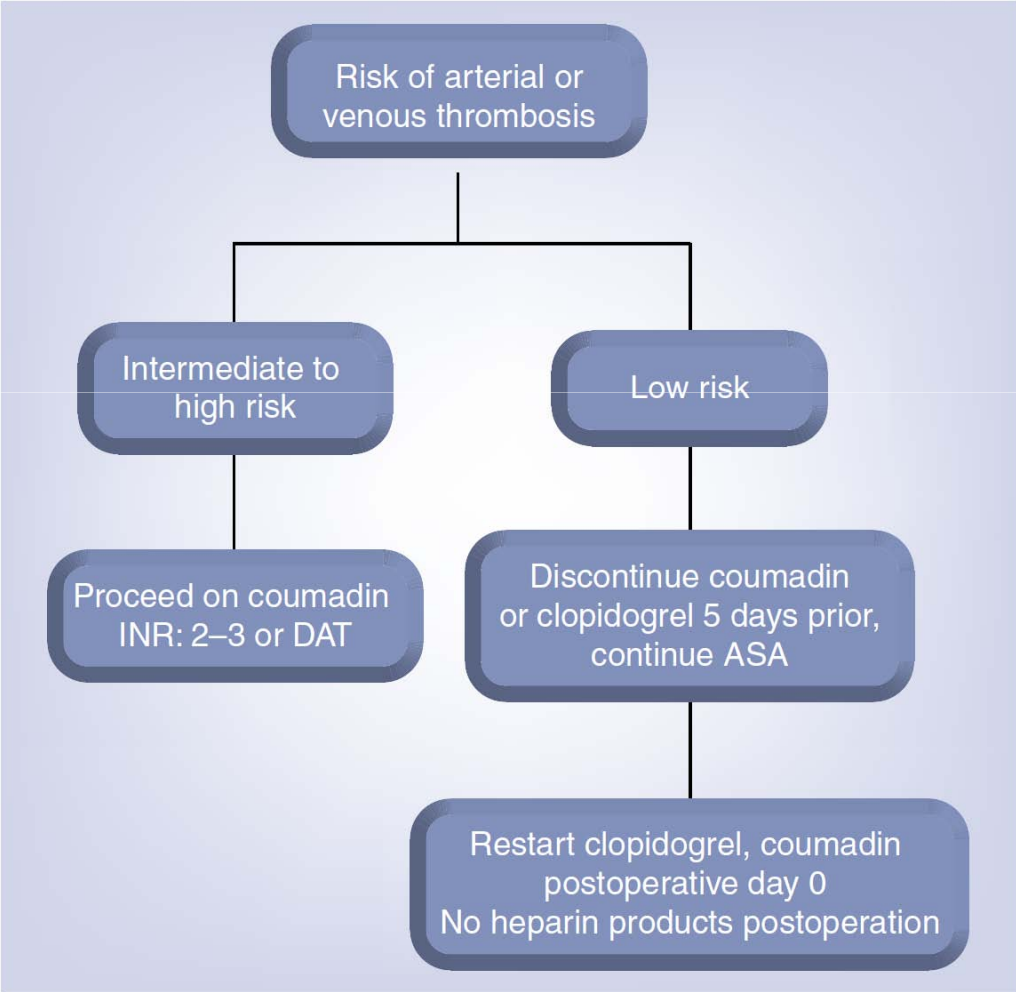
Differences in major pocket hematoma and hospital stay



Ghanabri et al, PACE 2010

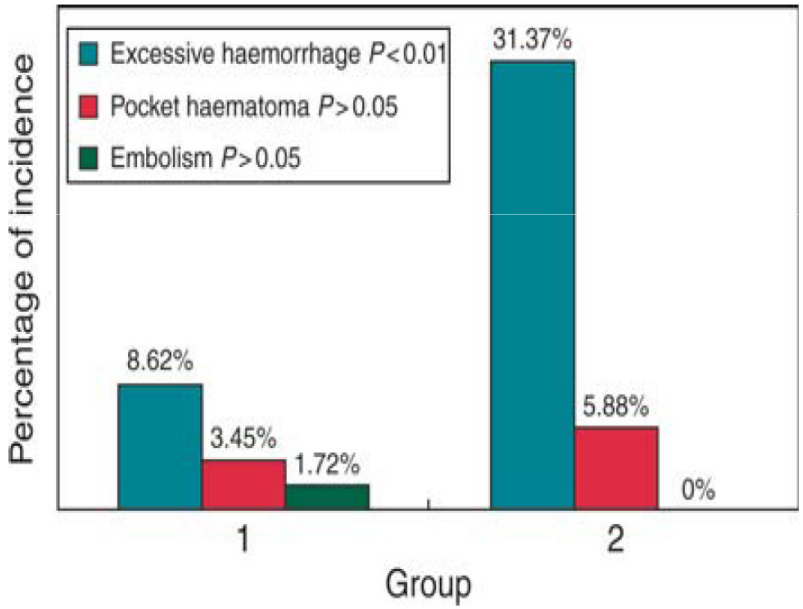
What is the best perioperative anticoagulation strategy?

Risk stratification before device implantation

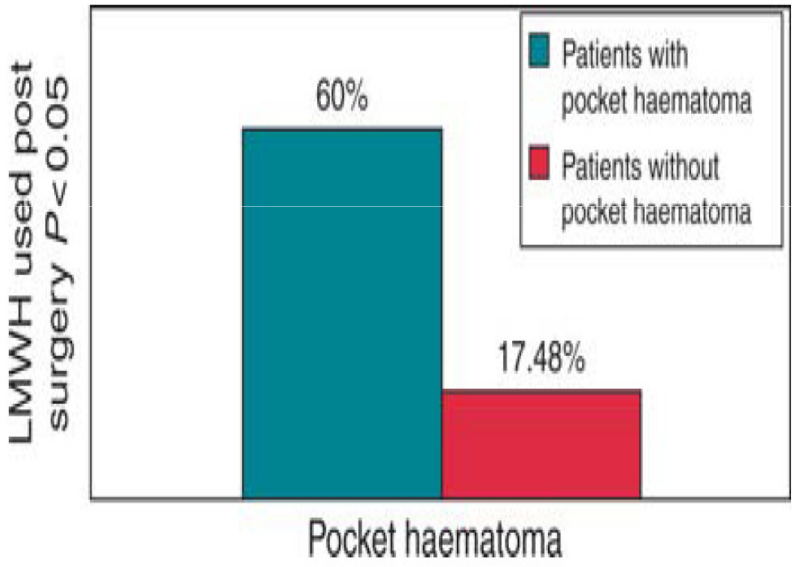


Ramirez et al., Exp Rev, 2011

Peri-operative anticoagulation and device implantation



Incidence of complications



Risk factors for complications

Cheng et al, Europace 2009

Protocol Erasmus MC: risk stratification

		Trombo-embolische complicatie risico	
		LAAG	HOOG
		· AF met $CHADS_2$ score ≤2 of CHA_2DS_2-VASc score ≤2 · Mechanische Aortaklep* St Jude Medical Bileaflet ≥ 3 nd na OK · CMP: LVEF <30 % · LV aneurysma met LVEF >30% · Veneuze tromb-embolie ≥6 mnd · Hypertensie · Diabetes Mellitus · Leeftijd 65-74 jaar	· AF met $CHADS_2$ score ≥2 of CHA_2DS_2-VASc score ≥2 · Alle mechanische kleppen, behalve mechanische Aortaklep* (St JudeMedical, Bileaflet ≥ 3 mnd na OK) · Bio-klepprothese met AF of slechte LV functie · Intracardiale trombus in situ (of in VG) met slechte LV functie · Veneuze trombo-embolie recidiverend / recent <3mnd · Longembolie <12 mnd · CVA/TIA in voorgeschiedenis · Ernstige trombofilie of stollingsziekten · Leeftijd ≥75 jaar
Bloedings risico			
LAAG	· Geen van de onderstaande risicofactoren	A	B
VERHOOGD	· Gebruik Acetylsalicyl, Carbasalaat, Clopidogrel, Prasugrel, Dipyridamol, Acenocoumarol, Fenprocoumon · Nierinsufficiëntie, eGFR < 60 ml/min · Leverinsufficiëntie · Trombocytopenie < 50 of bekende bloedingsneiging · Recente ICD/PM implantatie · (Pocket) bloeding in VG · Planning lead extractie, bijplaatsen lead, complexe wissel, pocket revisie · HASBLED ≥ 3	C	D

Erasmus MC protocol

Protocol A:

Trombo-embolic complication risk ***LOW***

Bleeding risk ***LOW***

- *Stop OAC, no heparine bridging*

dag -5	**stop fenprocoumon**
dag -3	stop acenocoumarol
dag-1/0	opname, INR < 2.0, interventie
dag + 1	geen OAC
dag +2	geen OAC
dag + 3	herstart OAC met normale dosering, geen oplaaddosis

Erasmus MC protocol

Protocol D:

Trombo-embolic complicatiion risk ***HIGH***

Bleeding risk ***HIGH***

OAC continuation

SENIOR Electrophysiologist with an experience more than 100 implantations

dag-5/-3	fenprocoumon of acenocoumarol niet onderbreken, dosering halveren
dag -2	controle INR
dag-1/0	opname, streefwaarde INR ≤ 2.3
dag 0	controle INR <2.3 = Implantatie, OAC continueren
dag + 1	OAC continueren normale dosering met normale dosering, geen oplaaddosis
dag +++	controle INR

Conclusions

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1. Complex decision – fine-tuned clinical protocol is necessary
2. Experienced operator is mandatory
3. No evidence yet is available for new anticoagulation agents
4. OAC (warfarin or coumadin continuation seems to be the best strategy)
5. Small mistake can change the fortune of the patient