APECAF 2023

28éme Journée Scientifique

14 octobre Namur

Pacing de la branche gauche

LBBAP pour Left Bundle Branch Area Pacing

Dr Xavier Carryn

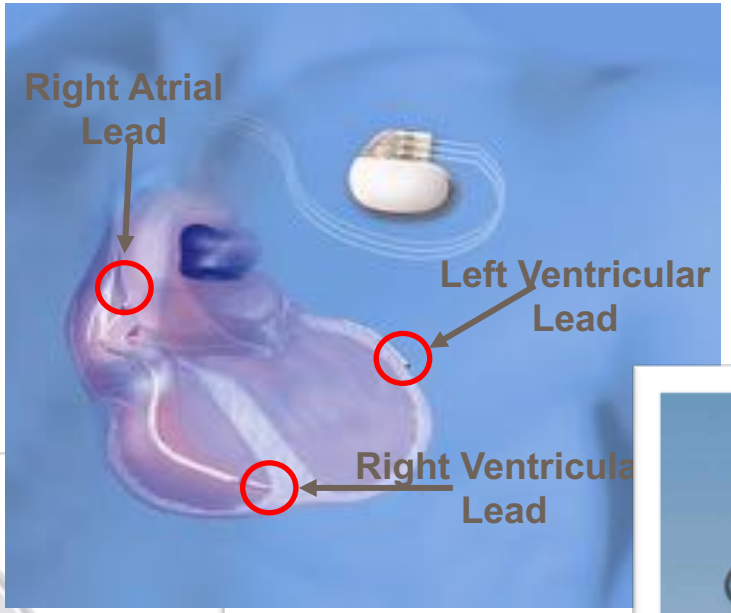
CHRSM site Meuse

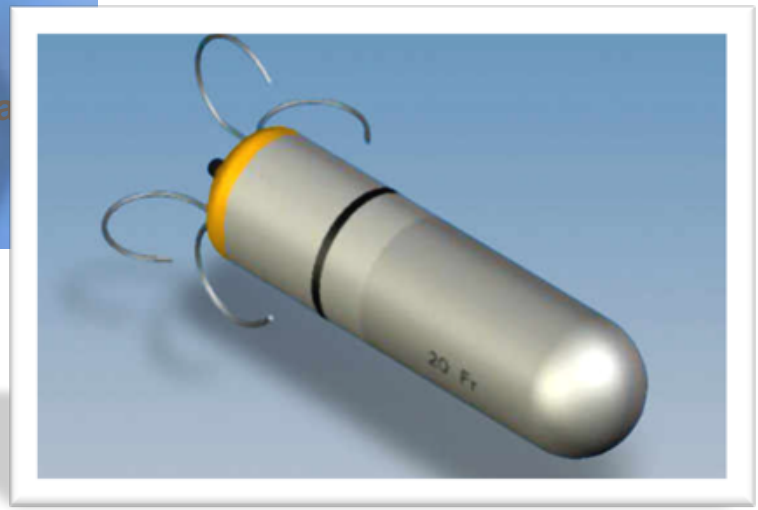
Un peu d'histoire

1958

Les Suédois Elmquist et Senning implantent pour la première fois un stimulateur cardiaque entièrement implantable

Un peu d'histoire





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Un peu d'histoire

Défibrillateur

Dr. Paul Zoll
(1911-1999)

- Première défibrillation transthoracique 1956
- Premier défibrillateur implantable 1970
- Première implantation humaine 1980

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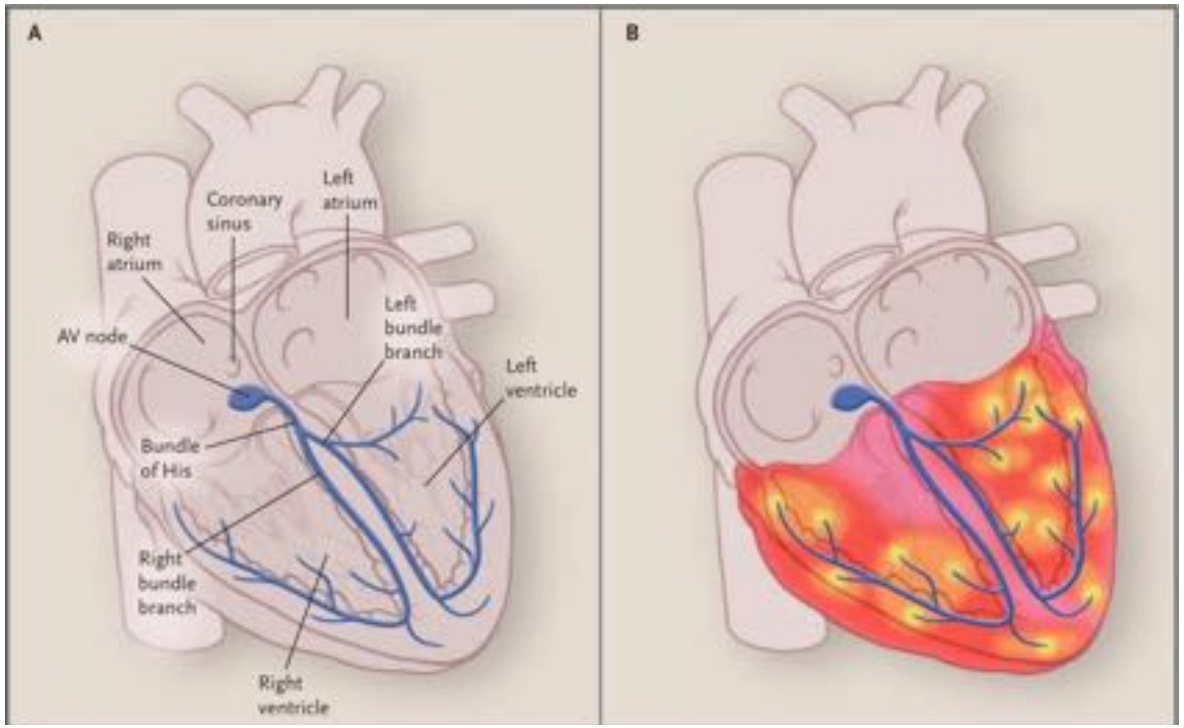
Dépolarisation ventriculaire



QRS fin = Bonne synchronisation de la contraction des ventricules
QRS large = désynchronisation

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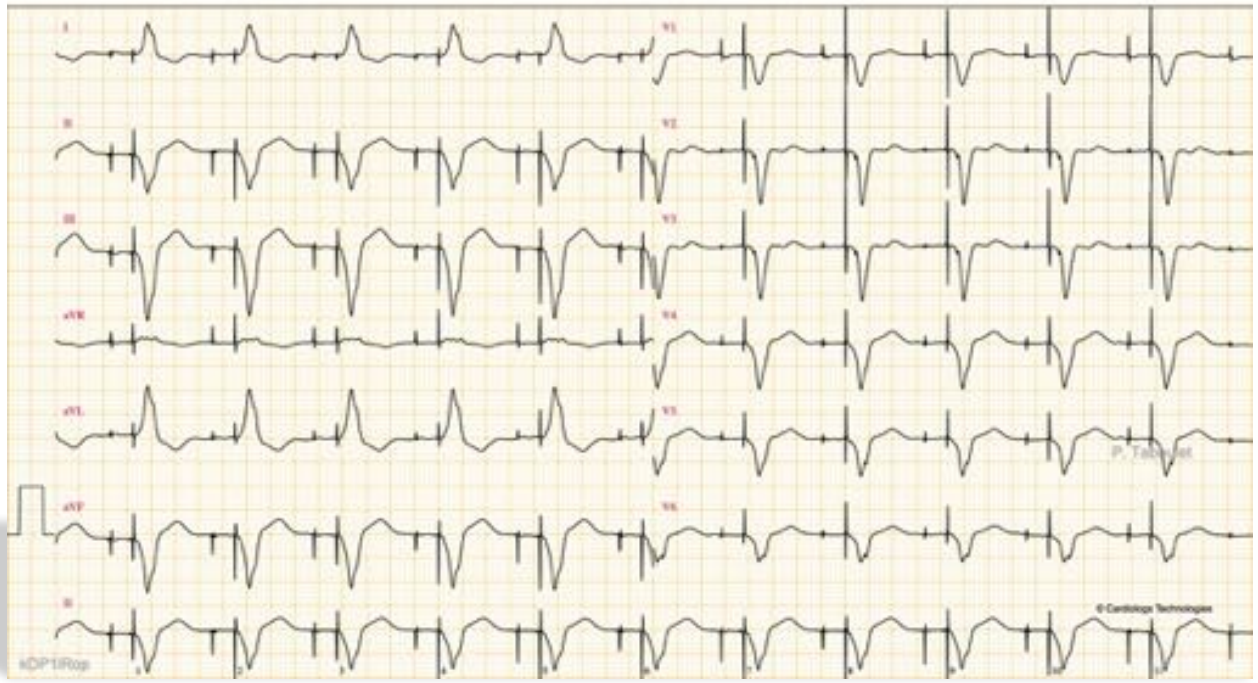
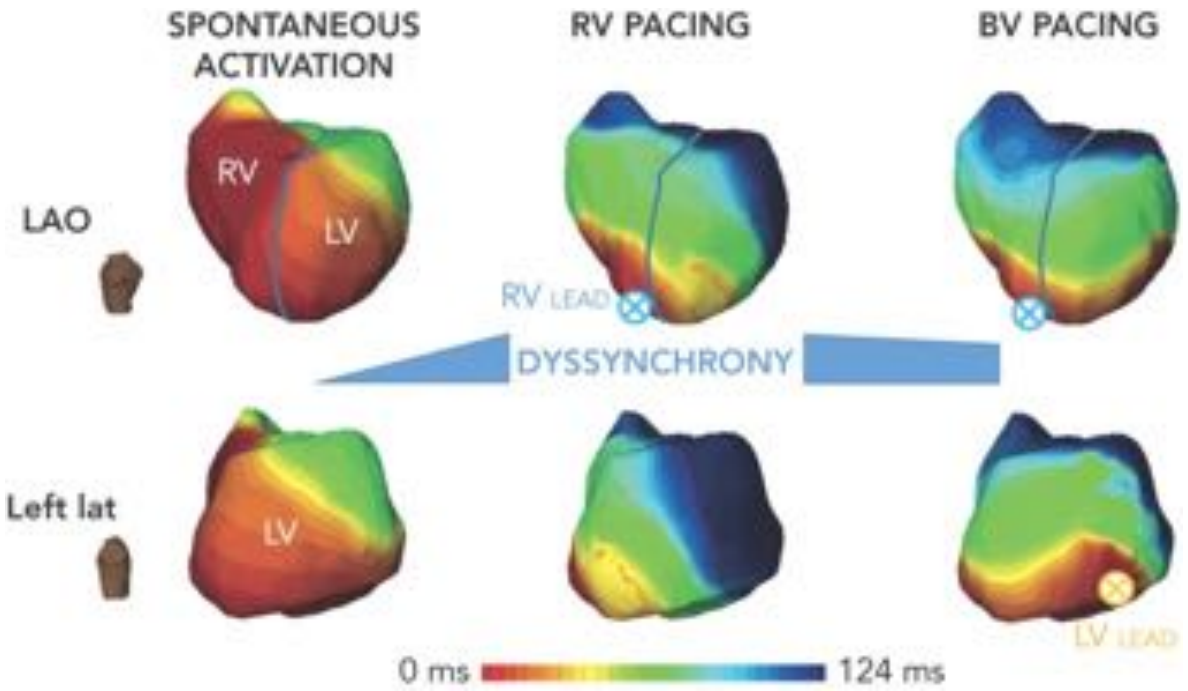
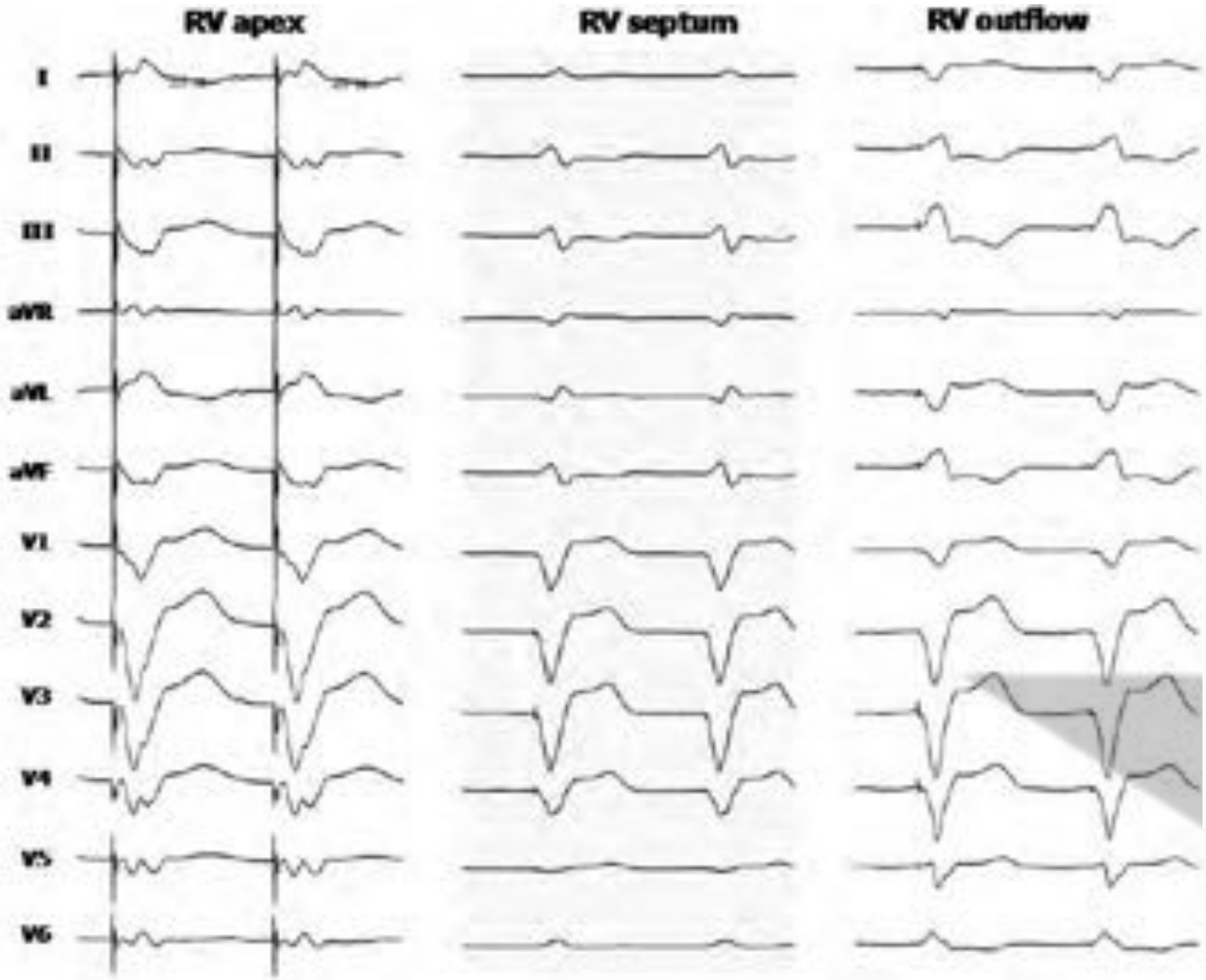
QRS large

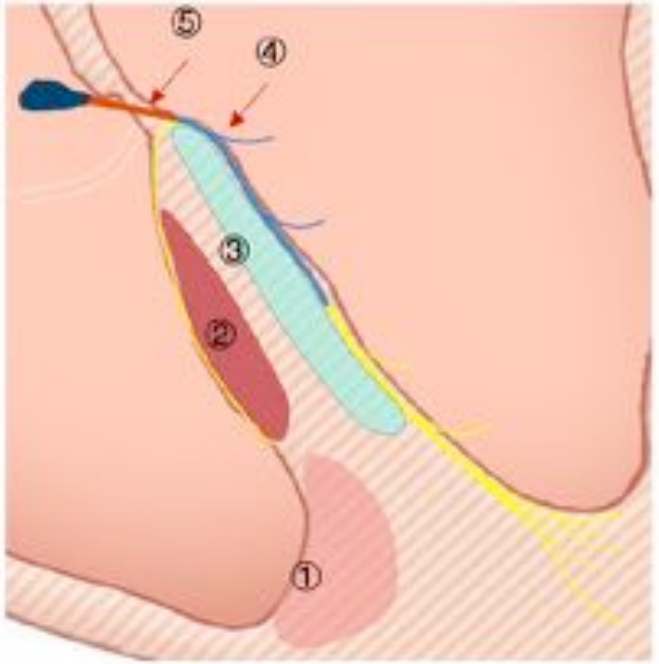
Désynchronisation = diminution de **l'efficacité mécanique**

Risque de **dégradation** progressive de la **fonction ventriculaire gauche** (5 à 20% des patient) si taux de pacing VD > 20-40%









①: RV apex
②: RV septum
③: Deep LV septum
④: proximal LBB
⑤: His bundle

LBBAP means LBBP or LVSP

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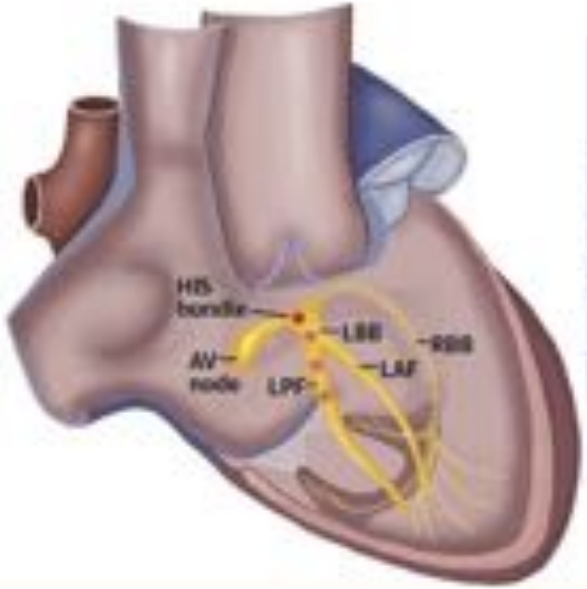
His Bundle Pacing

- Technically challenging
- Narrow target zone
- Encased in electrically inert fibrous tissue
- Low success rates in AV block
- High thresholds



Left Bundle Branch Area Pacing

- Technically less challenging
- Wide target zone
- Encased in dense muscle
- High success rates in AV block
- Low thresholds

B

Septogram showing lead depth in septum

C

TTE short axis showing lead depth in septum

Padala, S.K. et al. J Am Coll Cardiol EP. 2020;6(14):1773-82.

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Quels outils ?

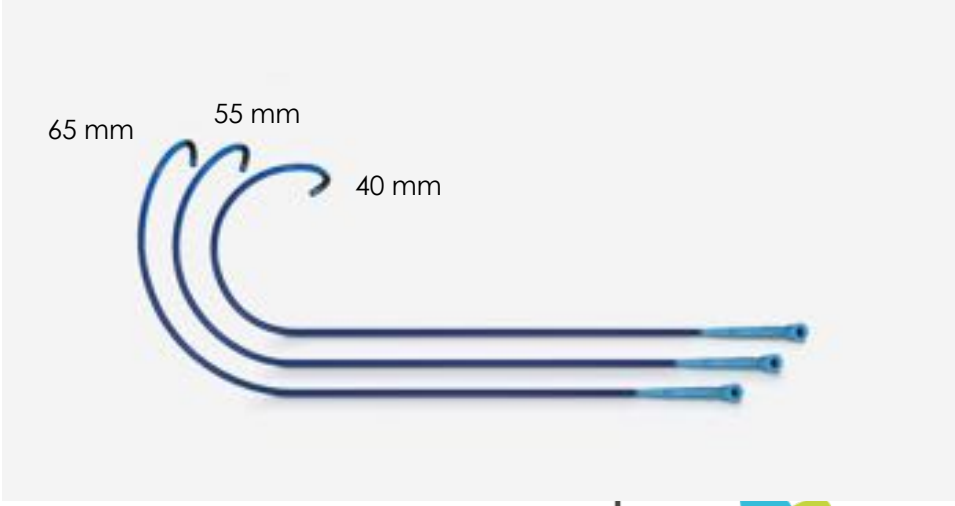
Cath Lab

ECG 12 dérivations

Baie EEP (ou possibilités de mesures précises sur ECG)

Introducteur spécifique

Programmateur



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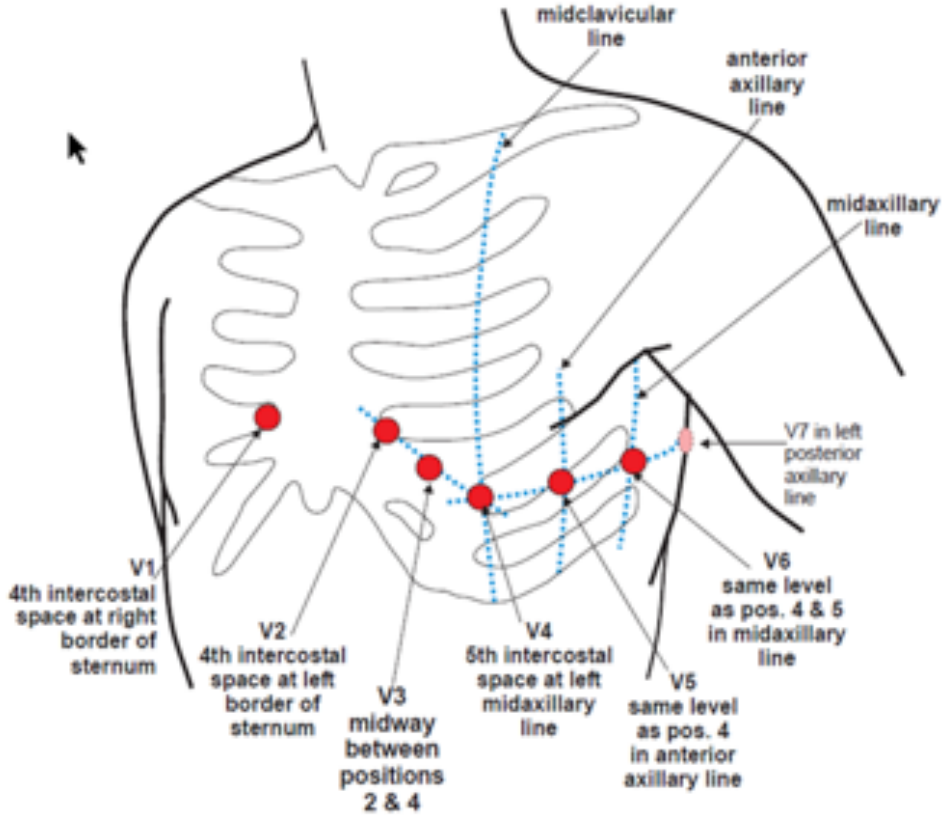
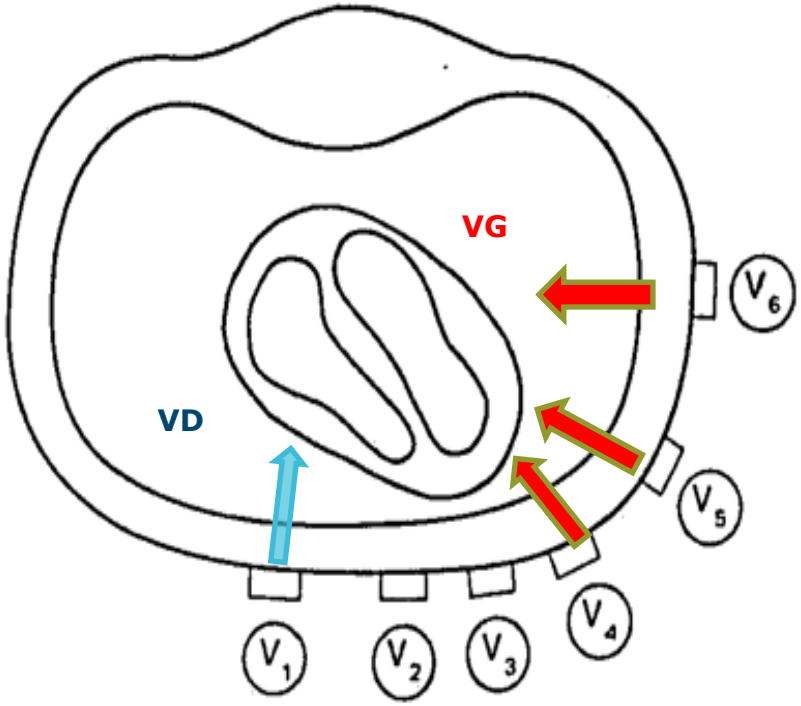
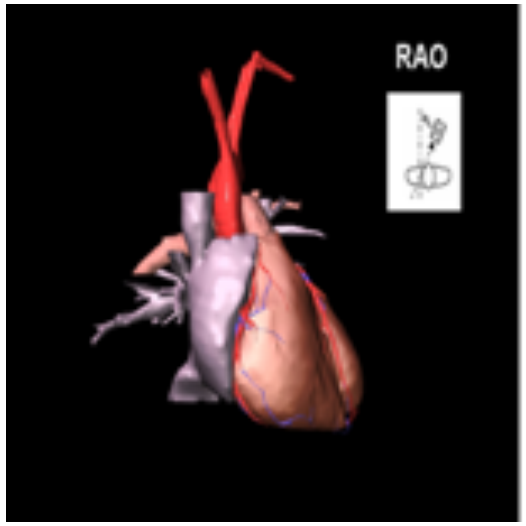
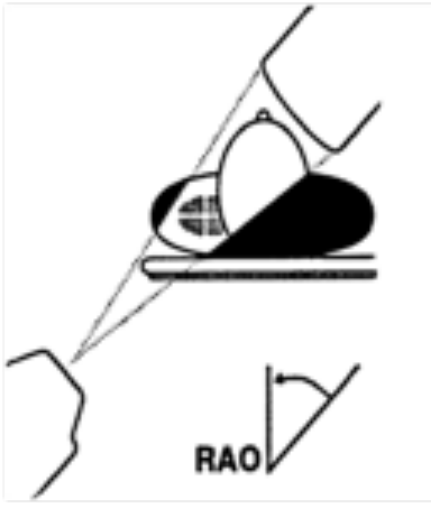
L'ECG est la clé !

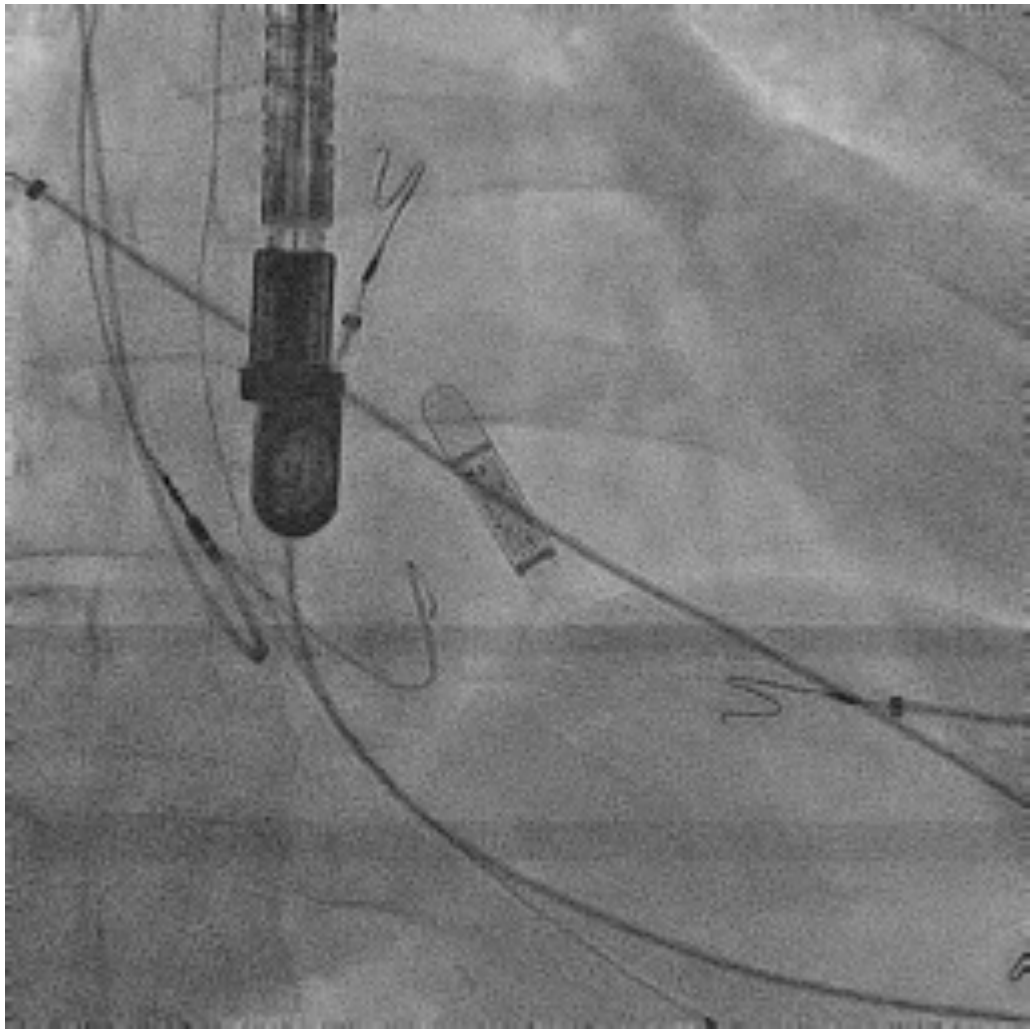


LVAT









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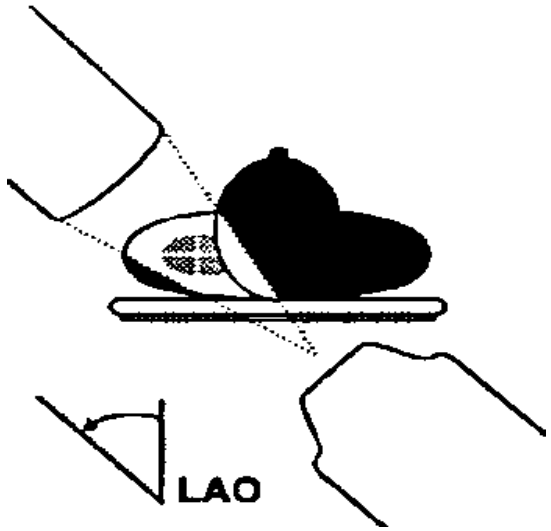

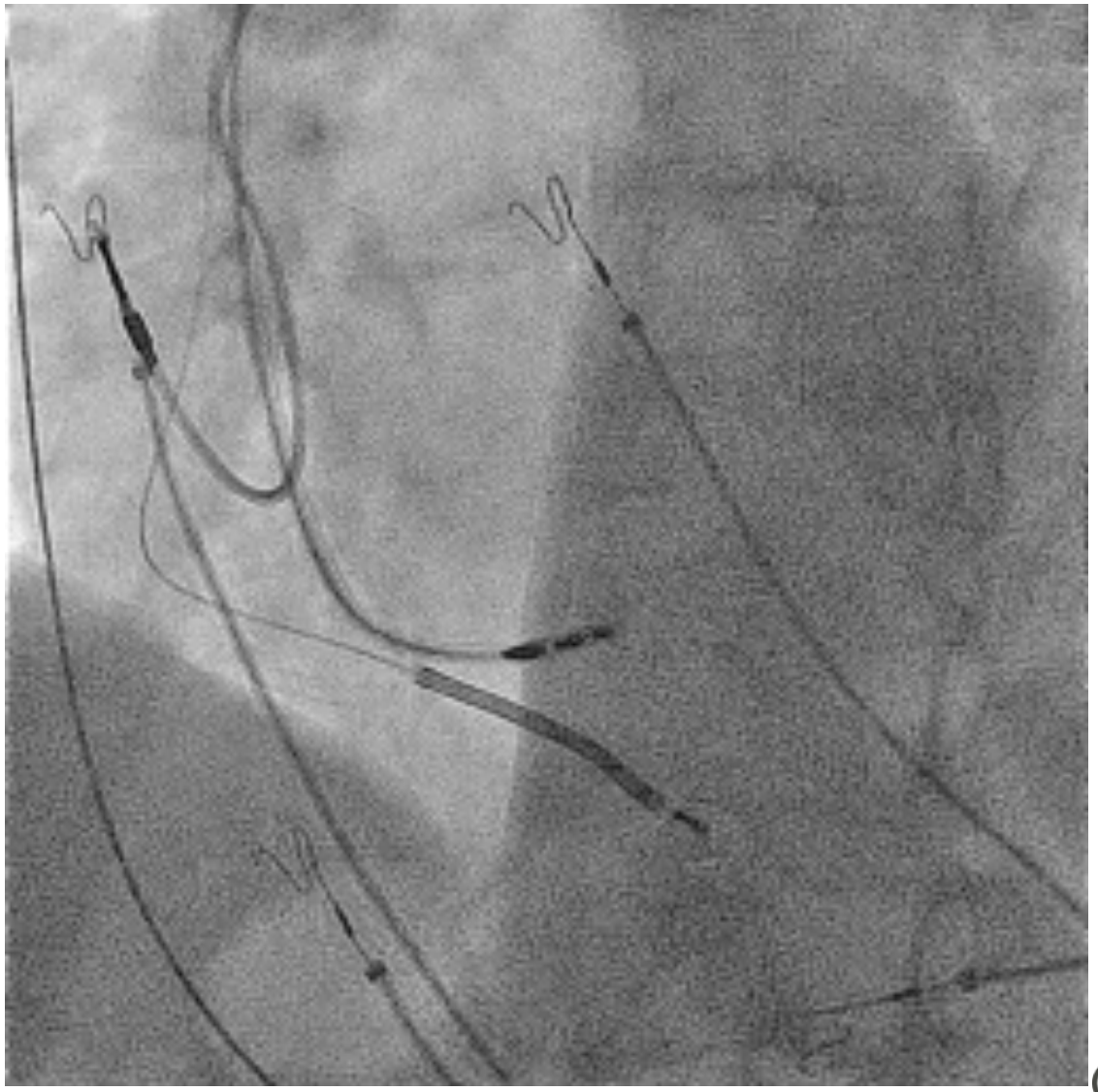

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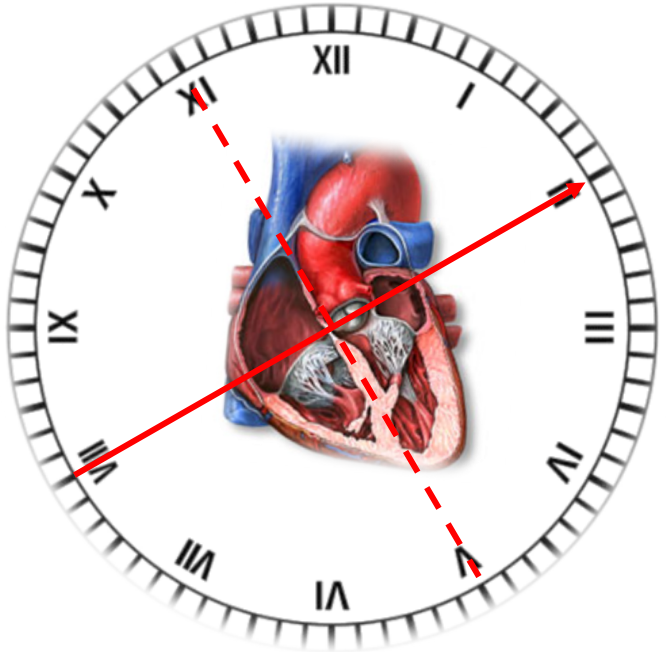
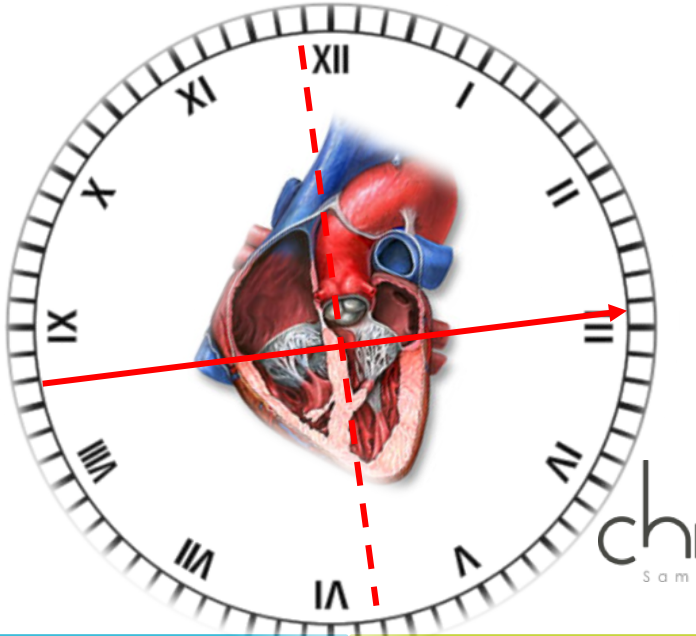
- Visualiser l'axe du septum
- Se positionner à la perpendiculaire





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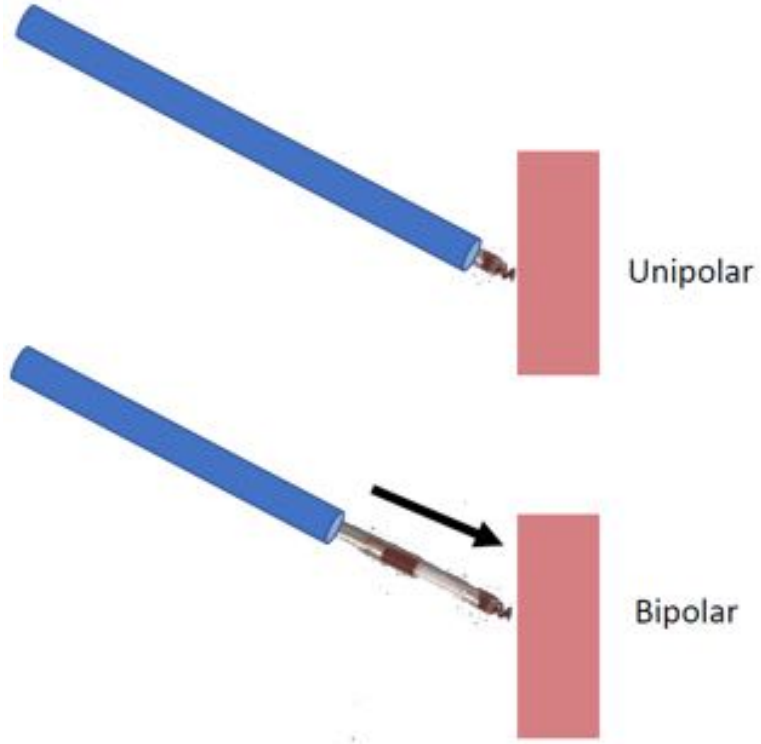
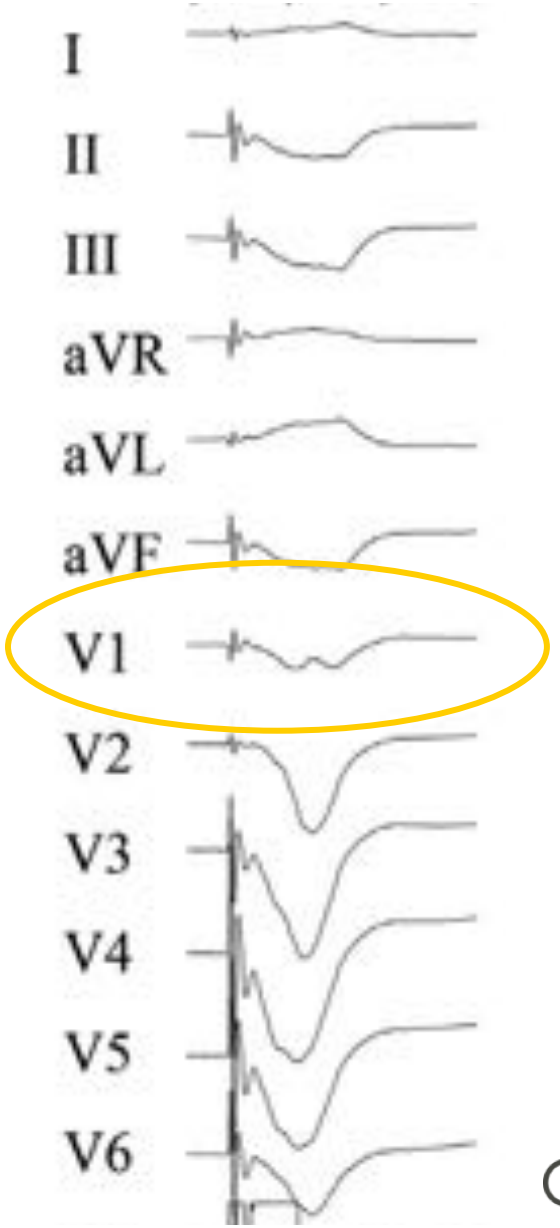
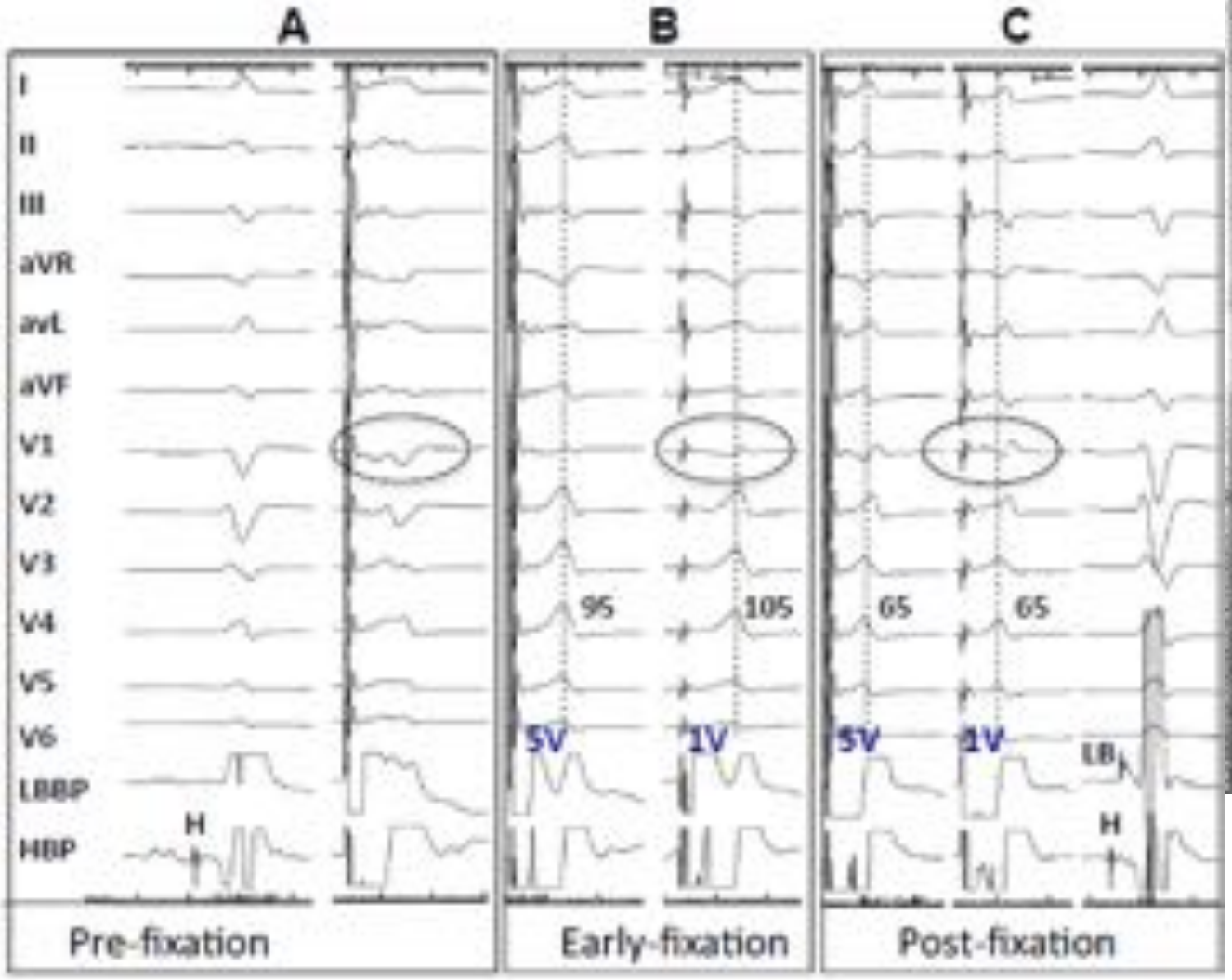
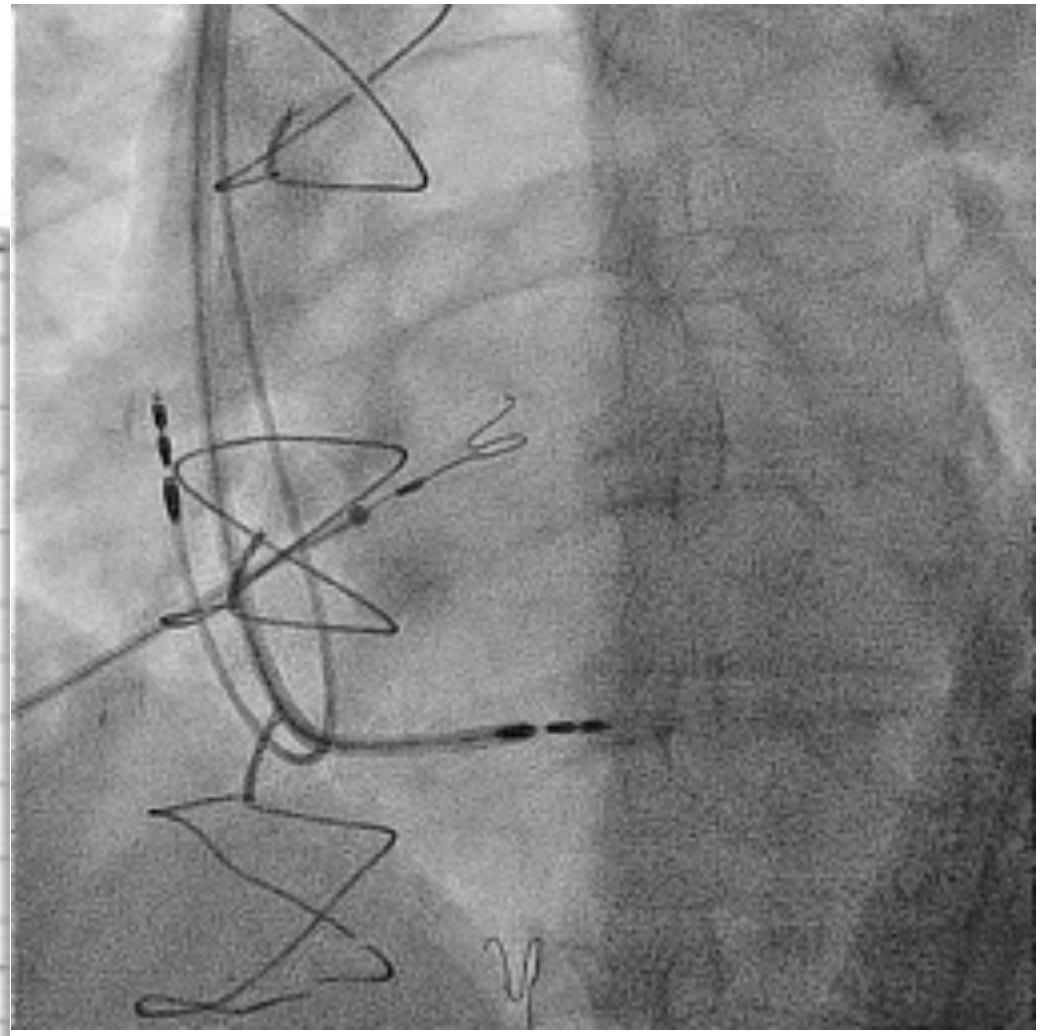
Pacing unipolaire

Recherche d'un aspect W en V1

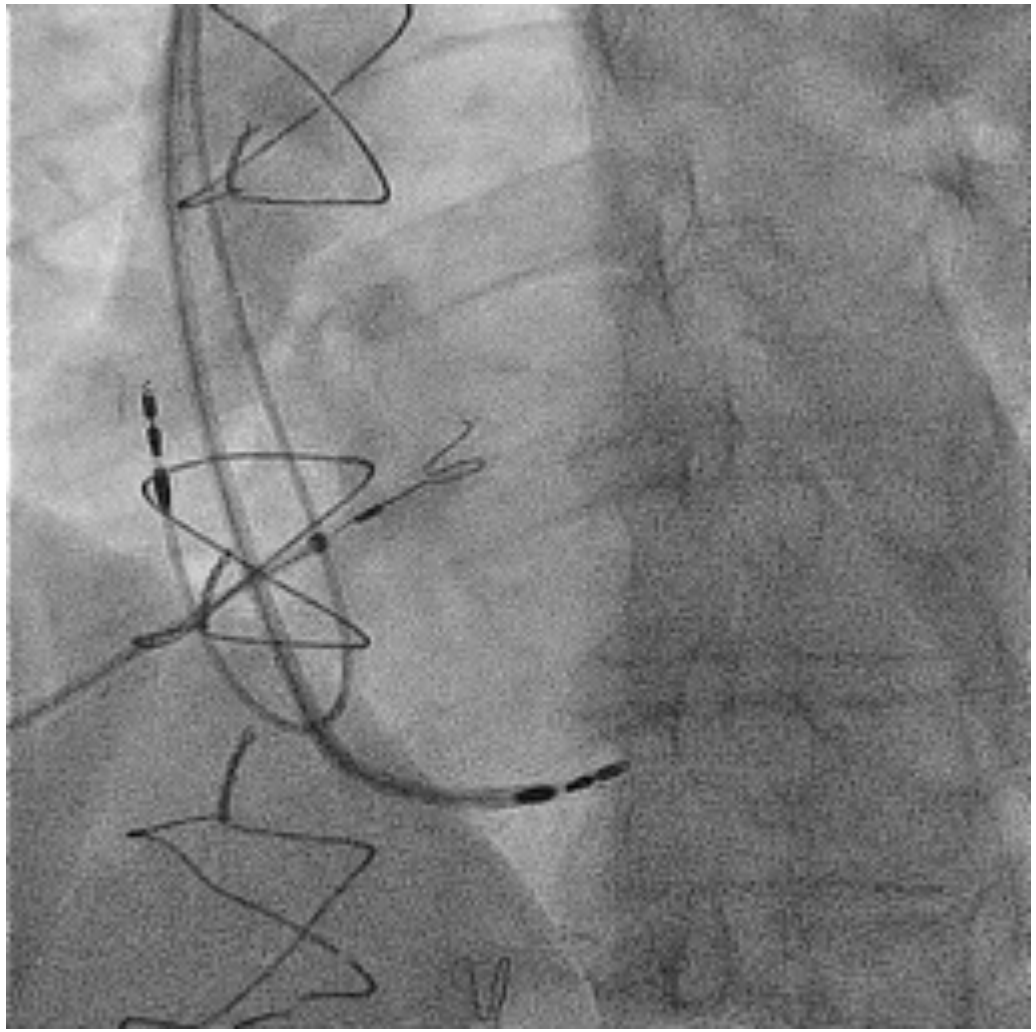


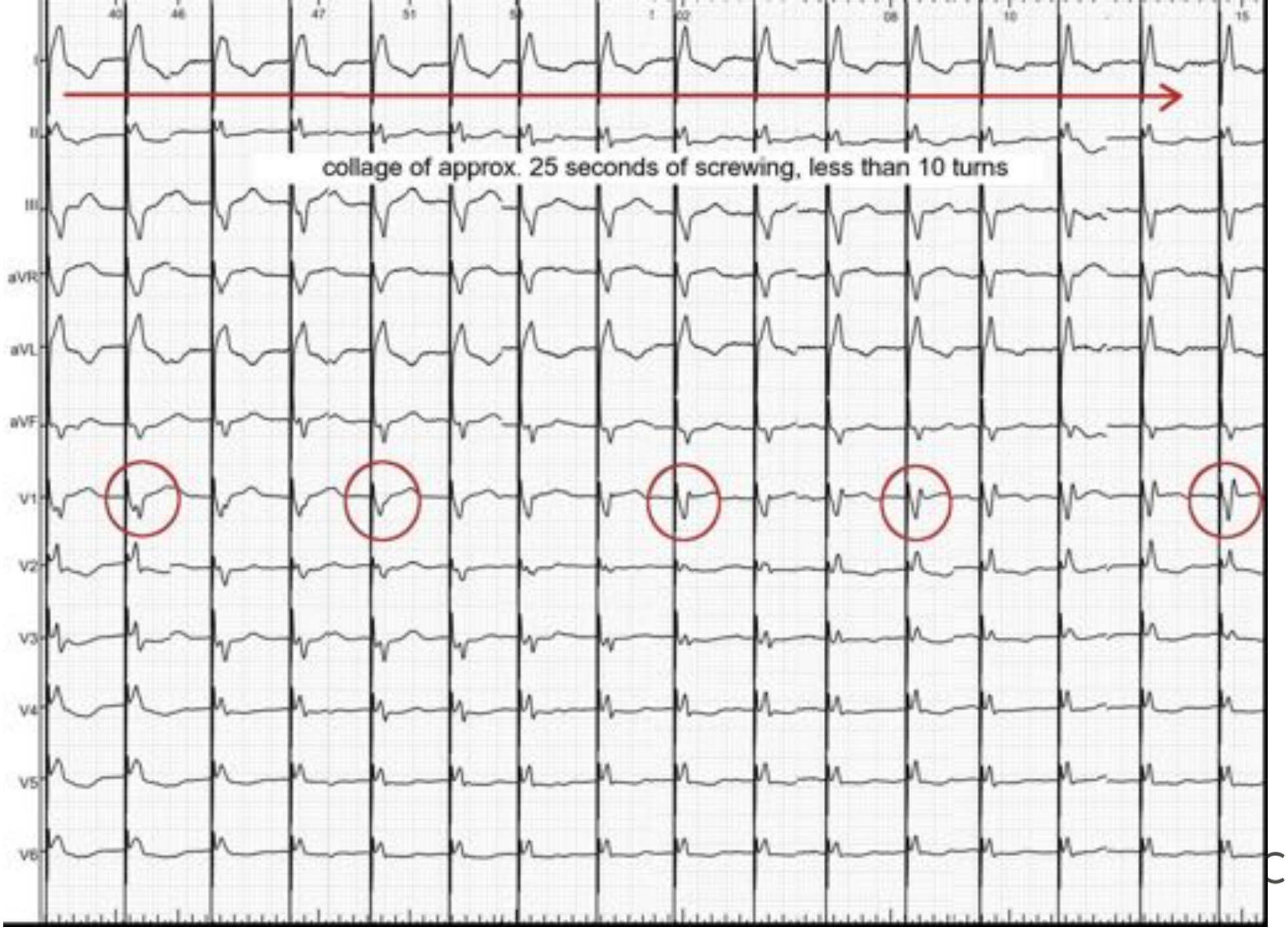


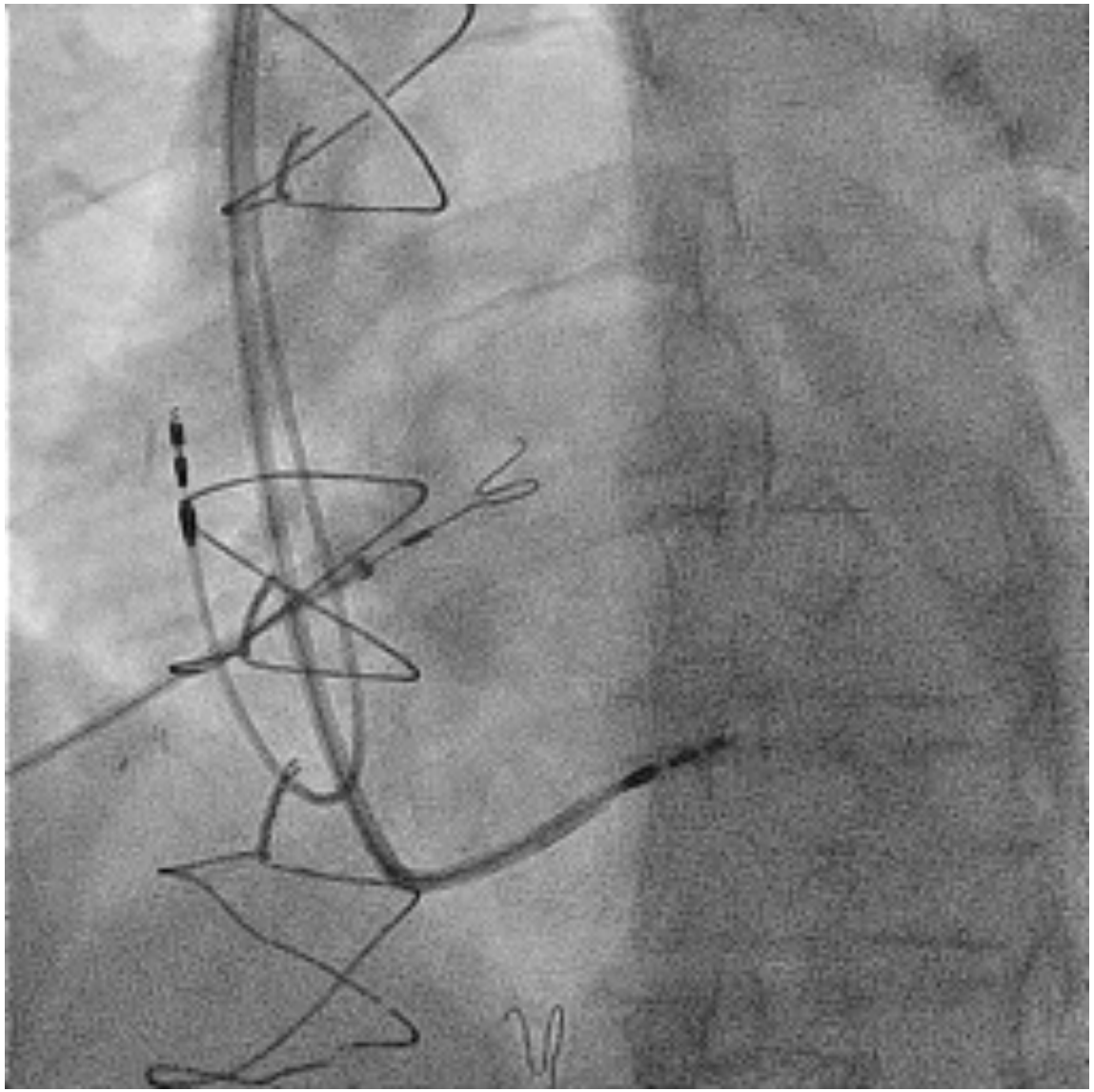

A
B
C
I
II
III
aVR
avL
aVF
V1
V2
V3
V4
V5
V6
LBBP
HBP
H
95
105
65
65
5V
1V
5V
1V
LB
H
Pre-fixation
Early-fixation
Post-fixation



Contraste pour
suivi de la profondeur
de la sonde




collage of approx. 25 seconds of screwing, less than 10 turns



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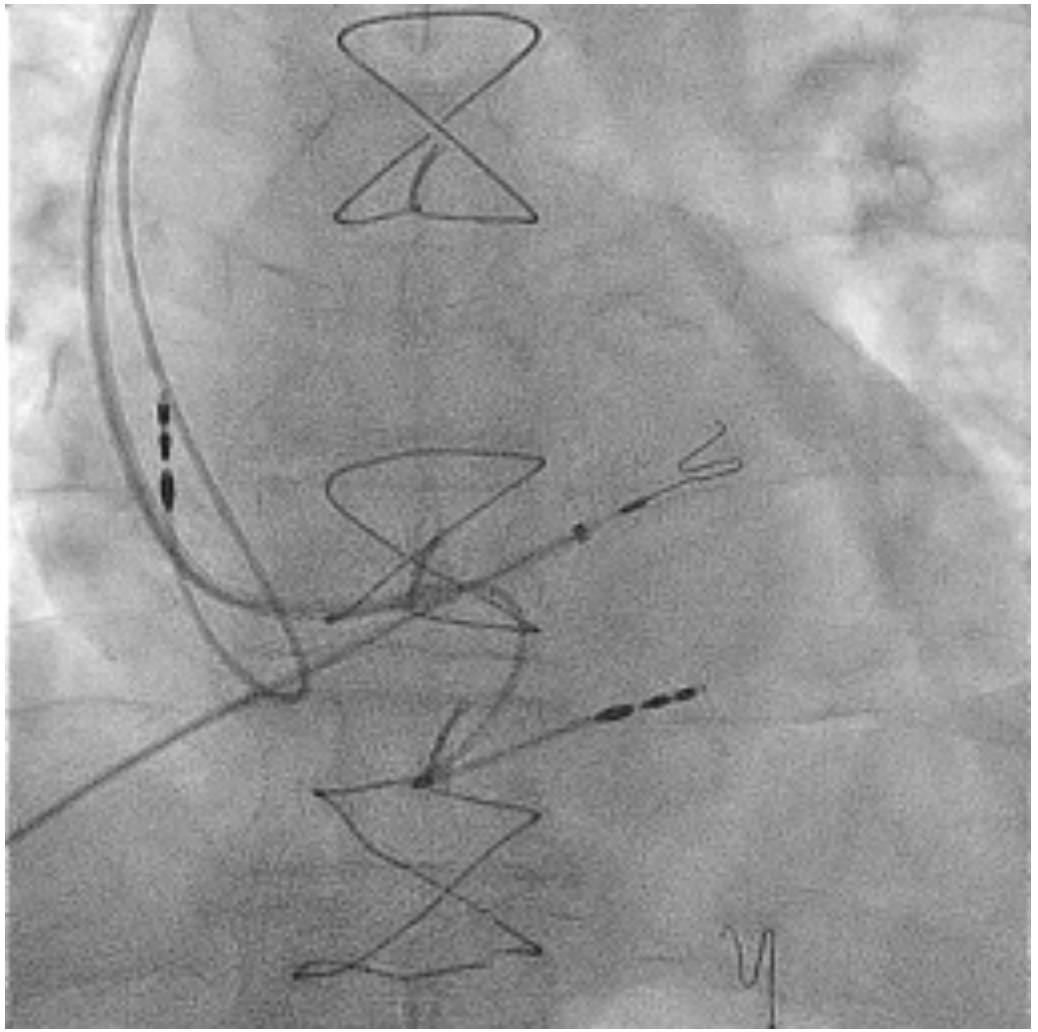

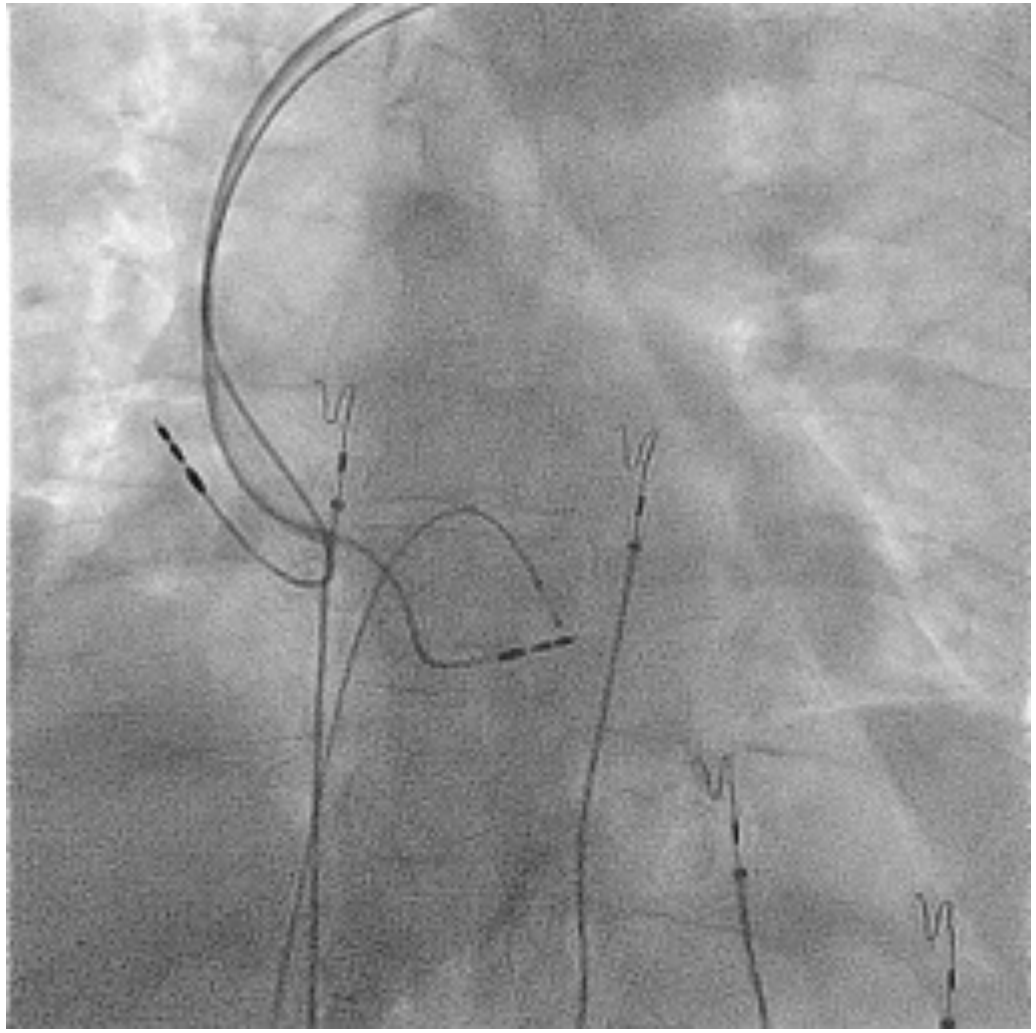

Critères de succès

Pas de consensus clair

Différents critères proposés

- Aspect de Bloc de branche droite incomplet
- LVAT court (temps d'activation du VG) < 85 ms
- Mesurer largeur de QRS

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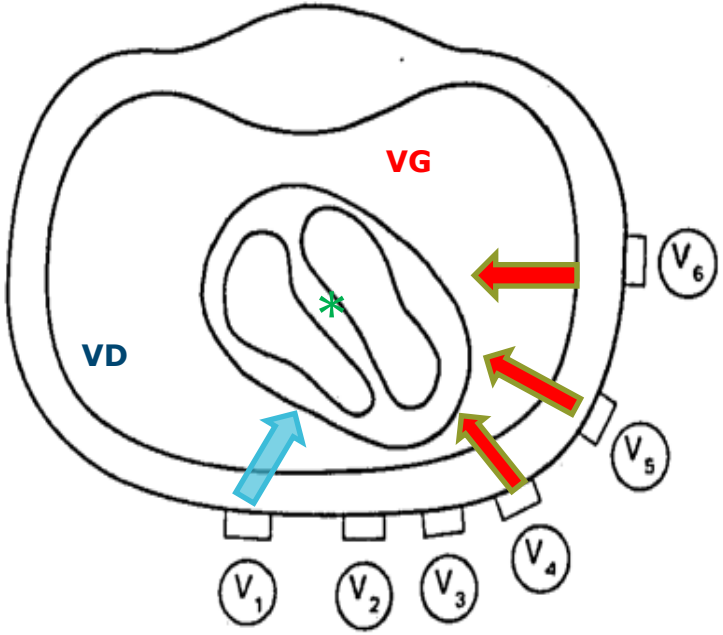
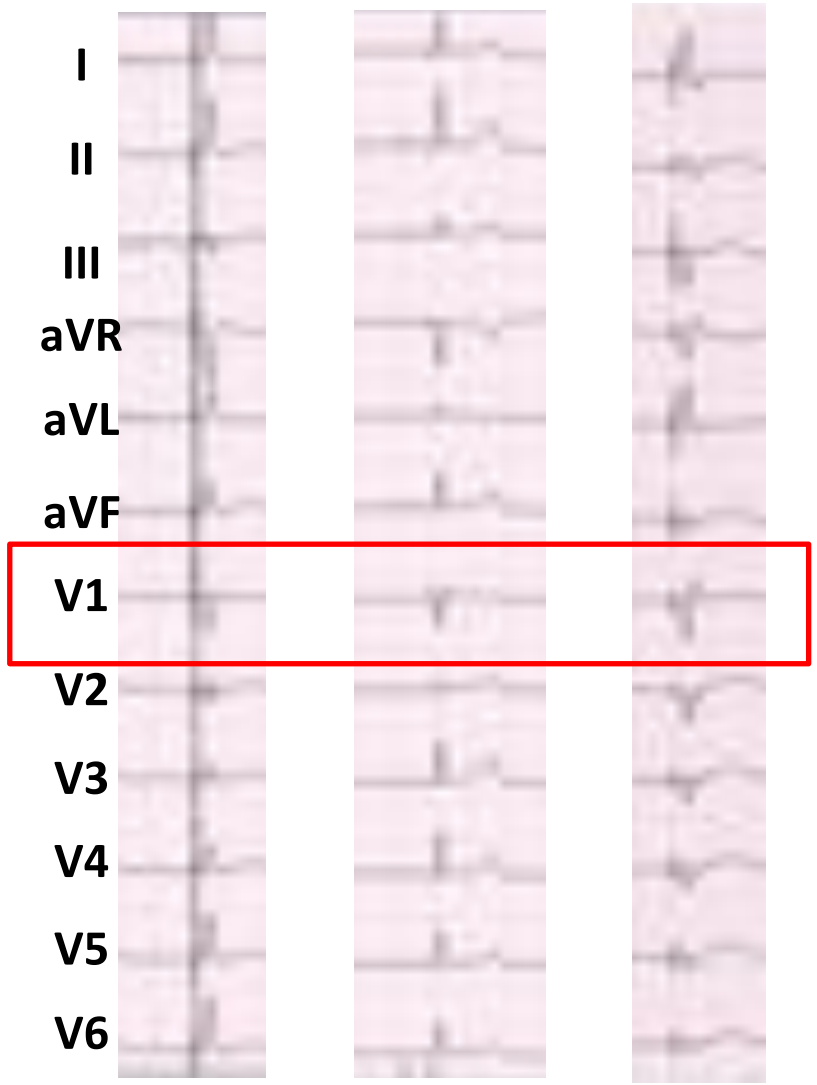
Critères de succès

1. Bloc de branche droite incomplet
   - **Pacing unipolaire !**
   - r' en V1 quand pacing du côté gauche du septum
   - Shift de pattern **W** vers **Qr** en vissant la sonde





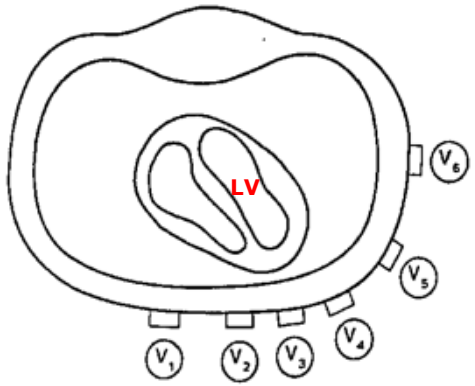
Critères de succès

2. LVAT court

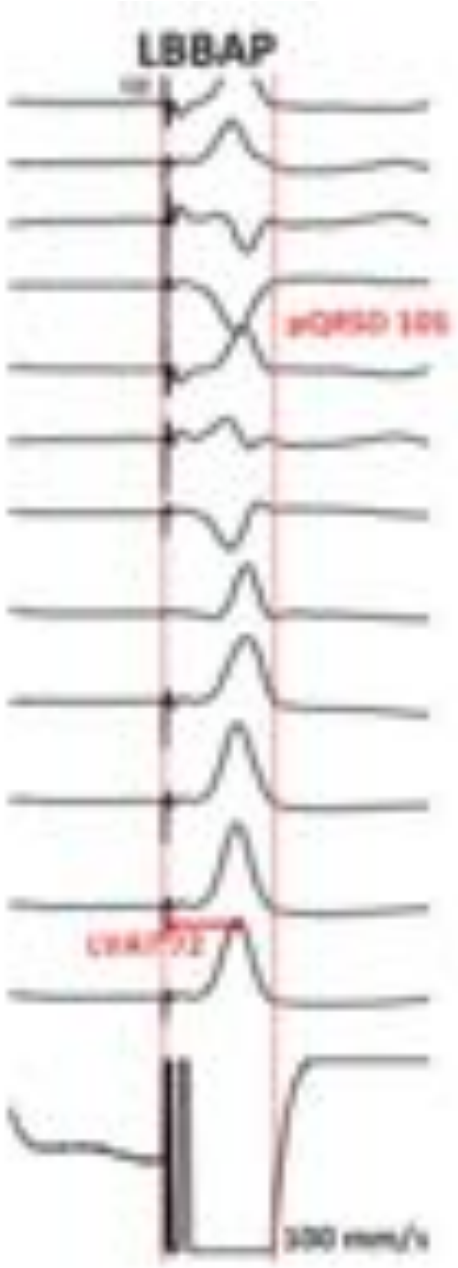
- Intervalle de la stim jusqu'au pic de l'onde R en

  V4, V5 or V6

- LVAT: Left Ventricular Activation time
  - Temps d'activation du VG

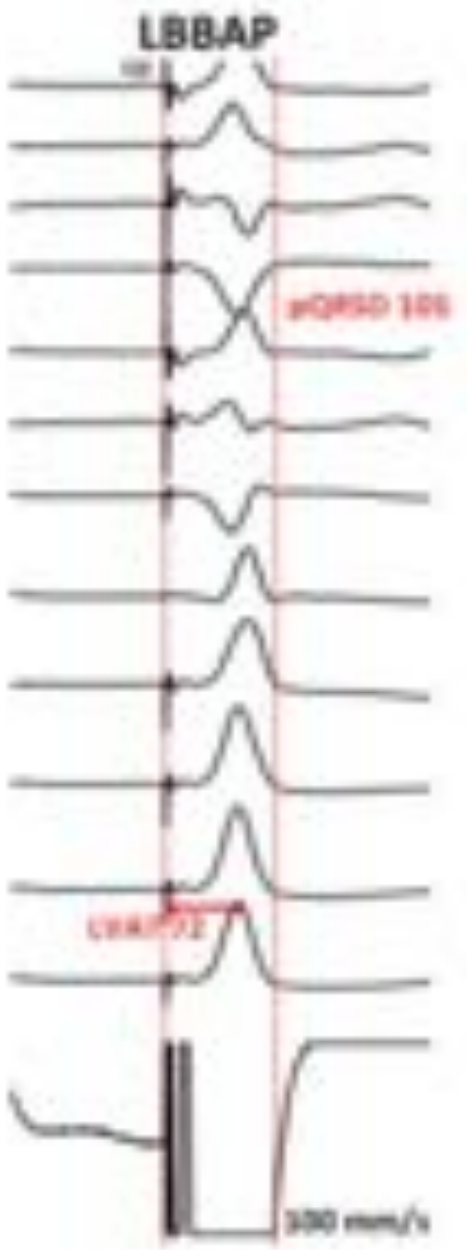


- Généralement < 85ms

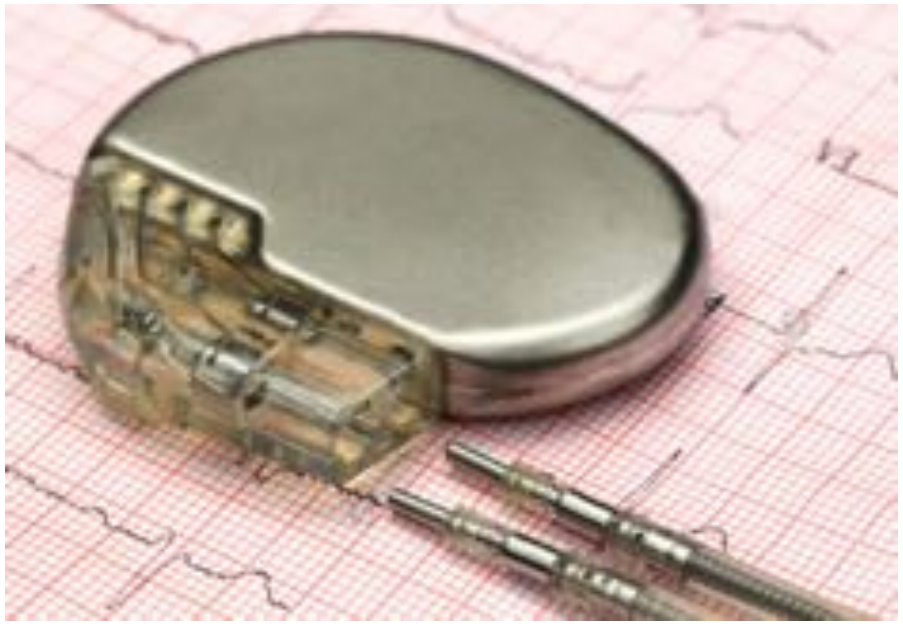


Critères de succès

- **Largeur QRS**
  - Généralement 110-130ms
  - Parfois jusque150 ms si Bloc de Branche préexistant




I
II
III
aVR
aVL
aVF
V1
V2
13.06.2023 15:14:39
QRS 140 ms
QT / QTcBaz 466 / 513 ms
PQ 174 ms
P 42 ms
RRIPP 818 / 1000 ms
Rythme AIV entraine sequentiel avec quelques complexes à rythme ventriculaire entraine
ECG anormal
DS post P SGD
QRS 142 ms
QT / QTcBaz 472 / 479 ms
PQ 178 ms
P 40 ms
RRIPP 960 / 1000 ms
PQRST 26 / 64 / 96 degrés
Rythme AIV entraine sequentiel
ECG anormal
DS
Indication
GE MAC2000 1:1 25 mm/s 10 mm/mV ADS 0.56-40 Hz 50 Hz 2x5x6_25
Non valide
1/1



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Criteria for successful LBBAP

- **4. Transitions from selective to non selective LBBP**
  - This is the proof of being at the right spot, but….
    - Very difficult to see the iso-electric line of 20-30 ms prior to the V activation
    - In some cases, we notice a transition during the implantation
    - @ FU post implant, this transition often disappears despite the fact that the paced QRS duration is still very good.
      - **Hypothesis:**
        - The threshold of the muscular tissue is lower than the threshold of the conduction system
        - As such, this is good news !!
        - The only way to verify, is to stimulate with the EP system based upon
          - Refractory period of the conduction tissue (fast conduction = short RP)
          - Refractory period of the muscular tissue (slower conduction = longer RP)