SCA et troubles du rythme
(pour faire face à l'urgence)

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www.e-cardiogram.com

SCA et troubles du rythme

Terkelsen CJ et al. *Prevalence and significance of accelerated idioventricular rhythm in patients with ST-elevation myocardial infarction treated with primary percutaneous coronary intervention*. Am J Cardiol 2009; 104:1641-6

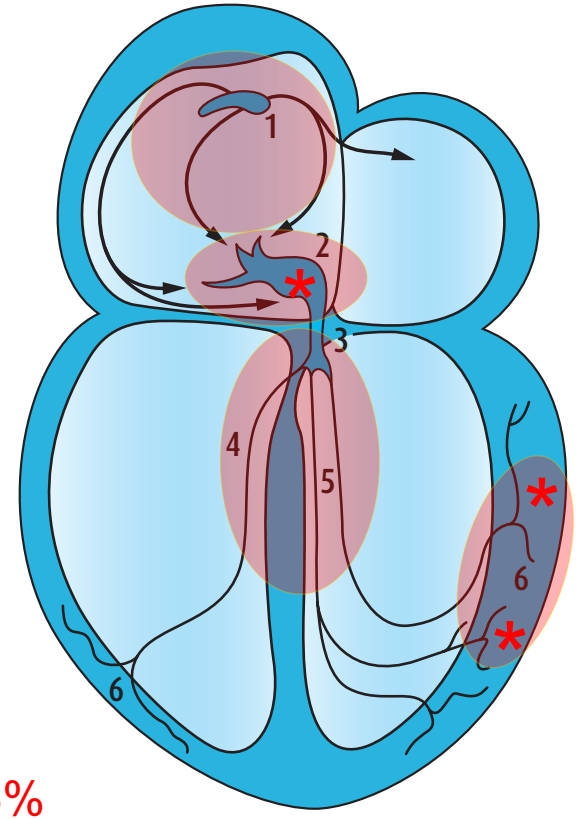
N = 503
(106 min)

Bradycardie ou dysfonction sinusale 28%
Tachycardie sinusale 22%
Automatisme anormal atrial : FA 9%

Bloc intranodal : Bloc AV 1 / 2 Mobitz 1 25 / 3%

Bloc infranodal : Bloc de branche D ou G 8 / 1%
Bloc AV 2 Mobitz 2 2%
Bloc AV haut degré et bloc AV 3 5%

Hyperautomatisme de reperfusion : J / RIVA 8 / 42%

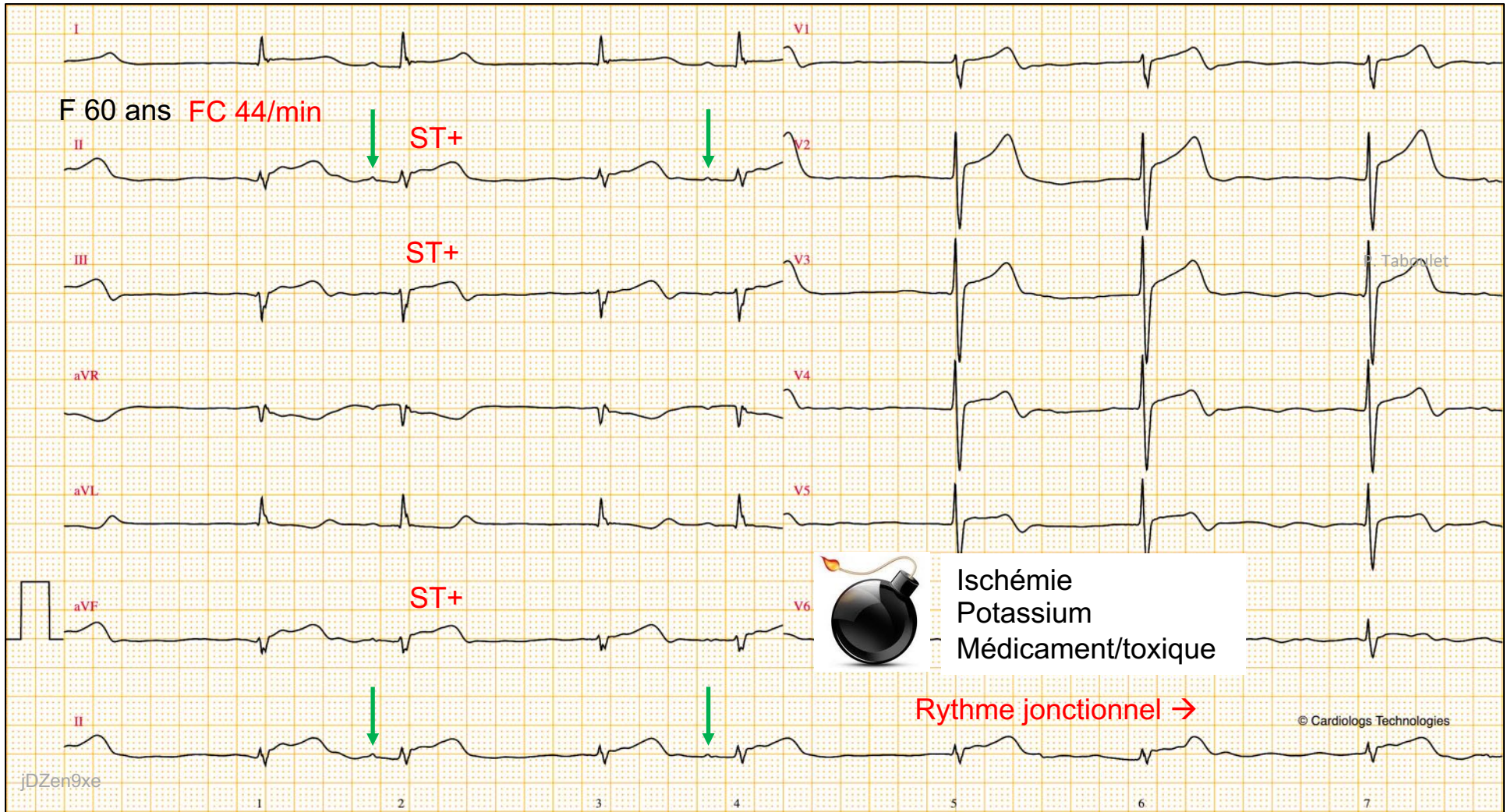


Automatisme anormal ventriculaire : ESV* et TVNS* 26%
Tachycardie ventriculaire soutenue (≥ 120 bpm) 2% (4%)
Fibrillation ventriculaire 2% (5%)

Pronostic
RIVA et BBD

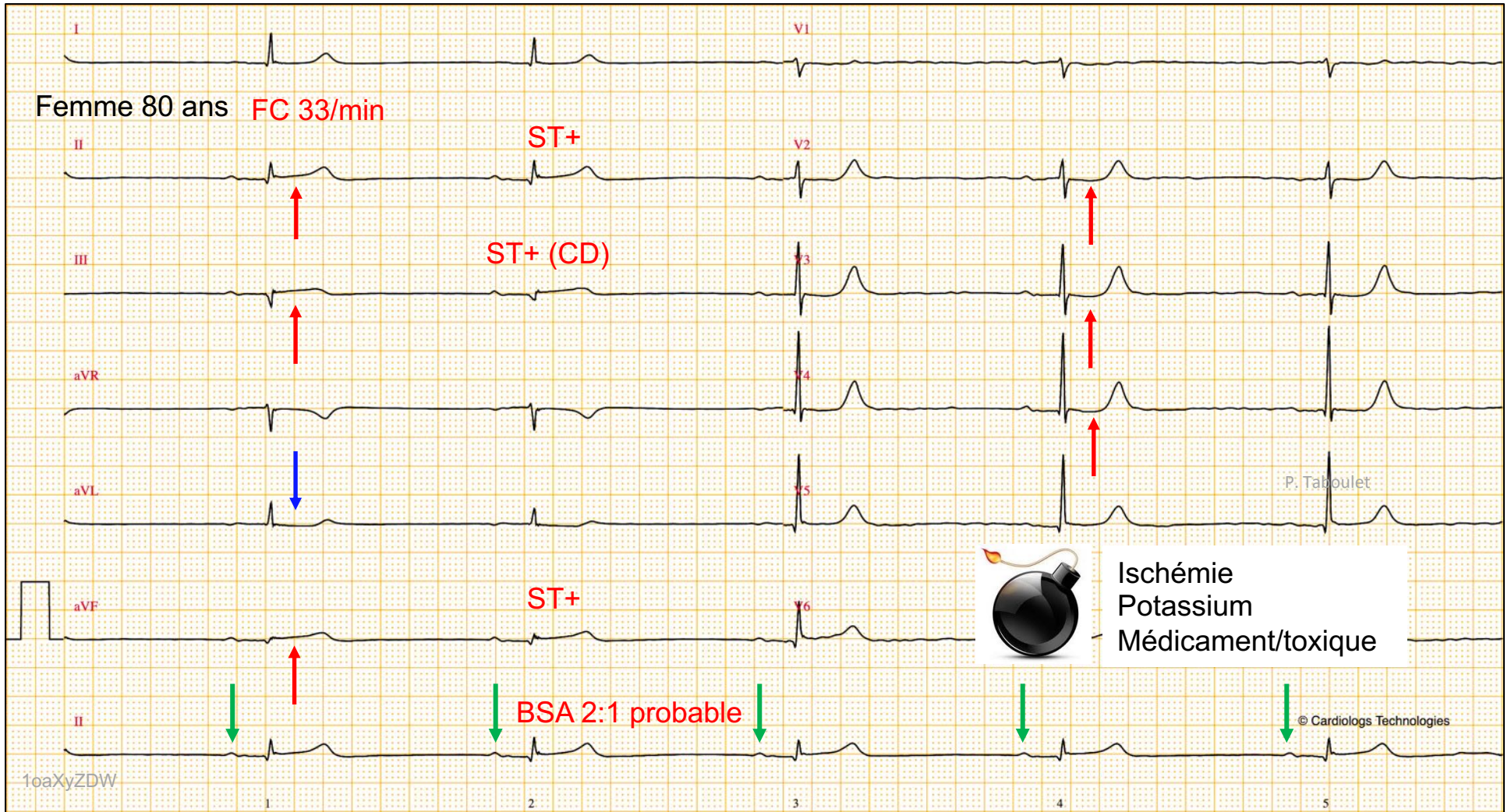
Dysfonction sinusale/BSA 28%

STEMI inférieur et infarctus atrial : bradycardie aggrave l'hémodynamique



Dysfonction sinusale/BSA 28%

STEMI inférieur et infarctus atrial : bradycardie aggrave l'hémodynamique
→ Atropine ou EEV transcutanée ou veineux

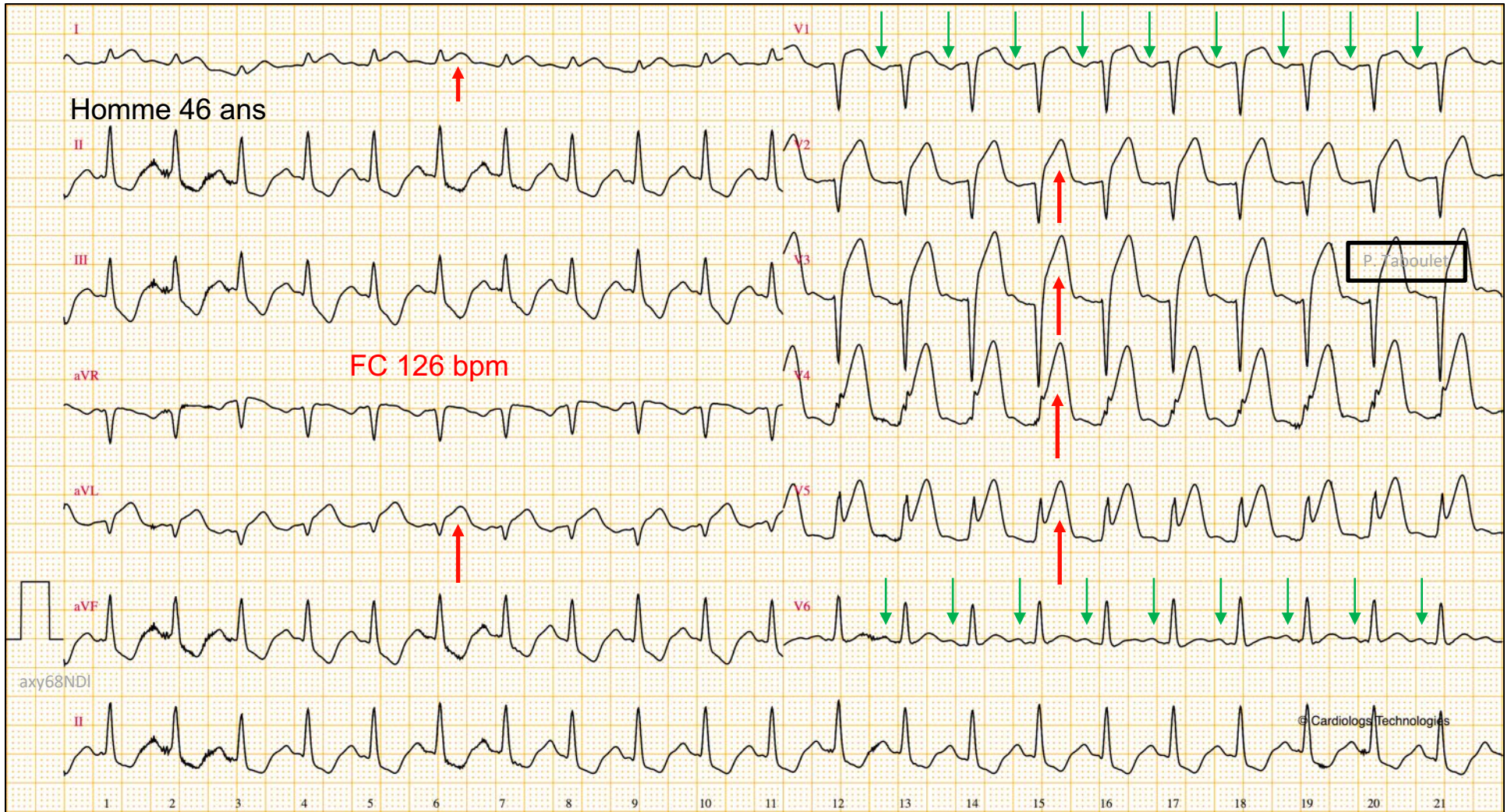


Tachycardie sinusale

22%

STEMI antérieur (onde de Pardee)

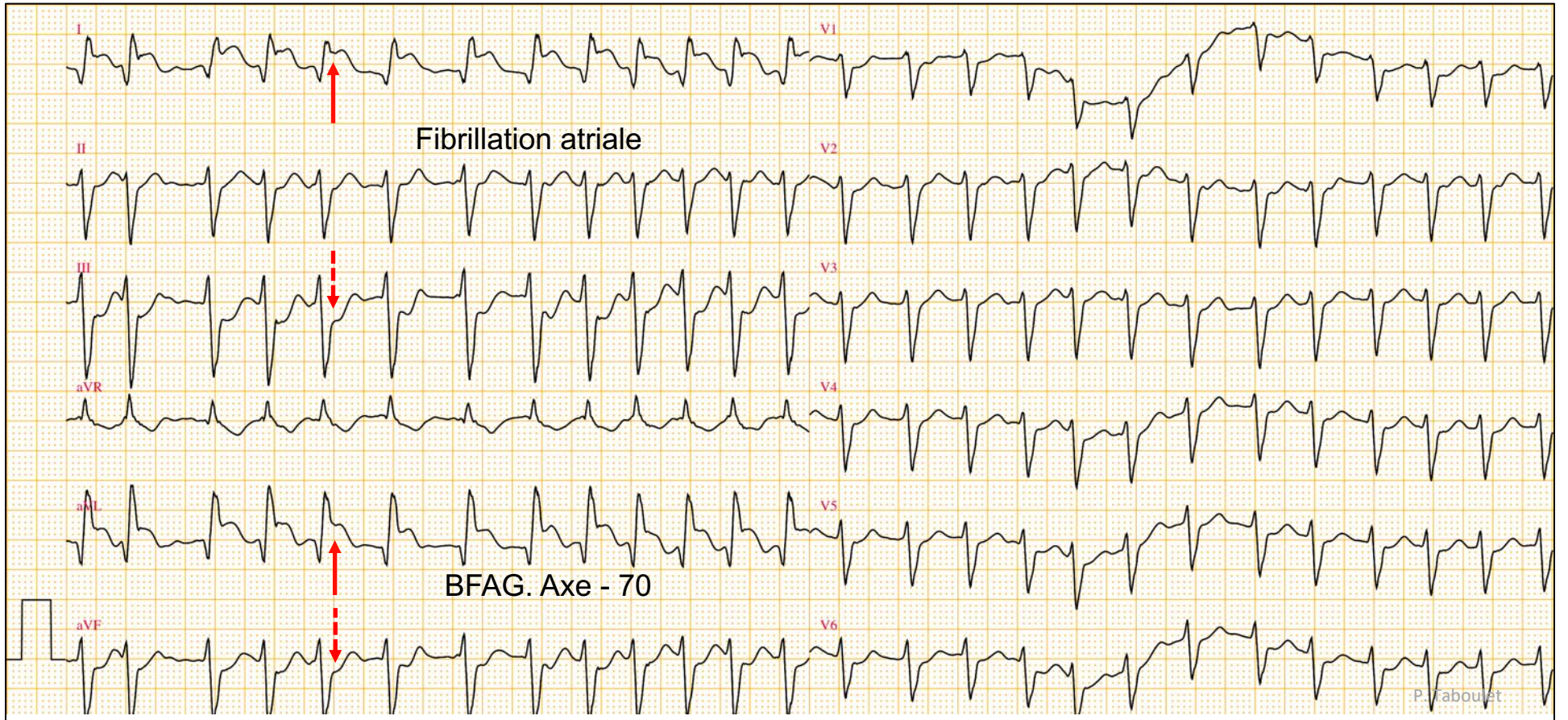
Tachycardie sinusale = signe de mauvaise tolérance = mauvais pronostic !



Fibrillation atriale

9%

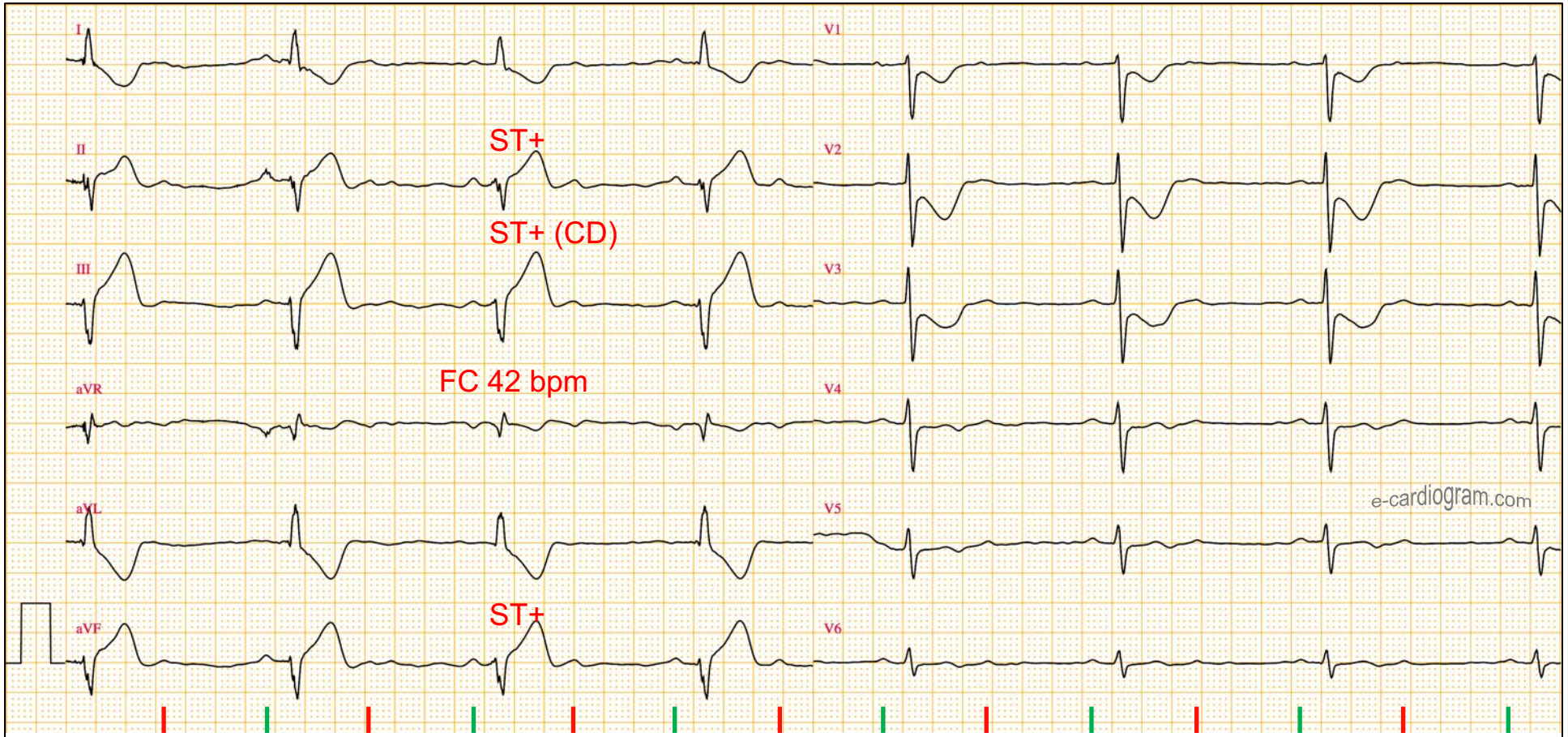
FA gêne le diagnostic, altère l'hémodynamique et favorise l'extension de l'infarctus
→ ralentir (BB) ou cardioversion (amiodarone ou CEE)



Une **fibrillation atriale** est présente ou apparait à la phase aiguë d'un **infarctus** dans environ 13% des cas (Jabre 2011) [1]. Elle apparaît au cours de l'évolution à 30 jours dans 4-10% des cas et aggrave le pronostic [2][3][4][6]. Elle s'observe plus fréquemment en cas d'infarctus compliqué d'insuffisance cardiaque, péricardite aiguë ou lésion ischémique de l'oreillette droite (e-cardiogram.com)

BAV II (nodal, infarctus inférieur) 3%

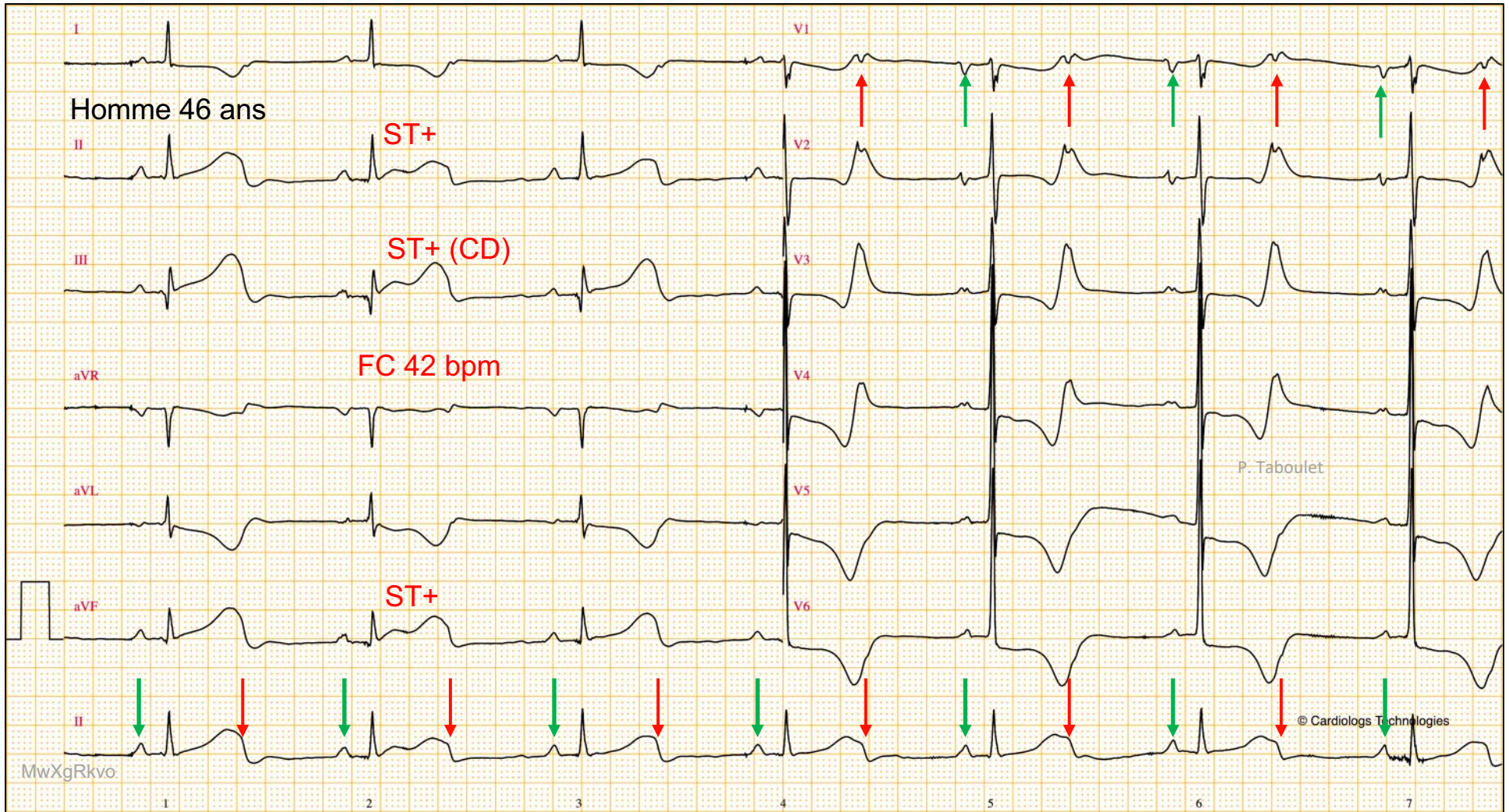
BAV 2 sur 1 à QRS fins sur infarctus inférieur = bloc nodal → Atropine ± Adré



L'isoprénaline n'est pas recommandée en cas de bradycardie sévère ou bloc AV de haut degré à la phase aiguë d'un **infarctus** (ESC 2017) [9].

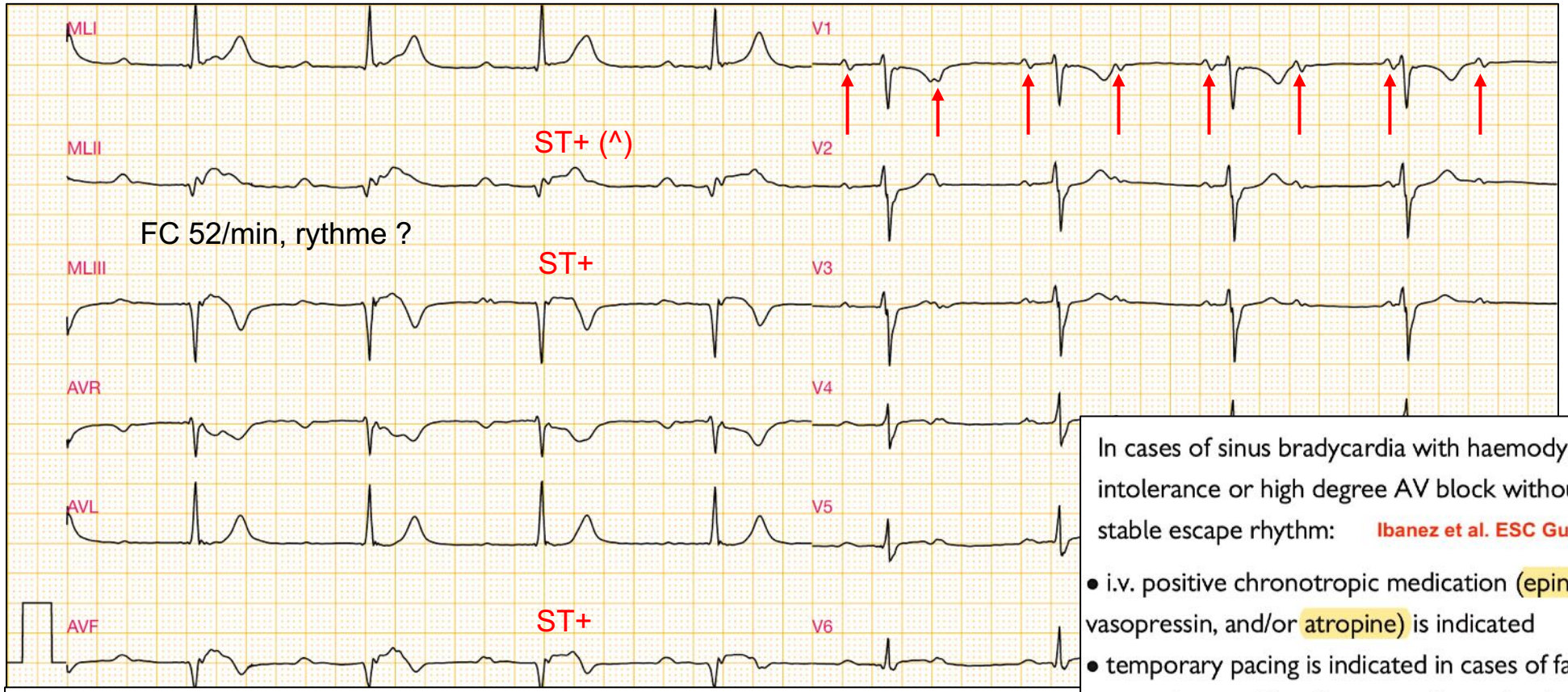
BAV II (nodal, infarctus inférieur) 3%

BAV II (2 sur 1) à QRS fins sur infarctus inférieur = bloc nodal → Atropine



BAV haut degré et III 3%

Infarctus inférieur semi récent avec BAV complet nodal
avec échappement jonctionnel → atropine ± adré



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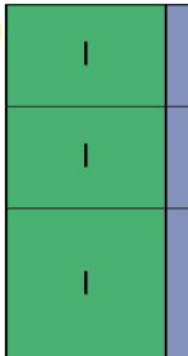
In cases of sinus bradycardia with haemodynamic intolerance or high degree AV block without stable escape rhythm: Ibanez et al. ESC Guidelines stemi EHJ 2017

- i.v. positive chronotropic medication (epinephrine, vasopressin, and/or atropine) is indicated
- temporary pacing is indicated in cases of failure to respond to positive chronotropic medication
- urgent angiography with a view to revascularization is indicated if the patient has not received previous reperfusion therapy.



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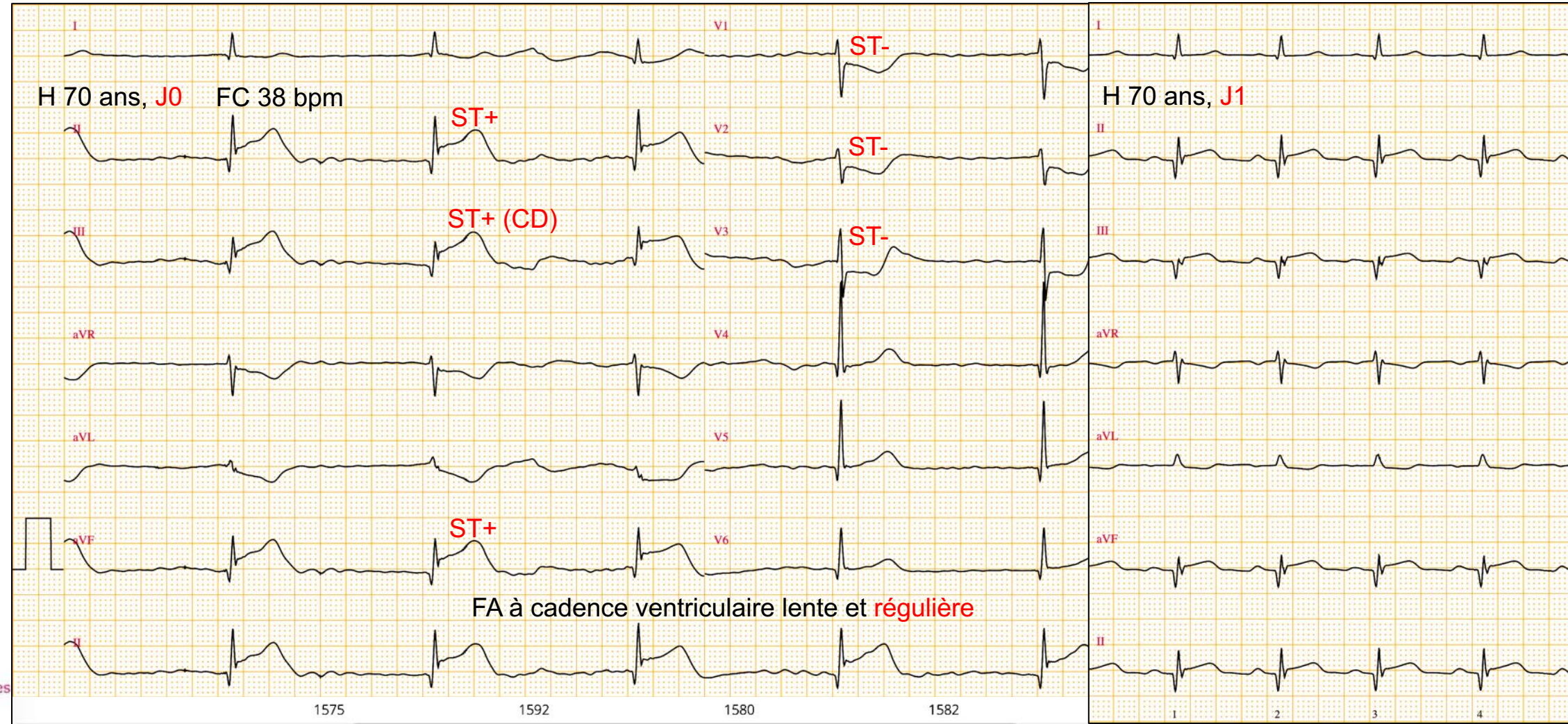
BAV haut degré

3%

Infarctus inféro-basal avec FA à cadence ventriculaire lente et régulière
= BAV haut degré nodal (QRS fins) → atropine



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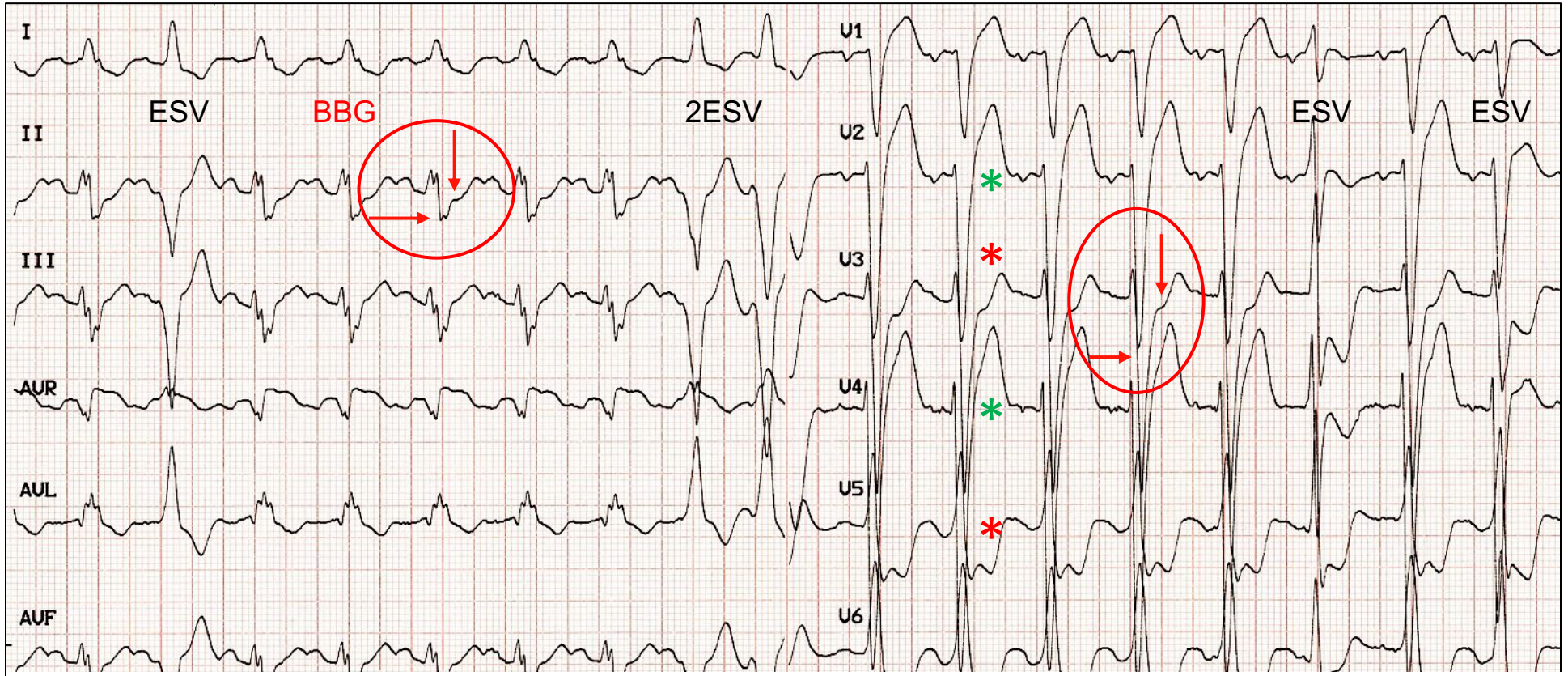
Infarctus et BBG (et ESV) 2-5%

Concordance de polarités entre QRS et ST (Sgarbossa NEJM 2009)



Un **bloc de branche gauche** est présent à la phase aiguë d'un **infarctus** dans 2-5% des cas et aggrave le pronostic [1]. Son apparition signe une occlusion IVA (b. septale). La perte de la **discordance appropriée** est à la base de la reconnaissance d'un **infarctus** en cas de **BBG** ou de **pacemaker** (cf. Sgarbossa H. NEJM 1996 et Smith S. AEM 2012)

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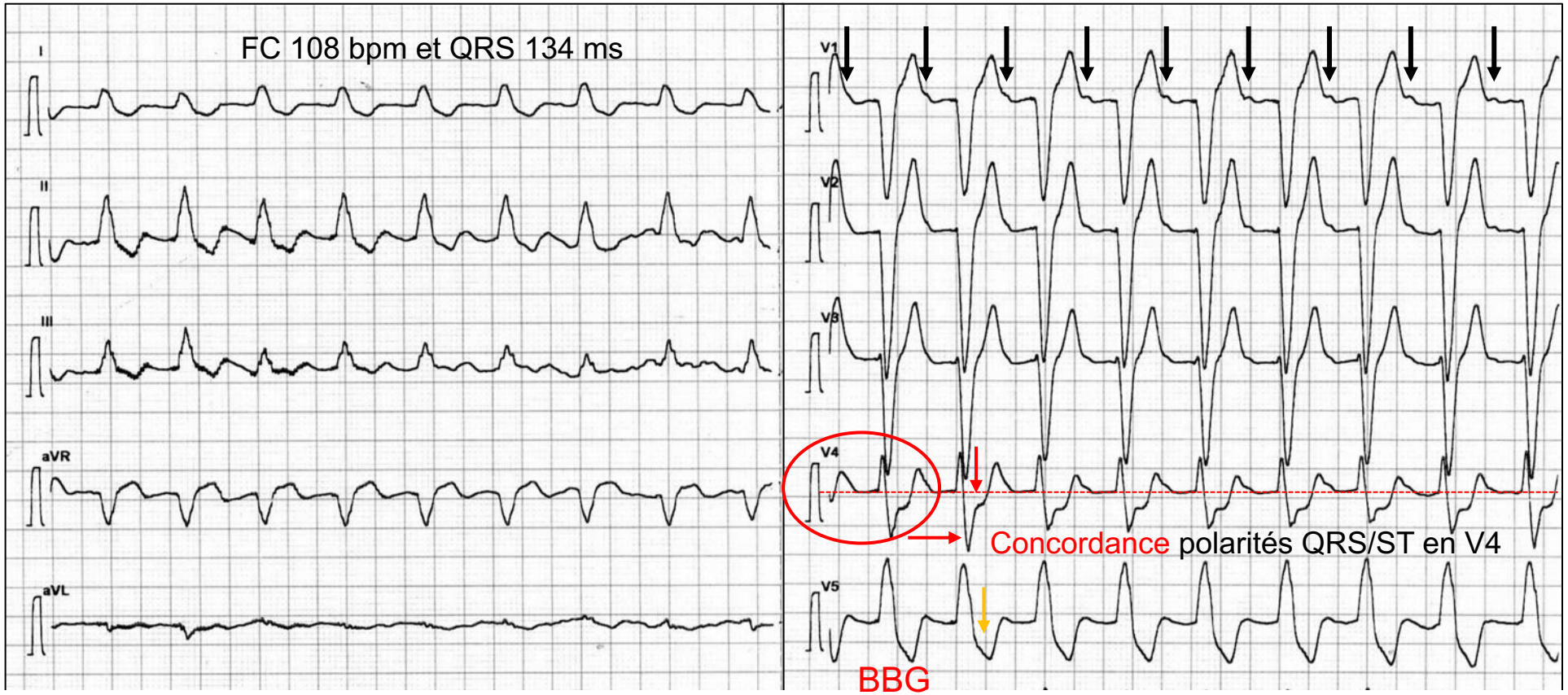
Avec le parrainage de la SFC

Infarctus et BBG

2-5%

Infarctus et BBG : signe de Sgarbossa/Smith

Smith SW, et al. Diagnosis of ST-elevation myocardial infarction in the presence of left bundle branch block… Ann Emerg Med. 2012



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Infarctus et bloc AV : traitement

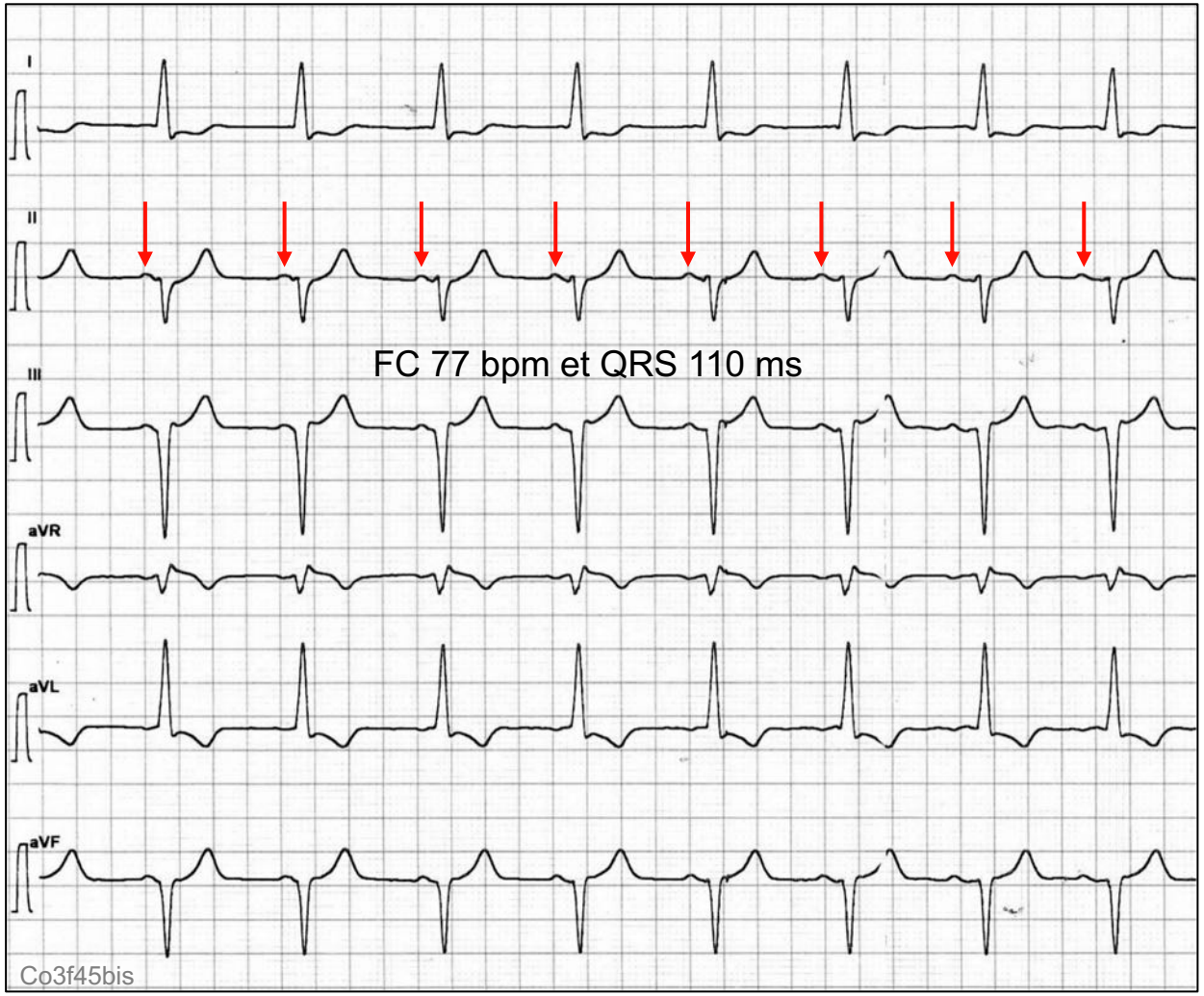
Intraventricular Conduction	Normal		First-Degree AV Block				Mobitz I Second-Degree AV Block				Mobitz II Second-Degree AV Block			
			Anterior MI		Nonanterior MI		Anterior MI		Nonanterior MI		Anterior MI		Nonanterior MI	
Normal	**Action**	**Class**	**Action**	**Class**	**Action**	**Class**	**Action**	**Class**	**Action**	**Class**	**Action**	**Class**	**Action**	**Class**
	Observe	I	Observe	I	Observe	I	Observe	IIb	Observe	IIa	Observe	III	Observe	III
	A	III	A	III	A	III	A*	III	A	III	A	III	A	III
	TC	III	TC	IIb	TC	IIb	TC	I	TC	I	TC	I	TC	I
	TV	III	TV	III	TV	III	TV	III	TV	III	TV	IIa	TV	IIa
Old or new fascicular block (LAFB or LPFB)	Observe	I	Observe	IIb	Observe	IIb	Observe	IIb	Observe	IIb	Observe	III	Observe	III
	A	III	A	III	A	III	A*	III	A	III	A	III	A	III
	TC	IIb	TC	I	TC	IIa	TC	I	TC	I	TC	I	TC	I
	TV	III	TV	III	TV	III	TV	III	TV	III	TV	IIa	TV	IIb
Old bundle-branch block	Observe	I	Observe	III	Observe	III	Observe	III	Observe	III	Observe	III	Observe	III
	A	III	A	III	A	III	A*	III	A	III	A	III	A	III
	TC	IIb	TC	I	TC	I	TC	I	TC	I	TC	I	TC	I
	TV	III	TV	IIb	TV	IIb	TV	IIb	TV	IIb	TV	IIa	TV	IIa
New bundle-branch block	Observe	III	Observe	III	Observe	III	Observe	III	Observe	III	Observe	III	Observe	III
	A	III	A	III	A	III	A*	III	A	III	A	III	A	III
	TC	I	TC	I	TC	I	TC	I	TC	I	TC	IIb	TC	IIb
	TV	IIb	TV	IIa	TV	IIa	TV	IIa	TV	IIa	TV	I	TV	I
Fascicular block + RBBB	Observe	III	Observe	III	Observe	III	Observe	III	Observe	III	Observe	III	Observe	III
	A	III	A	III	A	III	A*	III	A	III	A	III	A	III
	TC	I	TC	I	TC	I	TC	I	TC	I	TC	IIb	TC	IIb
	TV	IIb	TV	IIa	TV	IIa	TV	IIa	TV	IIa	TV	I	TV	I
Alternating left and right bundle-branch block	Observe	III	Observe	III	Observe	III	Observe	III	Observe	III	Observe	III	Observe	III
	A	III	A	III	A	III	A*	III	A	III	A	III	A	III
	TC	IIb	TC	IIb	TC	IIb	TC	IIb	TC	IIb	TC	IIb	TC	IIb
	TV	I	TV	I	TV	I	TV	I	TV	I	TV	I	TV	I

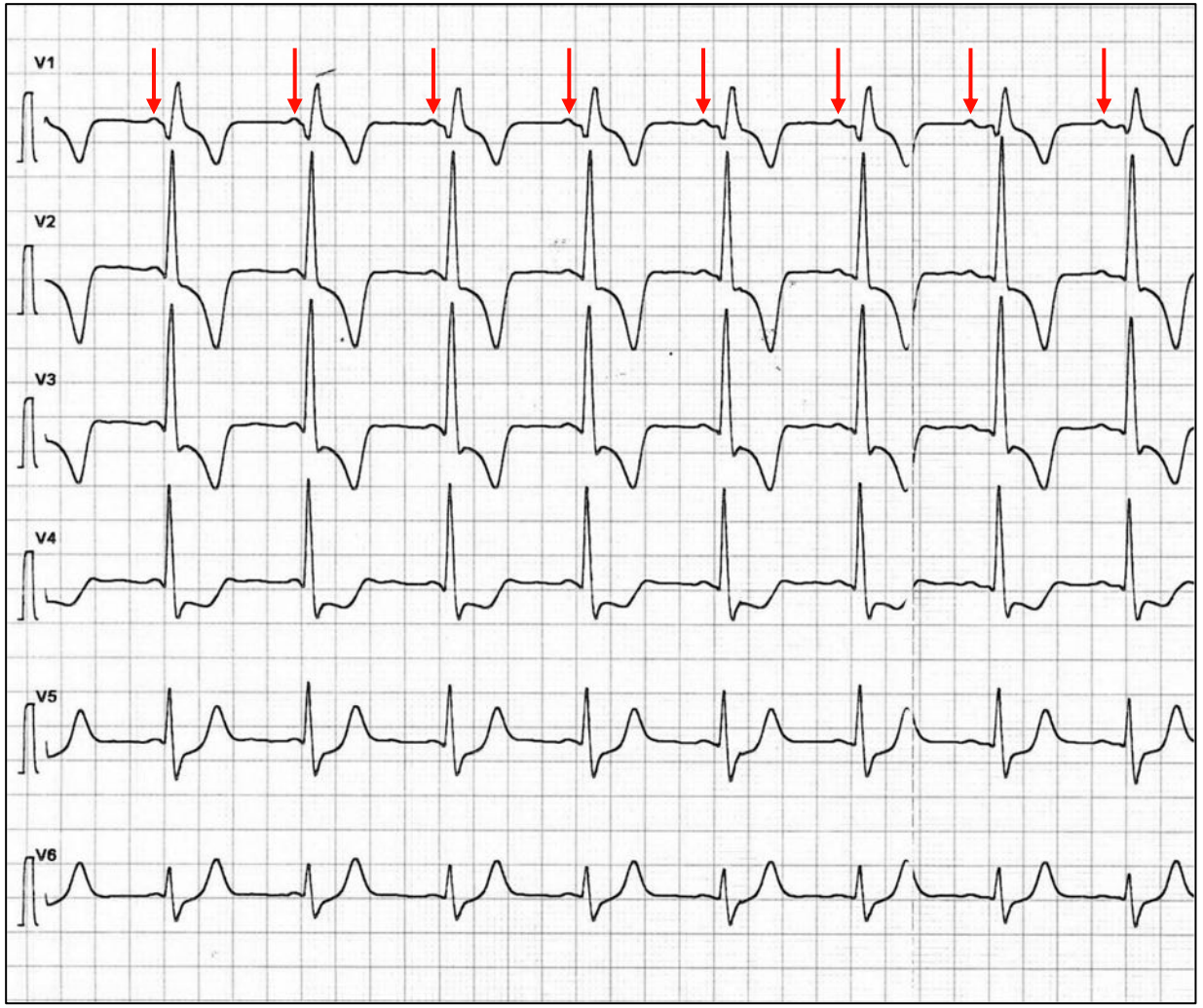
A : atropine ; TC : transcutaneous pacing (EES externe);
TV temporary transvenous pacing (sonde d'entraînement)

Antman EM et al. ACC/AHA guidelines …
Circulation 2004; 110:588-636

RIJA transitoire (tropo H3 1200 ng/l) → stent CD

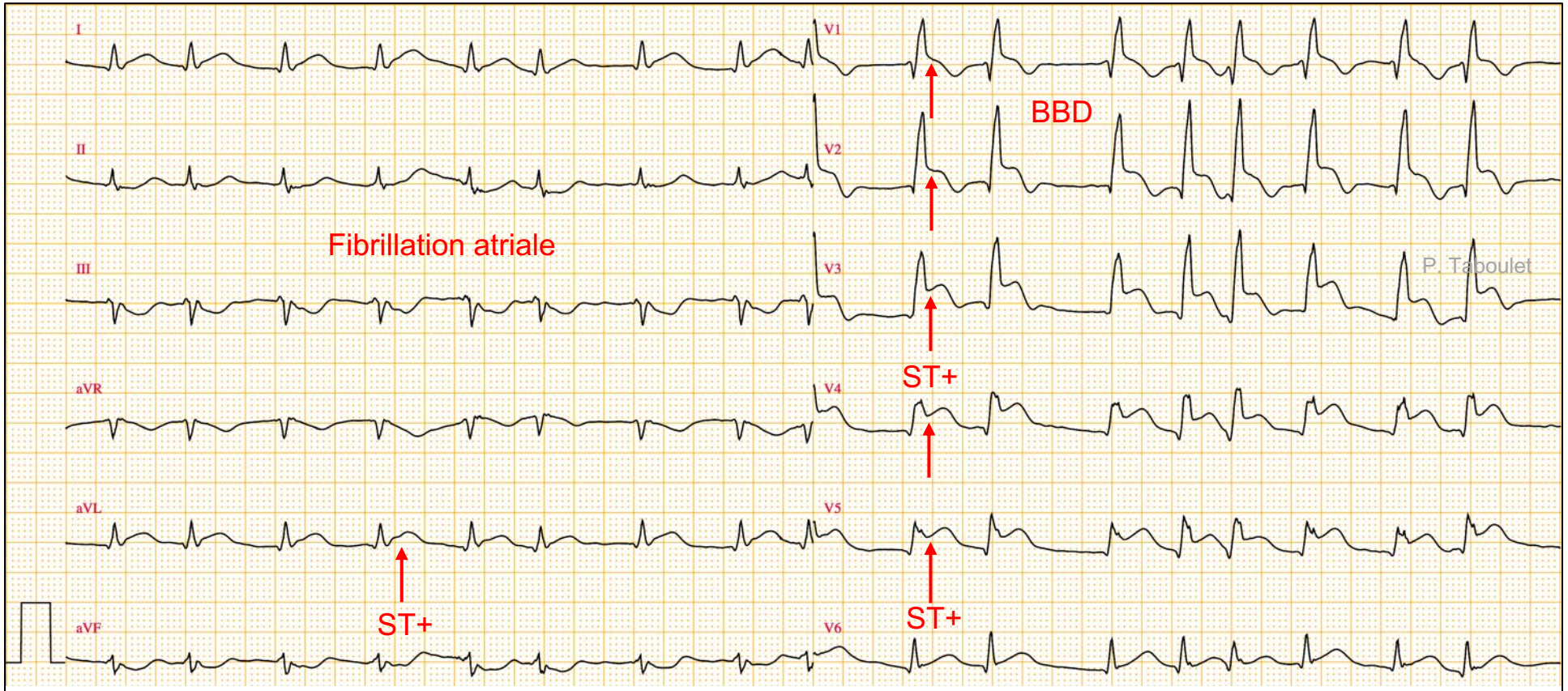
Suite +90 min : H 90 ans, DT 180 min, HTA et BBG connu, après trinitrine IV et aspirine





Bloc de branche droit 8%

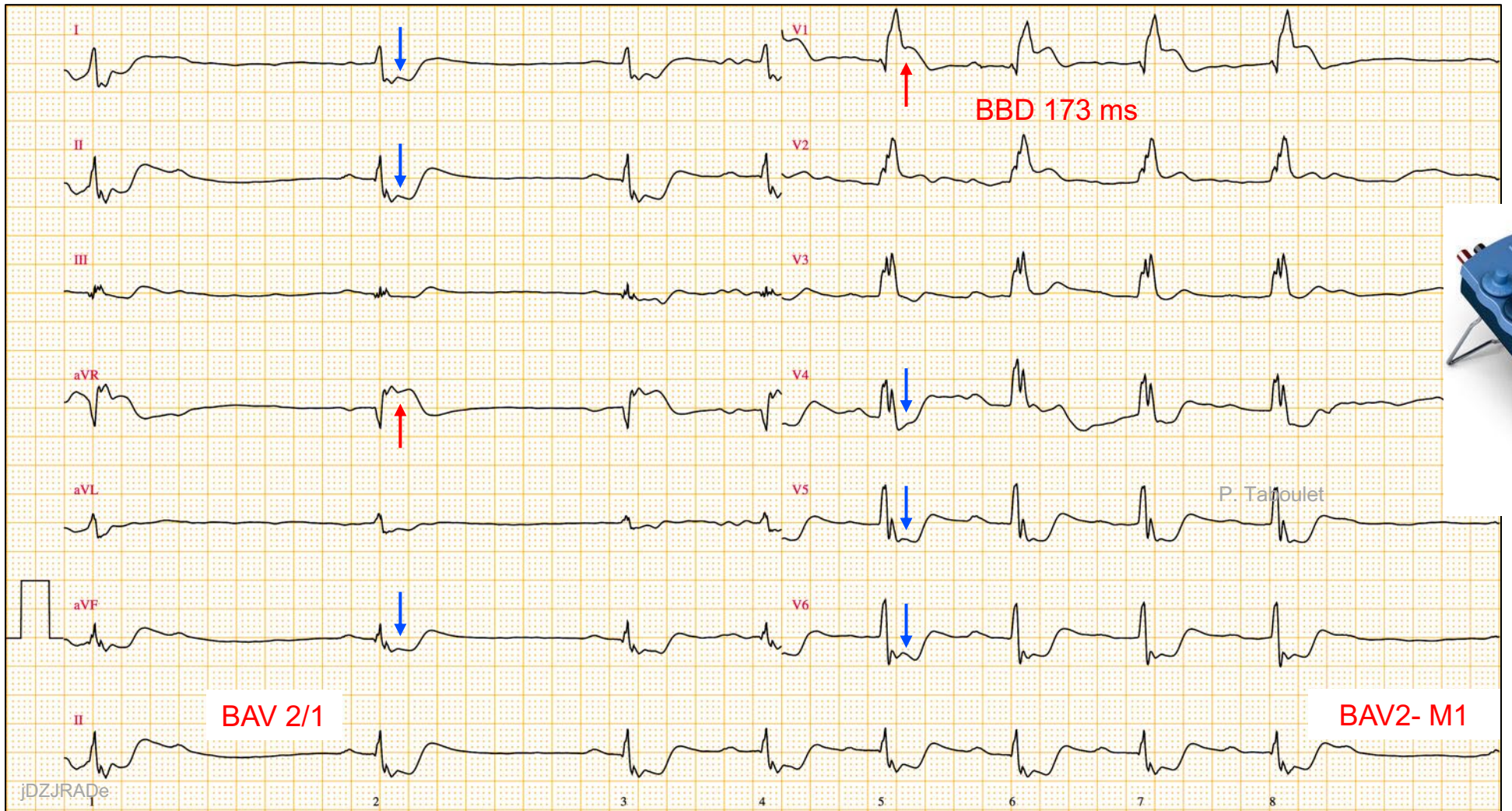
Un BBD ne masque jamais un sus-décalage de ST ↑



Une lésion aiguë de la branche droite signifie généralement une lésion proximale de l'IVA (1ère septale) et une autre lésion sur la CD ou la circonflexe pour générer une ischémie du **faisceau de His** [8] : mauvais pronostic

Bloc de branche droit

RS + BBD + infarctus sans sus-décalage de ST (avec ST+ en VR-V1)
BAV II type Mobitz 1 : mauvais pronostic



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Normal	**Action**	**Class**	**Action**	**Class**	**Action**	**Class**	**Action**	**Class**	**Action**	**Class**	**Action**	**Class**	**Action**	**Class**
	Observe	I	Observe	I	Observe	I	Observe	IIb	Observe	IIa	Observe	III	Observe	III
	A	III	A	III	A	III	A*	III	A	III	A	III	A	III
	TC	III	TC	IIb	TC	IIb	TC	I	TC	I	TC	I	TC	I
	TV	III	TV	III	TV	III	TV	III	TV	III	TV	IIa	TV	IIa
Old or new fascicular block (LAFB or LPFB)	Observe	I	Observe	IIb	Observe	IIb	Observe	IIb	Observe	IIb	Observe	III	Observe	III
	A	III	A	III	A	III	A*	III	A	III	A	III	A	III
	TC	IIb	TC	I	TC	IIa	TC	I	TC	I	TC	I	TC	I
	TV	III	TV	III	TV	III	TV	III	TV	III	TV	IIa	TV	IIb
Old bundle-branch block	Observe	I	Observe	III	Observe	III	Observe	III	Observe	III	Observe	III	Observe	III
	A	III	A	III	A	III	A*	III	A	III	A	III	A	III
	TC	IIb	TC	I	TC	I	TC	I	TC	I	TC	I	TC	I
	TV	III	TV	IIb	TV	IIb	TV	IIb	TV	IIb	TV	IIa	TV	IIa
New bundle-branch block	Observe	III	Observe	III	Observe	III	Observe	III	Observe	III	Observe	III	Observe	III
	A	III	A	III	A	III	A*	III	A	III	A	III	A	III
	TC	I	TC	I	TC	I	TC	I	TC	I	TC	IIb	TC	IIb
	TV	IIb	TV	IIa	TV	IIa	TV	IIa	TV	IIa	TV	I	TV	I
Fascicular block + RBBB	Observe	III	Observe	III	Observe	III	Observe	III	Observe	III	Observe	III	Observe	III
	A	III	A	III	A	III	A*	III	A	III	A	III	A	III
	TC	I	TC	I	TC	I	TC	I	TC	I	TC	IIb	TC	IIb
	TV	IIb	TV	IIa	TV	IIa	TV	IIa	TV	IIa	TV	I	TV	I
Alternating left and right bundle-branch block	Observe	III	Observe	III	Observe	III	Observe	III	Observe	III	Observe	III	Observe	III
	A	III	A	III	A	III	A*	III	A	III	A	III	A	III
	TC	IIb	TC	IIb	TC	IIb	TC	IIb	TC	IIb	TC	IIb	TC	IIb
	TV	I	TV	I	TV	I	TV	I	TV	I	TV	I	TV	I

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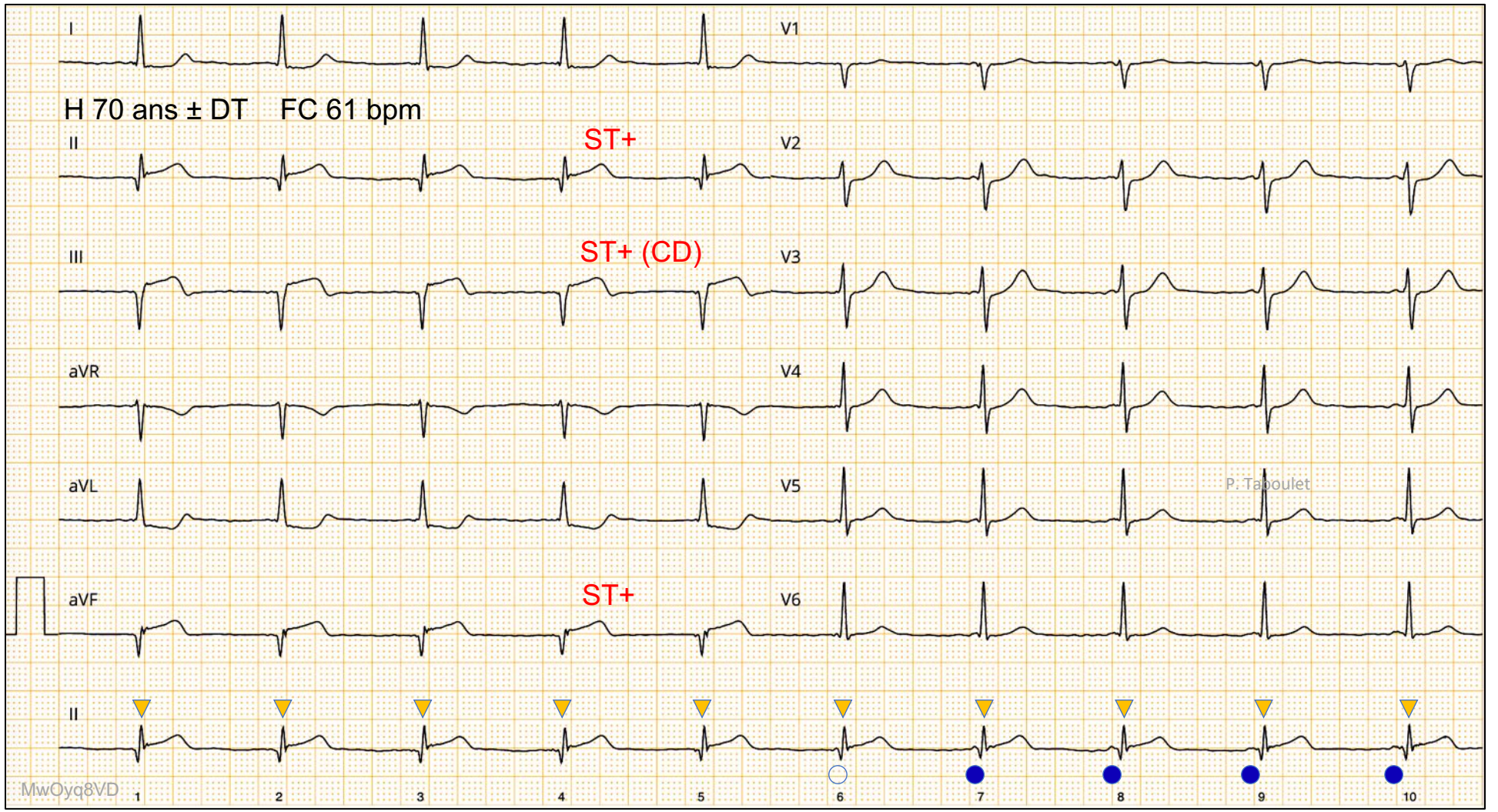
Avec le parrainage de la SFC

Hyperautomatisme jonctionnel 8%

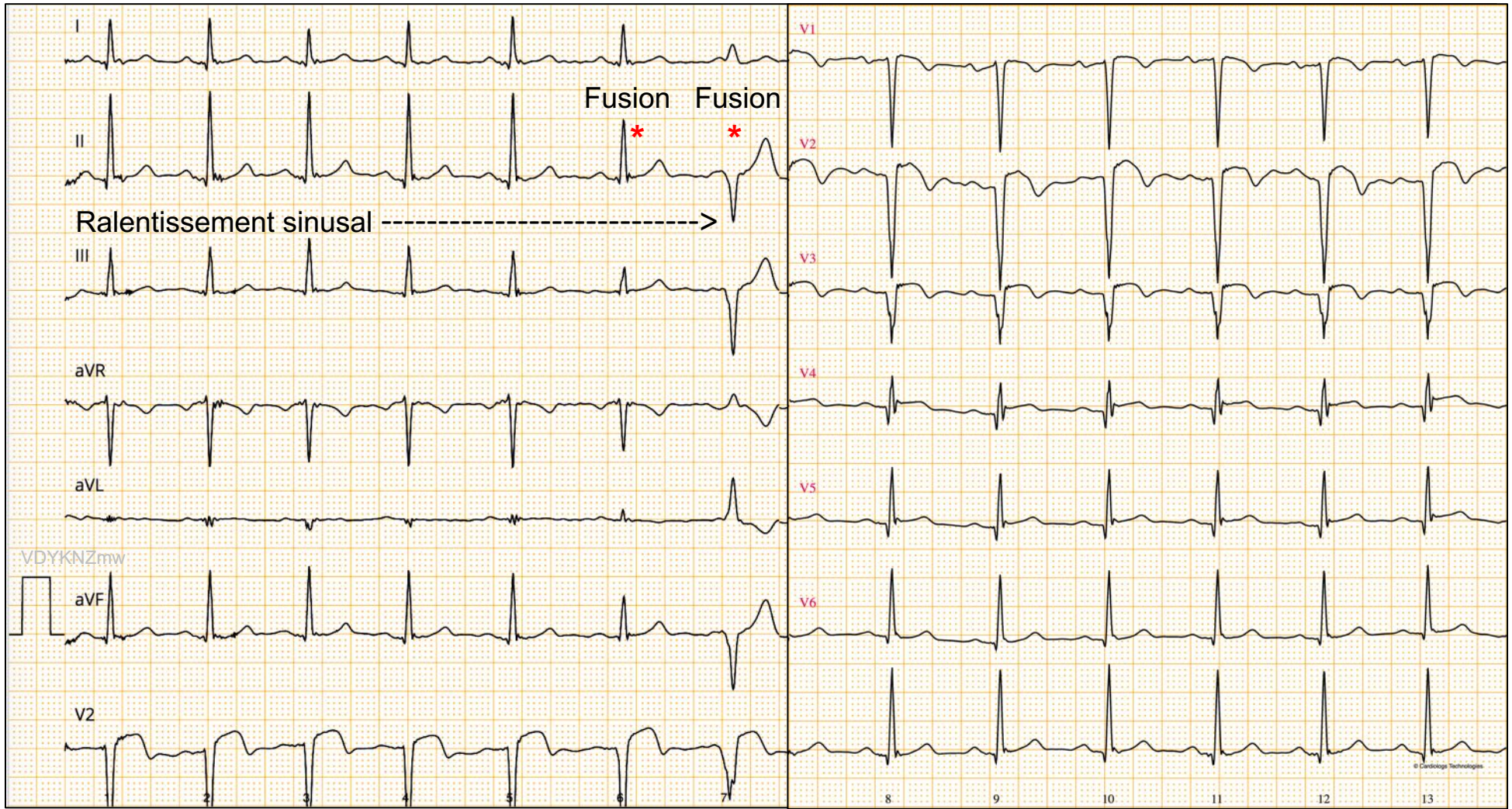
Rythme jonctionnel accéléré : signe de reperfusion ?



Hyperautomatisme ventriculaire 8%

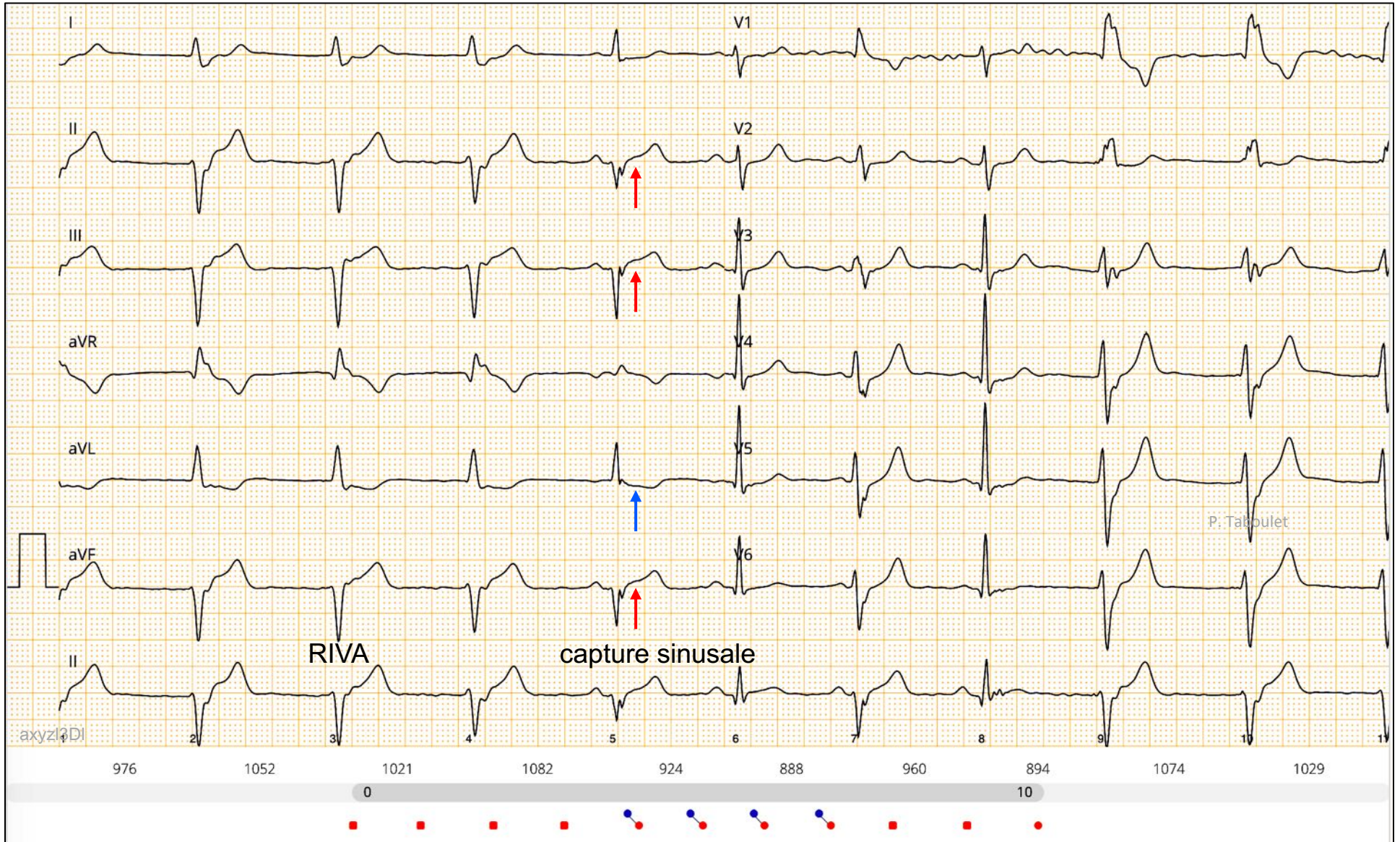
RS puis captures/fusion* puis RIVA (80/min)

Infarctus ST+ antérieur avec RIVA : signe de reperfusion ?



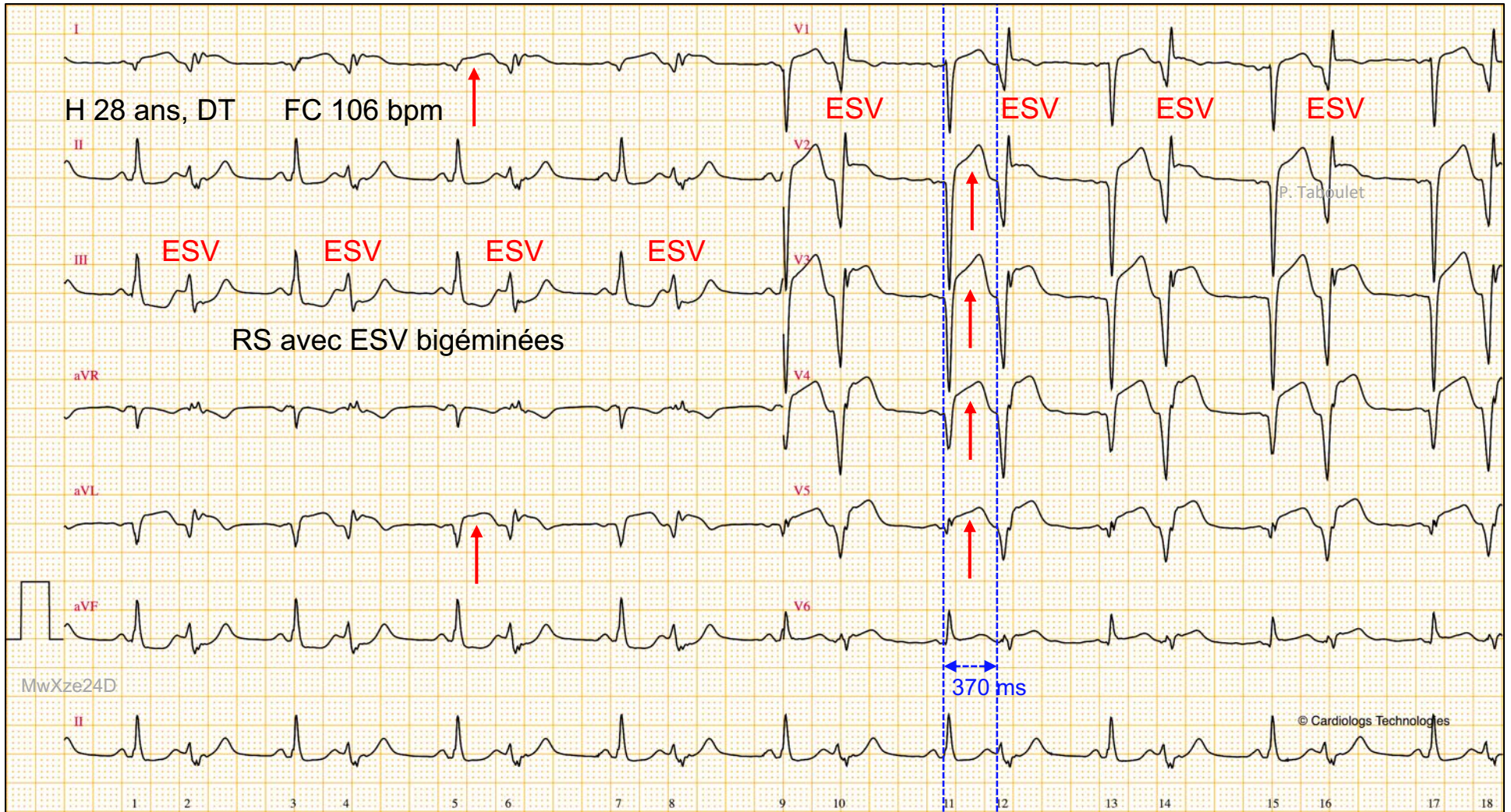
Hyperautomatisme ventriculaire 42%

Rythme ventriculaire accéléré : signe de reperfusion



Automatisme anormal ventriculaire 42%

Infarctus ST+ antérieur avec ESV bigéminées couplage fixe et > 300 ms
faible risque TV/FV (mais prudence !)



Kalarus Z et al. Cardiac arrhythmias in the emergency settings of acute coronary syndrome… EHRA consensus document. Europace. 2019 Oct 1;21(10):1603-1604.

Table 2 Management of ventricular arrhythmias in the acute phase of MI

Correction of electrolyte imbalances (hypokalaemia and hypomagnesaemia) is recommended in patients with VT and/or VF.		1,63
Intravenous beta-blockers and/or amiodarone treatment is indicated for patients with recurrent polymorphic VT and/or VF unless contraindicated.		64
Electrical cardioversion/defibrillation is the intervention of choice to promptly terminate life-threatening Vas.		65
Prompt and complete (even staged) revascularization is recommended to treat myocardial ischaemia presenting with recurrent VT/VF.		66,67
Intravenous lidocaine can be considered (as second choice) for recurrent VAs with haemodynamic intolerance not controlled by amiodarone, beta-blockers, or repetitive electrical cardioversion.		61
Overdrive pacing should be considered if VT is frequently recurrent despite anti-arrhythmic therapy and cannot be controlled by repetitive electrical cardioversion.		68,69
In hemodynamically unstable patients with refractory VAs a percutaneous LVAD (Impella, TandemHeart, or extracorporeal life support) may be considered.		69,70
In patients with recurrent life-threatening VAs sedation (preferably with benzodiazepines) or general anaesthesia to reduce sympathetic drive should be considered.		60
Early administration of iv beta-blockers at the time of presentation should be considered in haemodynamically stable patients.[a]		69,71
Asymptomatic, non-sustained and hemodynamically well tolerated VAs should not be treated with anti-arrhythmic drugs before reperfusion ('wait and see').		1
Prophylactic treatment with anti-arrhythmic drugs, with the exception of beta-blockers, is not recommended.		72,73

[a]Intravenous beta-blockers must be avoided in patients with hypotension, acute heart failure or AV block, or severe bradycardia.

ACE-I, angiotensin-converting-enzyme inhibitors; ARB, angiotensin II receptor blocker; iv, intravenous; LVAD, left ventricular assist device; VA, ventricular arrhythmia; VF, ventricular fibrillation; VT, ventricular tachycardia.

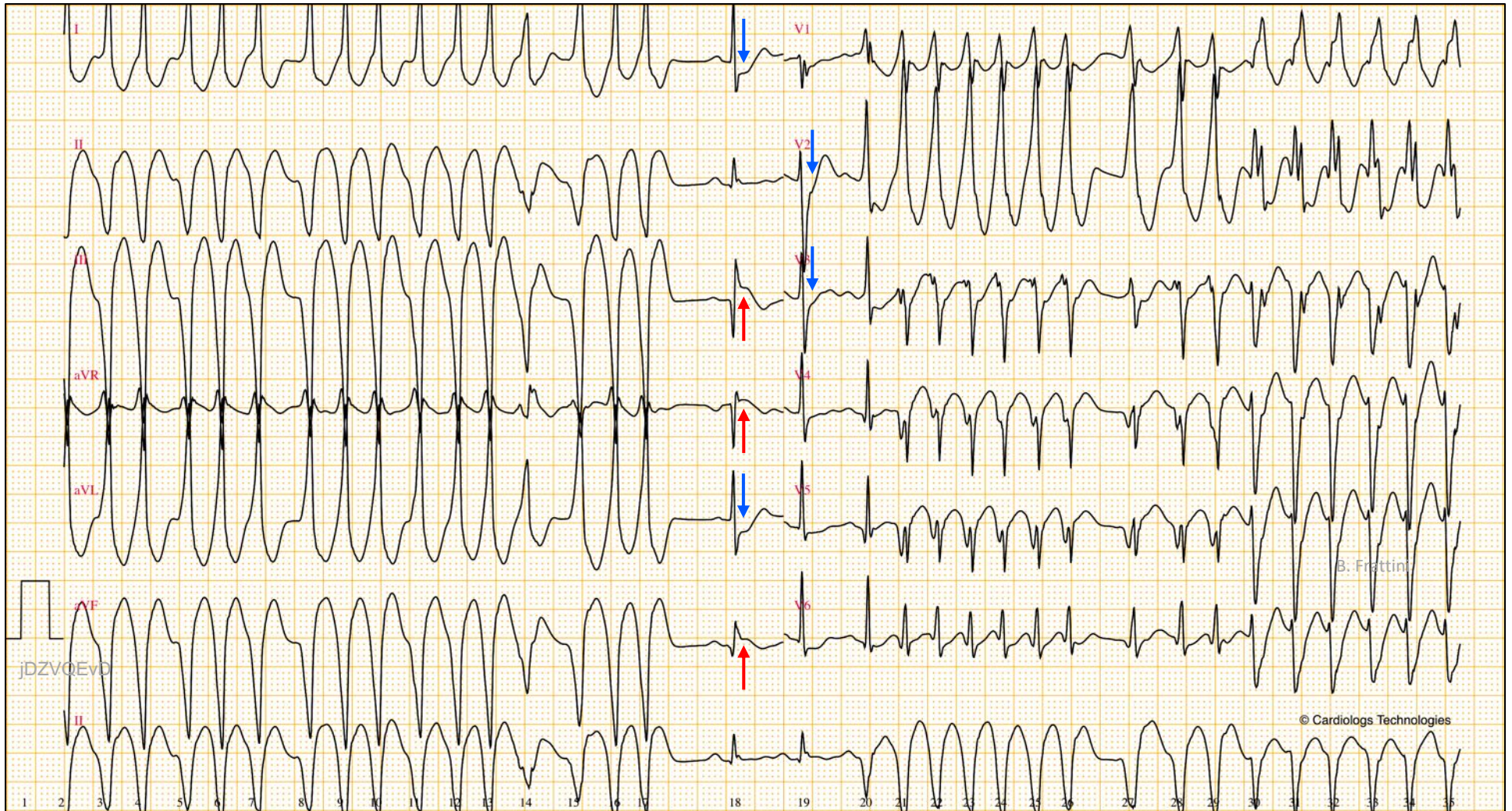
Automatisme anormal ventriculaire

TV

26%

TV ischémiques (< 30 sec non soutenues)

→ Amiodarone ± bétabloquant → lidocaïne → sédation et CEE…



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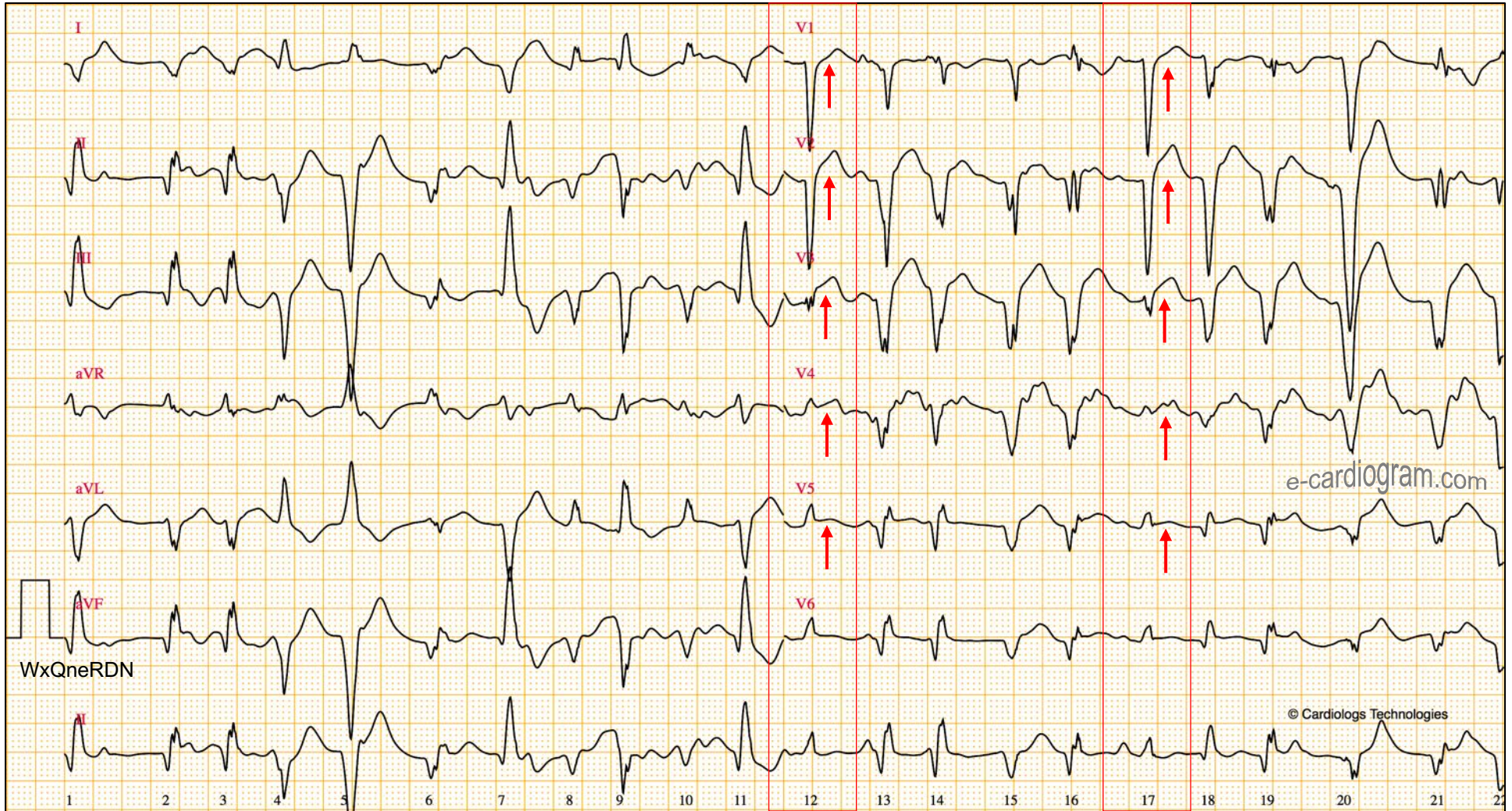
Automatisme anormal ventriculaire
ESV x ou TV

26%

TV ischémique irrégulière et polymorphe : risque FV +++

→ Amiodarone, bétabloquant, K et Mg, CEE… reperfusion, ablation

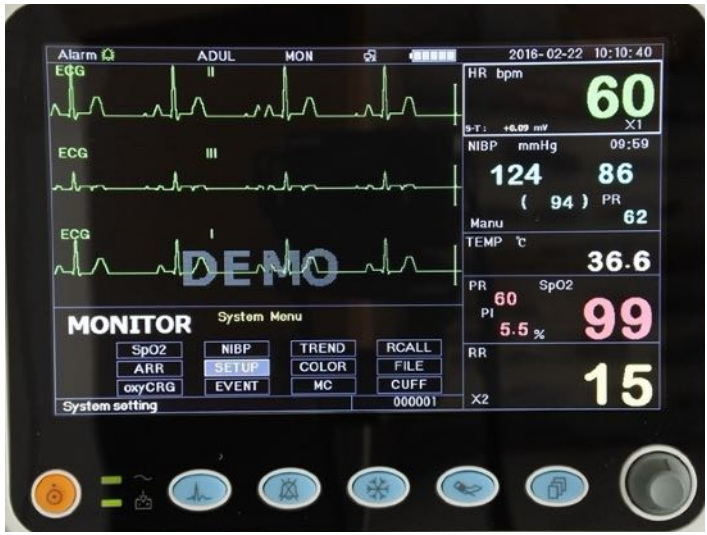


Automatisme anormal ventriculaire
ESV x ou TV

Le risque de FV augmente avant reperfusion selon l'amplitude du ST+
le nombre de dérivations… et une alternance électrique des QRS

SCA et troubles du rythme

Pronostic engagé : anticipation +++



Bradycardie sinusale → vagale ou dysfonction atriale (atropine)
Tachycardie sinusale → mauvaise tolérance hémodynamique ?
Automatisme anormal atrial → FA (traitement spécifique ± CEE)

Bloc intranodal → ± bon pronostic (± sensible à l'atropine)

Bloc de branche → menace asystole : EES transcutanée
Bloc AV Mobitz 2 → asystole, torsades : EES transveineux
Bloc AV 3 → atropine (± adré ?) puis EES

Hyperautomatisme → bon pronostic (reperfusion), oui mais infarctus étendu

Automatisme anormal ventriculaire → ESV et TV (observation ± Amiod. ou BB)

Bibliographie

- Terkelsen CJ et al. Prevalence and significance of accelerated idioventricular rhythm in patients with ST-elevation myocardial infarction treated with primary percutaneous coronary intervention. Am J Cardiol 2009;104:1641–6.
- Kalarus Z, et al. Cardiac arrhythmias in the emergency settings of acute coronary syndrome and revascularization: an European Heart Rhythm Association (EHRA) consensus document… Europace. 2019 Oct 1;21(10):1603-1604.
- Gorenek B, et al. *Cardiac arrhythmias in acute coronary syndromes position paper from the joint EHRA, ACCA, and EAPCI task force*. Europace. 2014;16(11):1655-73
- Smith SW, et al. *Diagnosis of ST-elevation myocardial infarction in the presence of* left *bundle branch block* … Ann Emerg Med. 2012
- Zimetbaum PJ, Josephson ME. Use of the electrocardiogram in acute myocardial infarction. N Engl J Med 2003; 348:933-40.
- Ibanez B, James S, Agewall S, et al. 2017 ESC Guidelines for the management of acute myocardial infarction in patients presenting with ST-segment elevation… Eur Heart J. 2018;39(2):119–177. Antman EM et al. ACC/AHA guidelines for the management of patients with ST-elevation myocardial infarction-executive summary... Circulation 2004; 110:588-636.

BAV III nodal (surveillance) 3%

Bloc AV III avec rythme d'échappement à QRS 110 ms, réguliers à 54/min
(ischémie T- résolutive en territoire inférieur)