U KANDIDÁTŮ NA SRDEČNÍ RESYNCHRONIZAČNÍ TERAPII ULTRA-VYSOKO-FREKVENČNÍ EKG PŘEKONÁVÁ STRAUSSOVA KRITÉRIA PRO ODLIŠENÍ BLOKÁDY LEVÉHO RAMÉNKA TAWAROVA OD NITROKOMOROVÉ PORUCHY VEDENÍ

Karol Čurila

Cardiocenter, Charles university in Prague

Rozdíly mezi LBBB a IVCD

- LBBB
- Porucha vedení uvnitř levého raménka Tawarova
- Mezikomorová dyssynchronie nad ≥ 60 ms
- Dobrá/výborná odpověď na CRT (CSP nebo BVP)

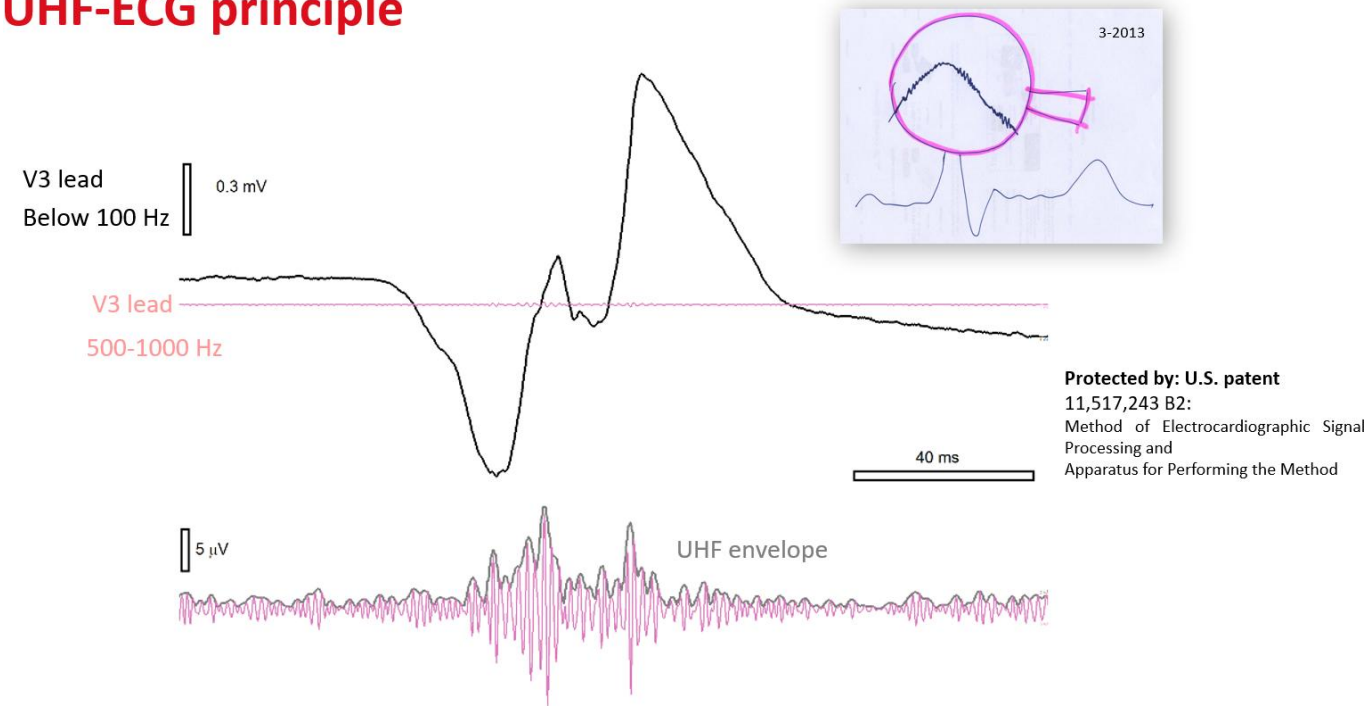
- IVCD
- Vedení levým raménkem na septu je zachovalé
- Porucha vedení je uvnitř levé komory – většinou jizva
- Mezikomorová dyssynchronie většinou do ≤ 60 ms
- Různá odpověď na Biv CRT (lze použít CSP CRT pro tyto pacienty???)

Jak byla LBBB definována v éře Biv CRT?

	AHA/ACC/HRS	ESC 2006	ESC 2009	ESC 2013	Strauss
QRS duration	≥120ms	≥120ms	≥120ms	≥120ms	M: ≥140 ms, F: ≥130 ms
QS or rS pattern	-	V1	V1,V2	V1	V1,V2
QS pattern	-	aVR	-	-	-
Positive T-wave	Yes	V1 and aVR	-	-	-
Delayed ID-time (≥60ms)	V5,V6	I and V6	-	-	-
Discordant T-waves	Usually	usually	-	-	-
Notch/slurred R-wave	I, aVL, V5, V6	-	I, aVL, V5, V6	I, aVL, V5, V6	I, aVL, V1, V2, V5, V6
Negative T-wave	Yes	-	I, aVL, V5, V6	-	-
Absent Q-wave	I, V5, V6	-	I, aVL, V5, V6	V5, V6	-

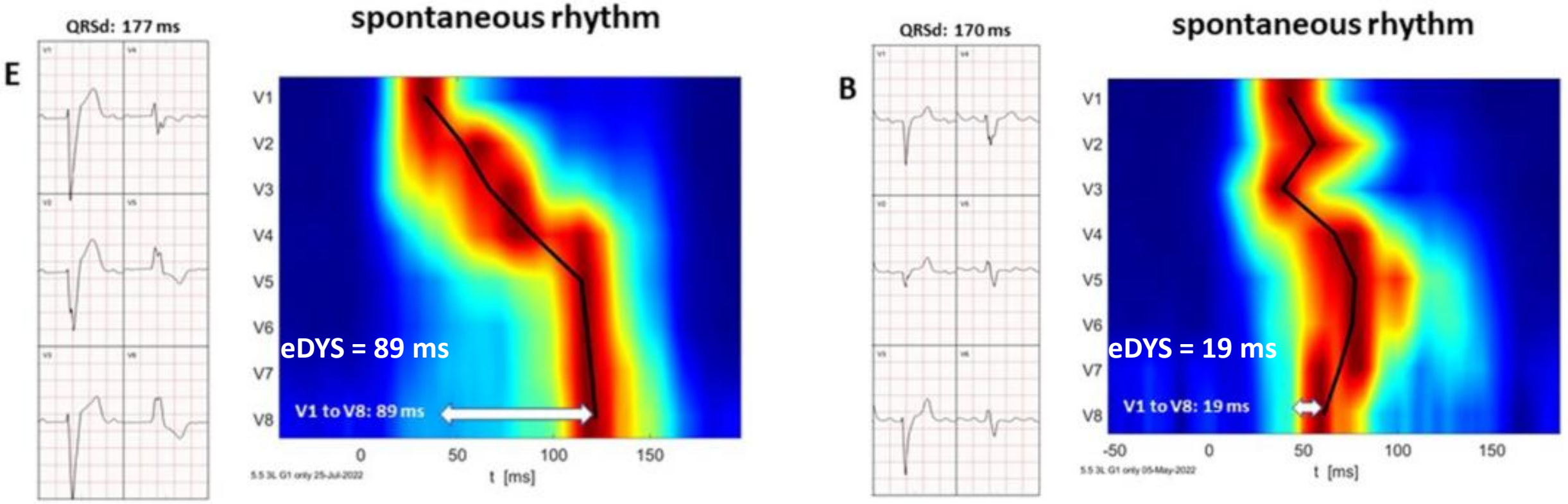
Ultra-vysoko-frekvenční EKG

UHF-ECG principle



Protected by: U.S. patent
11,517,243 B2:
Method of Electrocardiographic Signal Processing and
Apparatus for Performing the Method

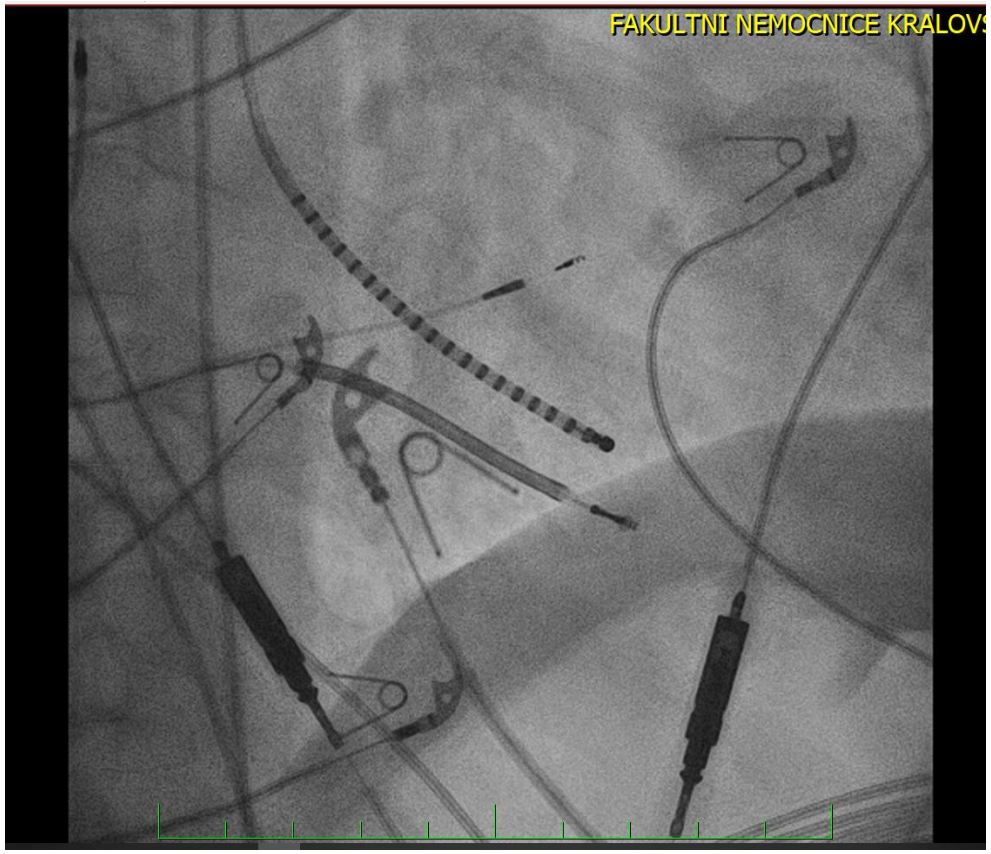
Příklady IVCD a LBBB na UHF-ECG



Curila et al. JICE. 2023

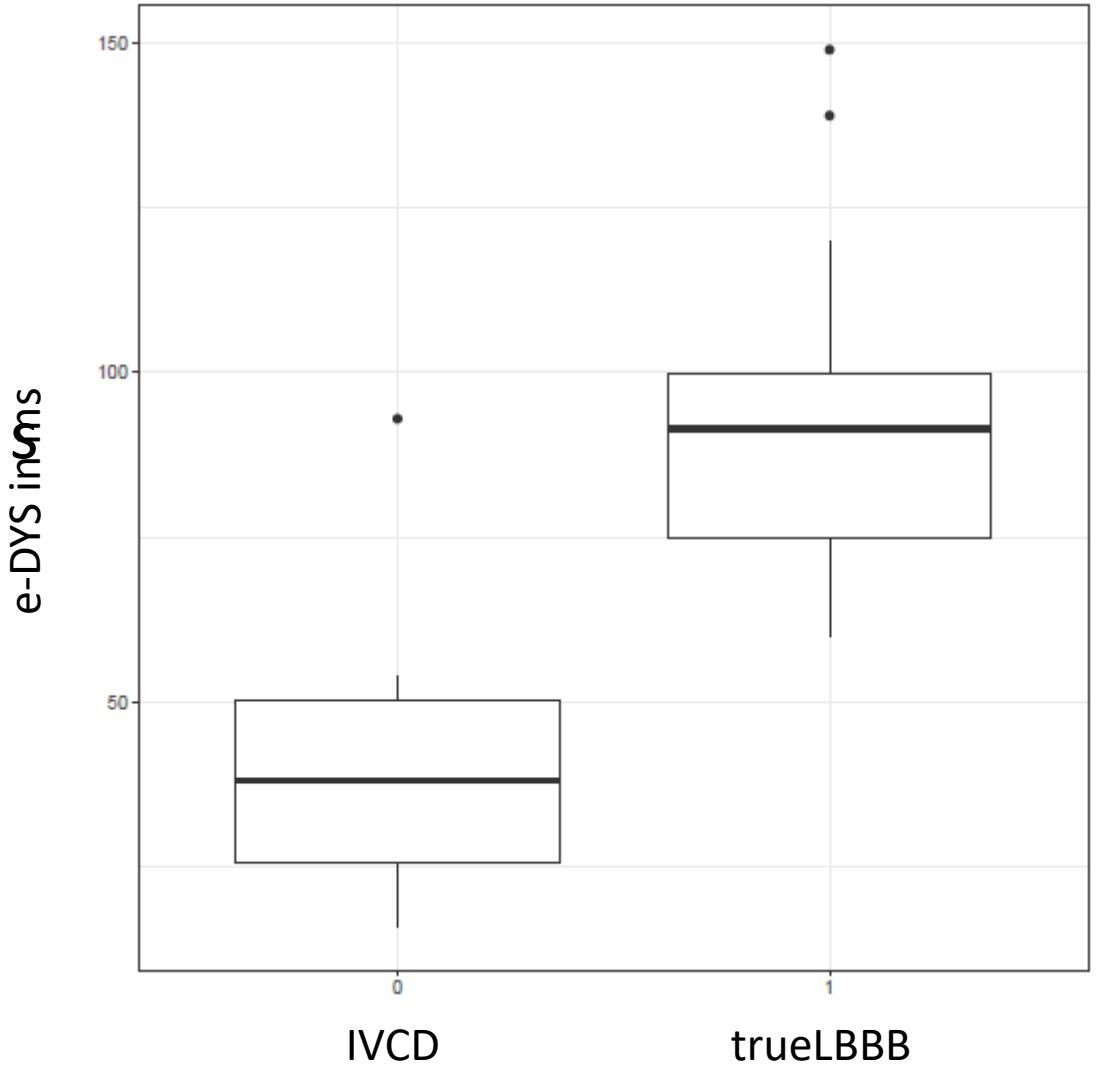
UHFBLOCK studie - metodologie

- Pacienty s indikací k CRT
- nonRBBB morphologie, LVEF ≤ 40%
- QRSd ≥ 130 ms
- Mapování levého septa k odlíšení true LBBB od IVCD
- Strauss kritéria na standartním EKG vs. UHF-ECG



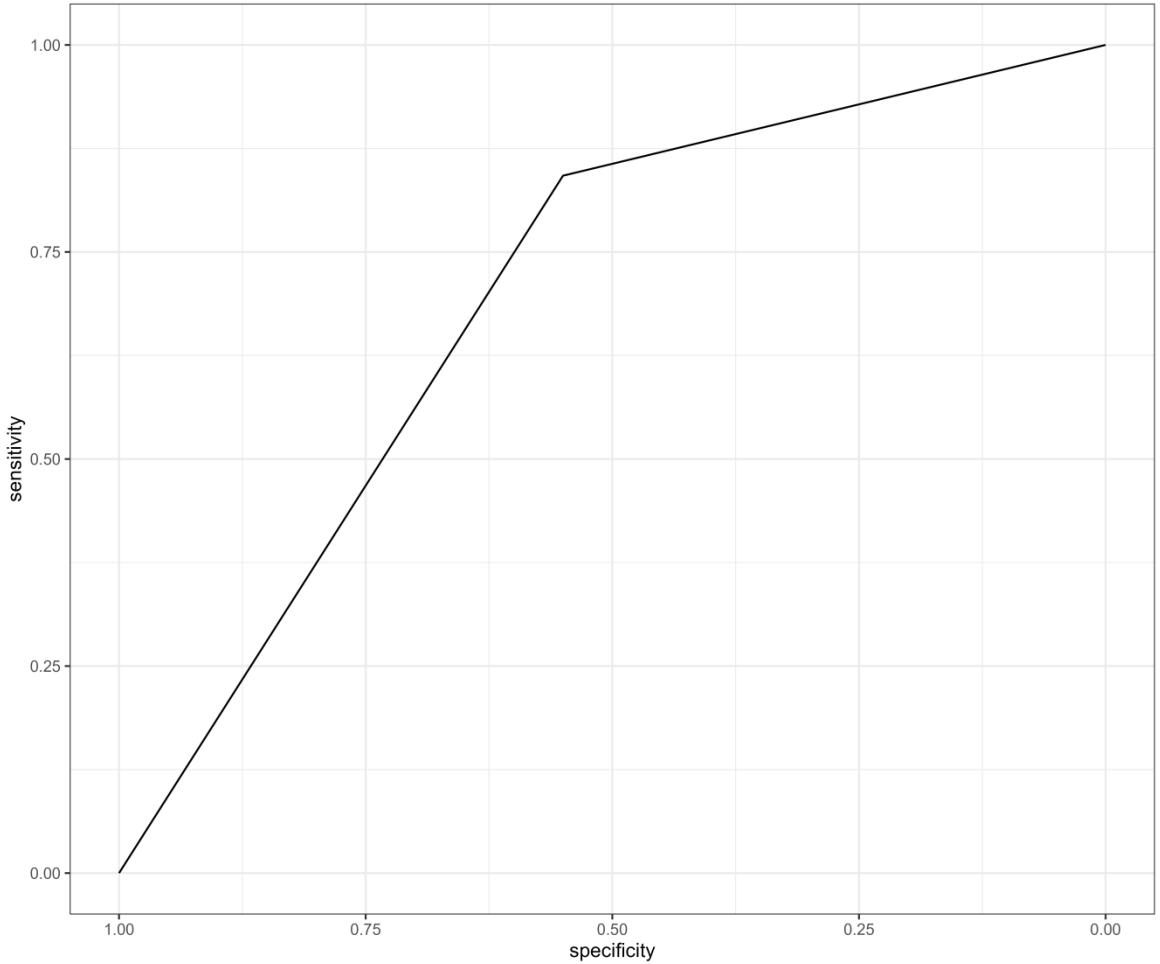
Výsledky

- 58 pacientů (41 mužů)
- LVEF 28 ± 8 % a QRSd 169 ± 19 ms
- Výsledky mapování: 38 s trueLBBB a 20 IVCD
- TrueLBBB QRSd: 177 ms vs 153 ms in IVCD
- TrueLBBB eDYS: 91 ms vs 40 ms in IVCD

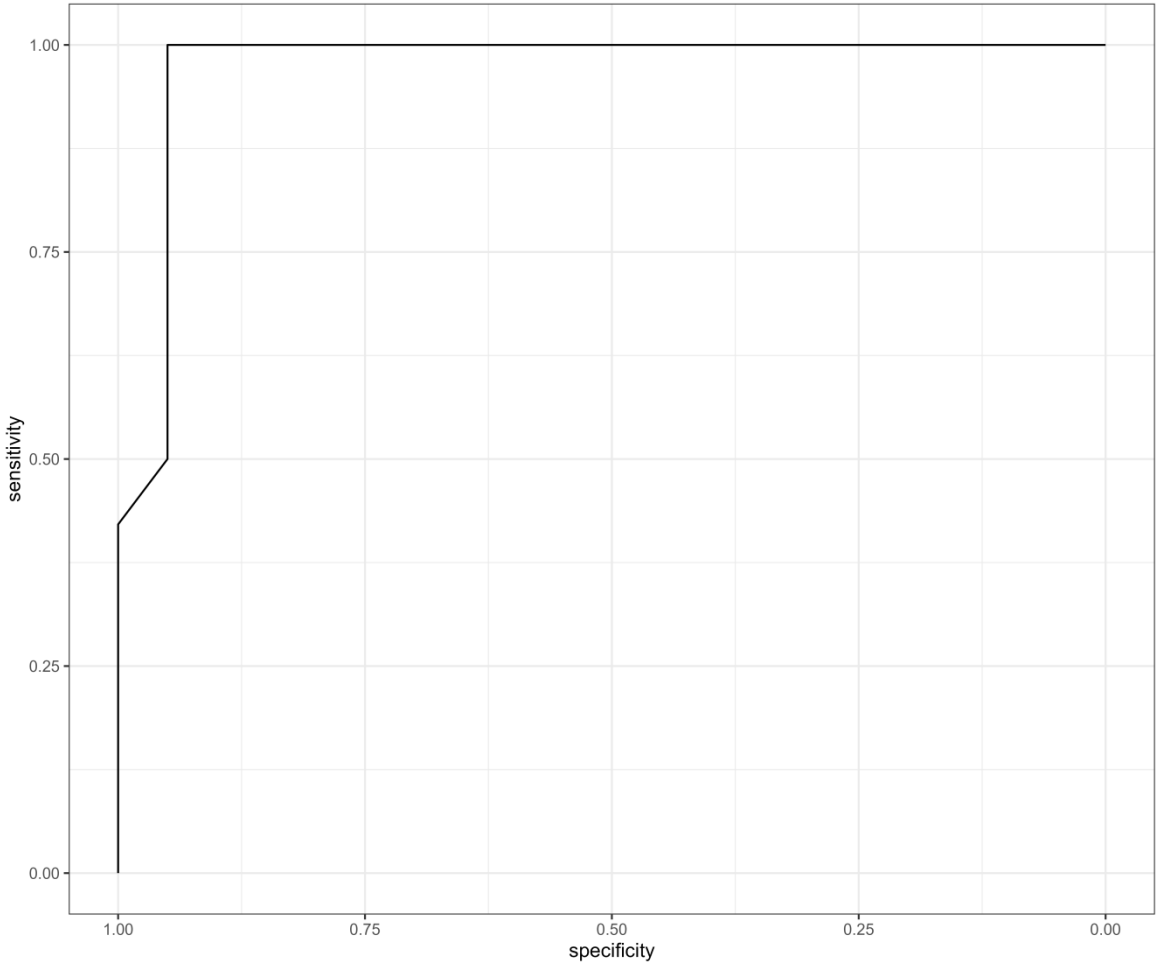


Výsledky

Strauss LBBB



UHF-ECG - eDYS



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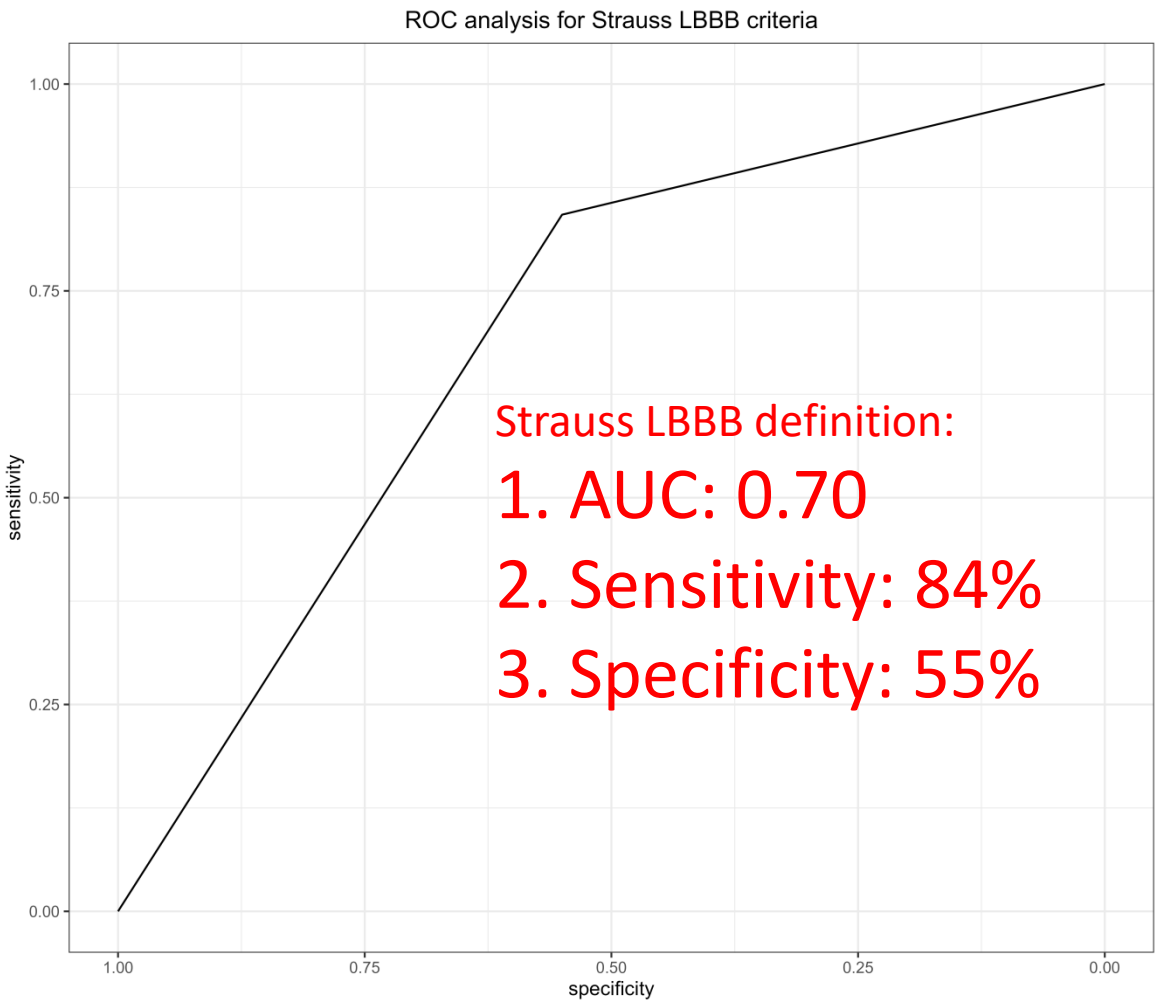
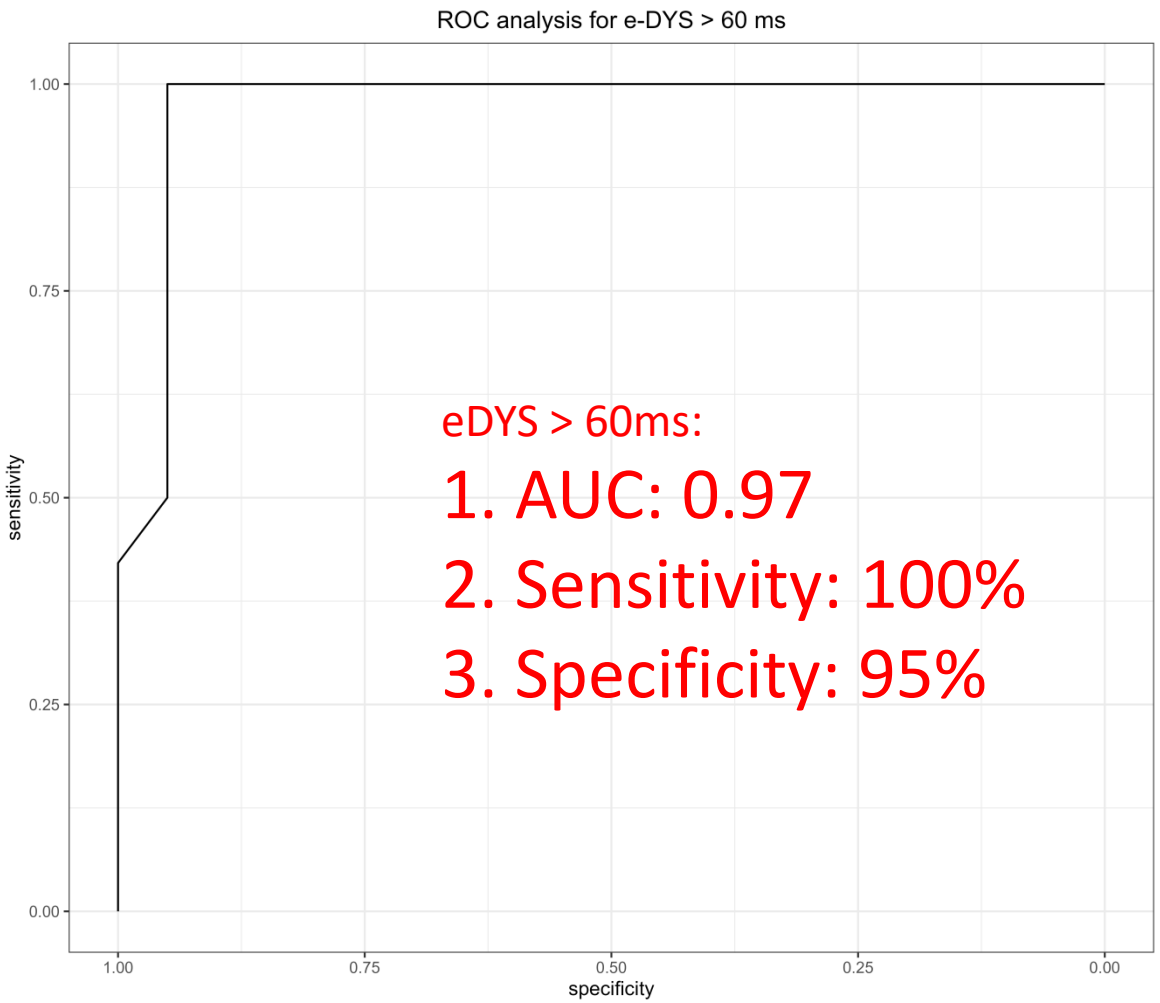


Strauss LBBB definition:

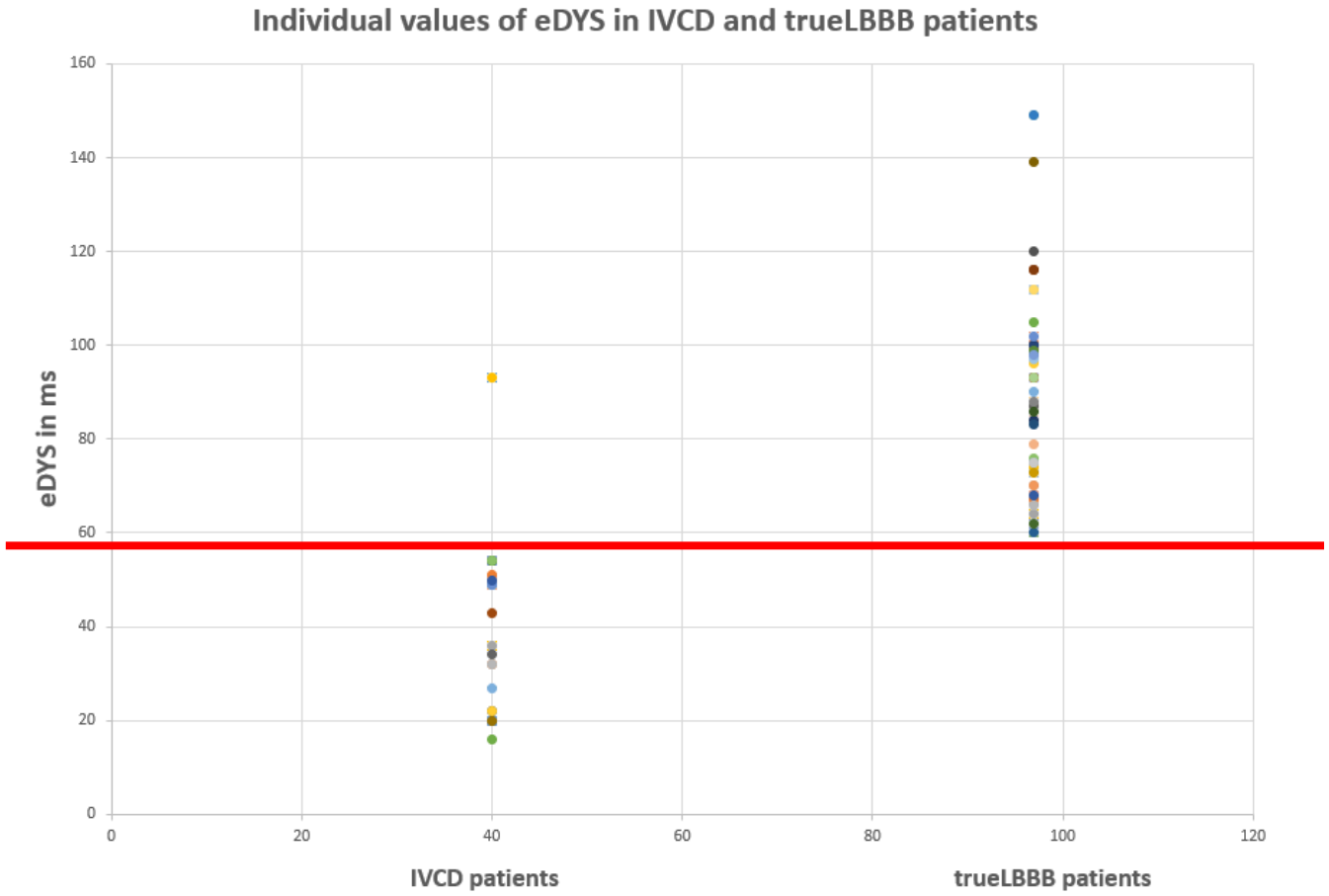
1. AUC: 0.70
2. Sensitivity: 84%
3. Specificity: 55%

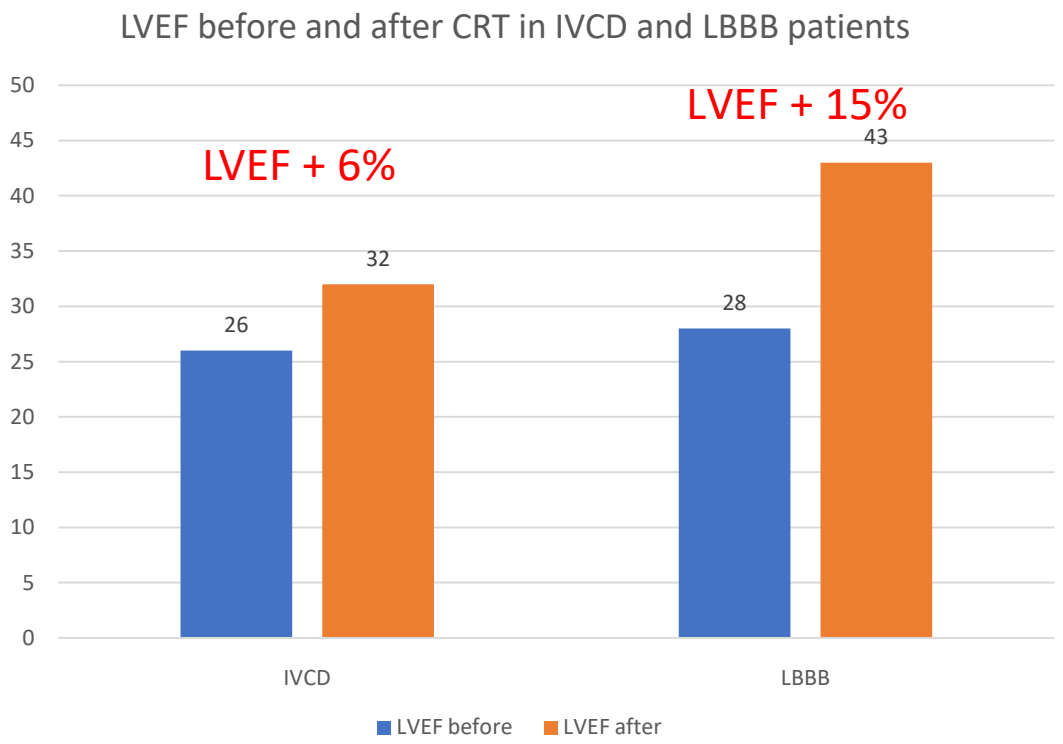


eDYS > 60ms:

1. AUC: 0.97
2. Sensitivity: 100%
3. Specificity: 95%

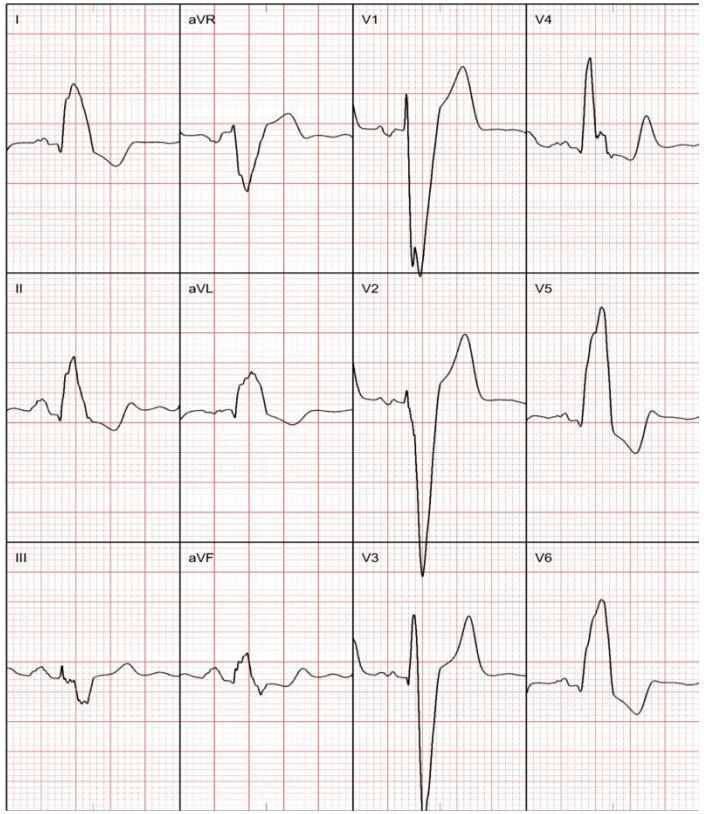
Results – individuální hodnoty a změna LVEF





Standartní EKG vs. UHF-ECG u LBBB vs. IVCD

QRSd 221 ms



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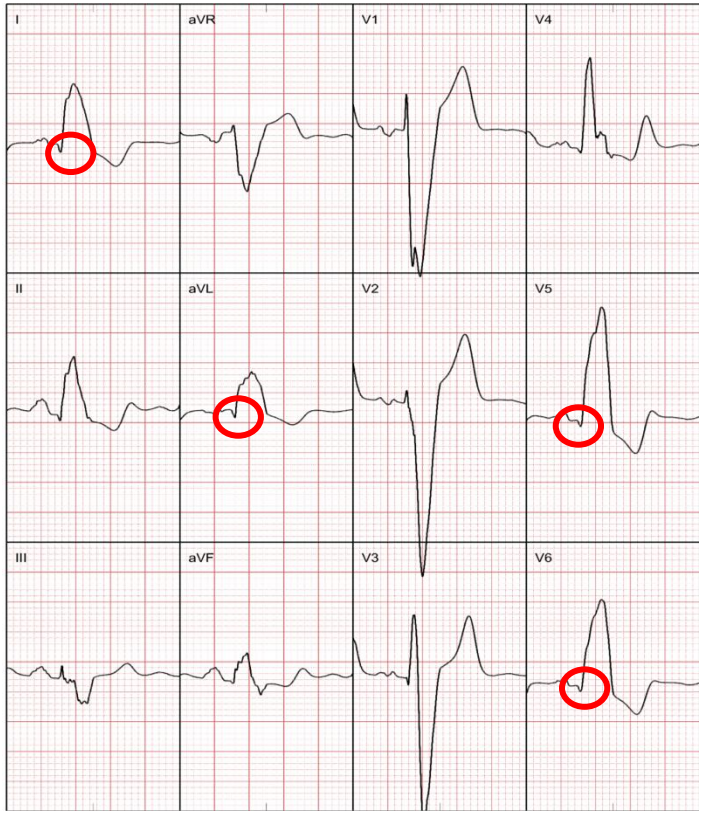

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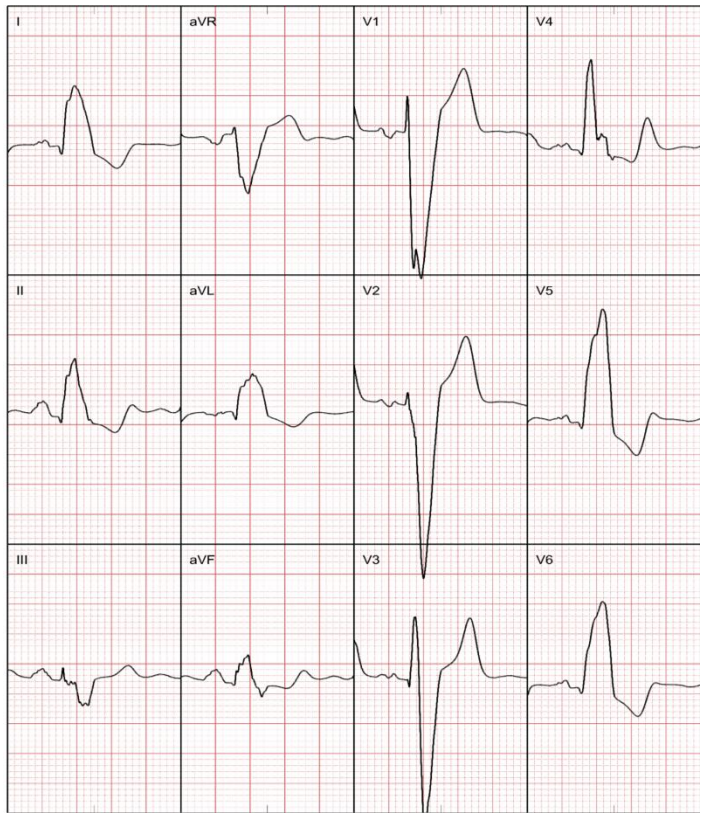
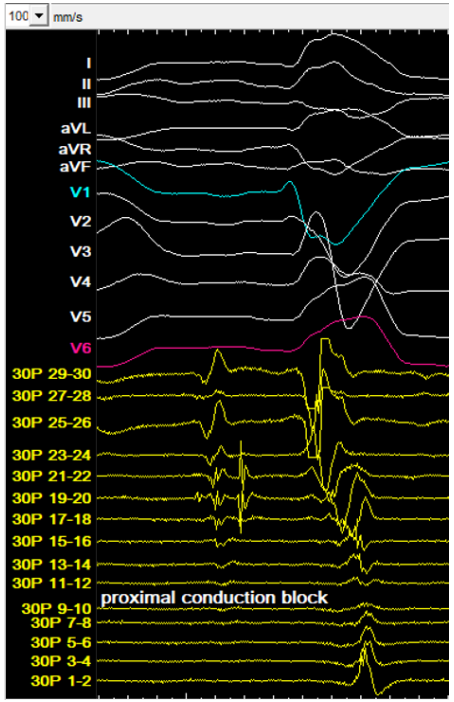
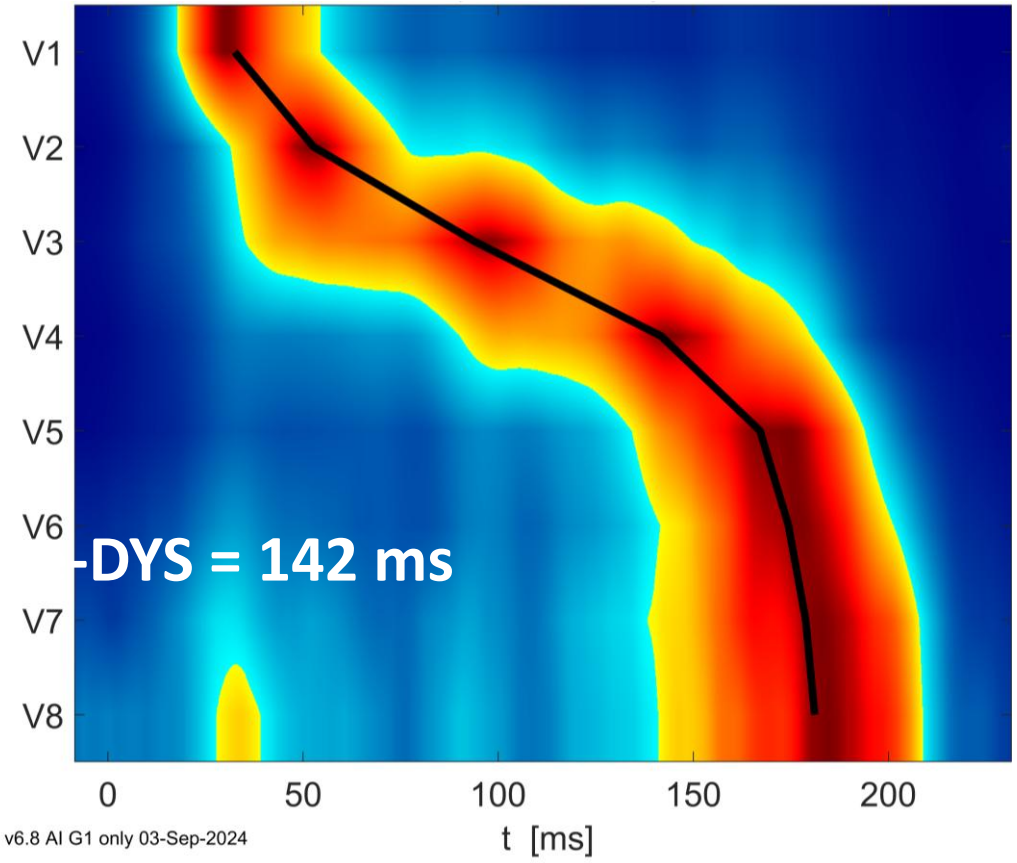


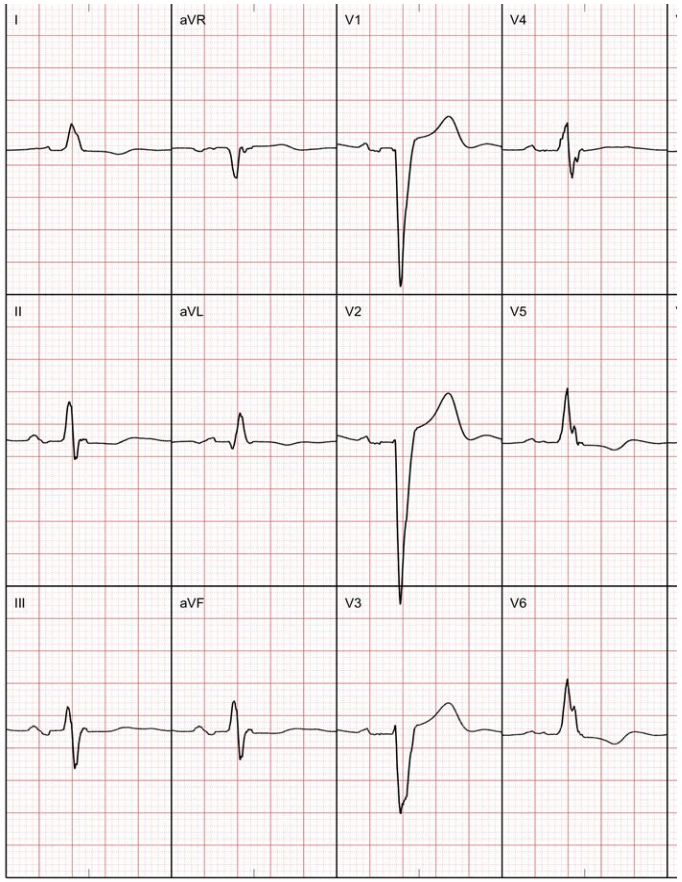


trueLBBB = proximal LBB block



Standartní EKG vs. UHF-ECG u LBBB vs. IVCD

QRSd 154 ms



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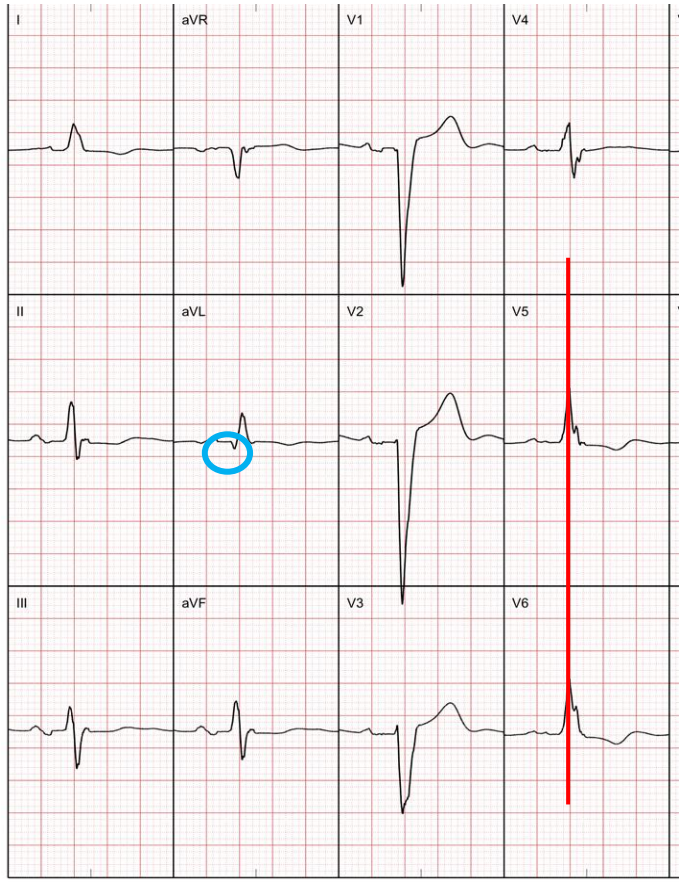
Negative T-wave	Yes	-	I, aVL,V5,V6	-	-
Absent Q-wave	I,V5,V6	-	I, aVL,V5,V6	V5,V6	-

Standartní EKG vs. UHF-ECG u LBBB vs. IVCD

QRSd 154 ms



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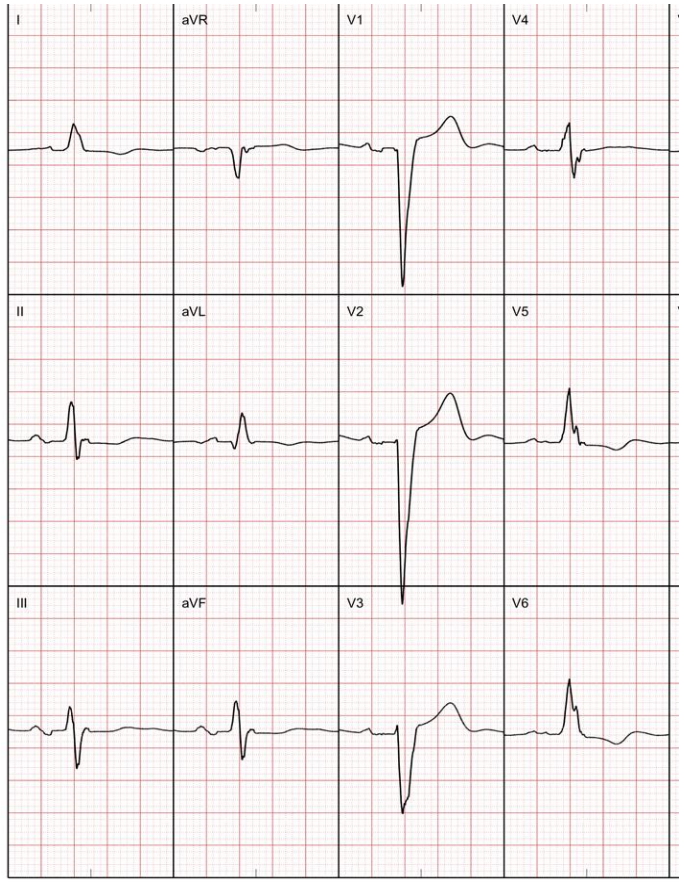
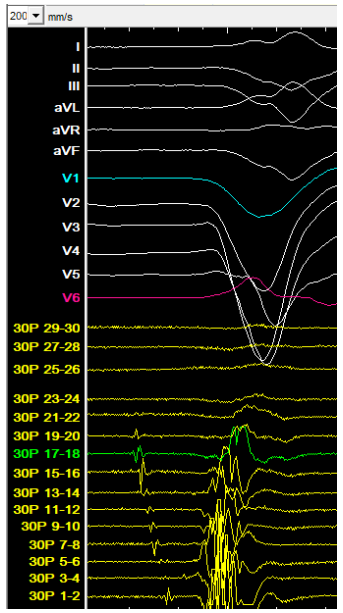
Negative T-wave	Yes	-	I, aVL, V5, V6	-	-
Absent Q-wave	I, V5, V6	-	I, aVL, V5, V6	V5, V6	-

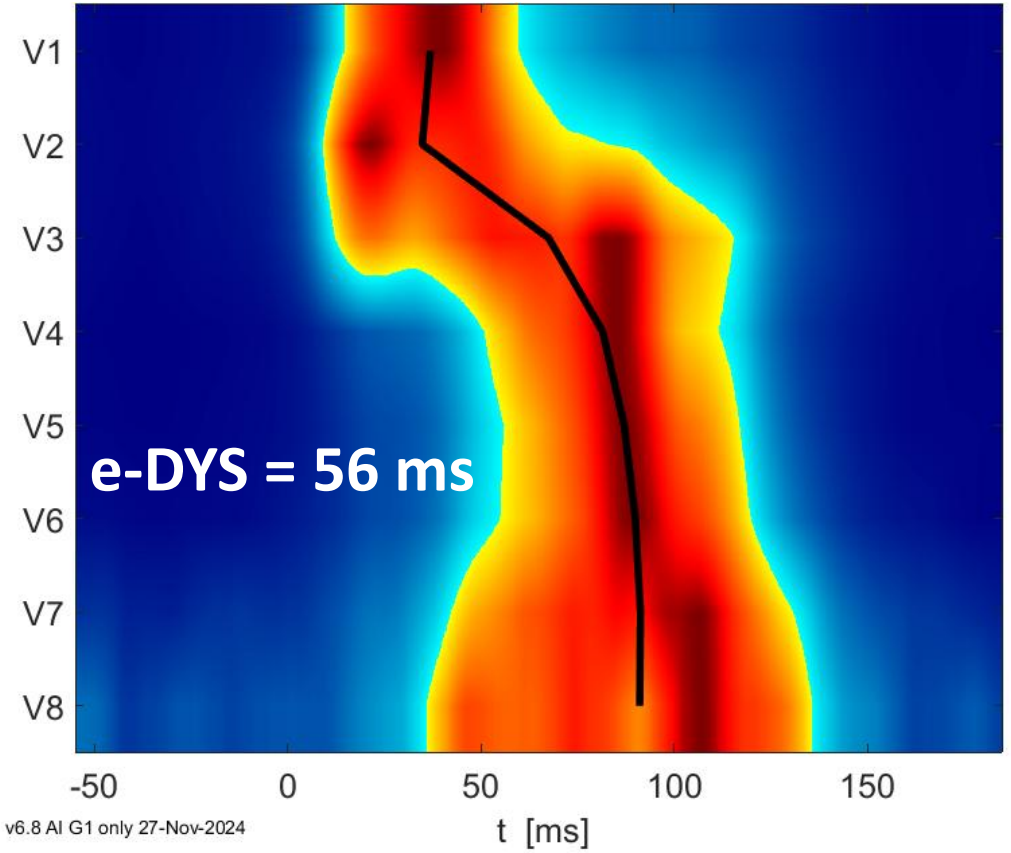
Standartní EKG vs. UHF-ECG u LBBB vs. IVCD

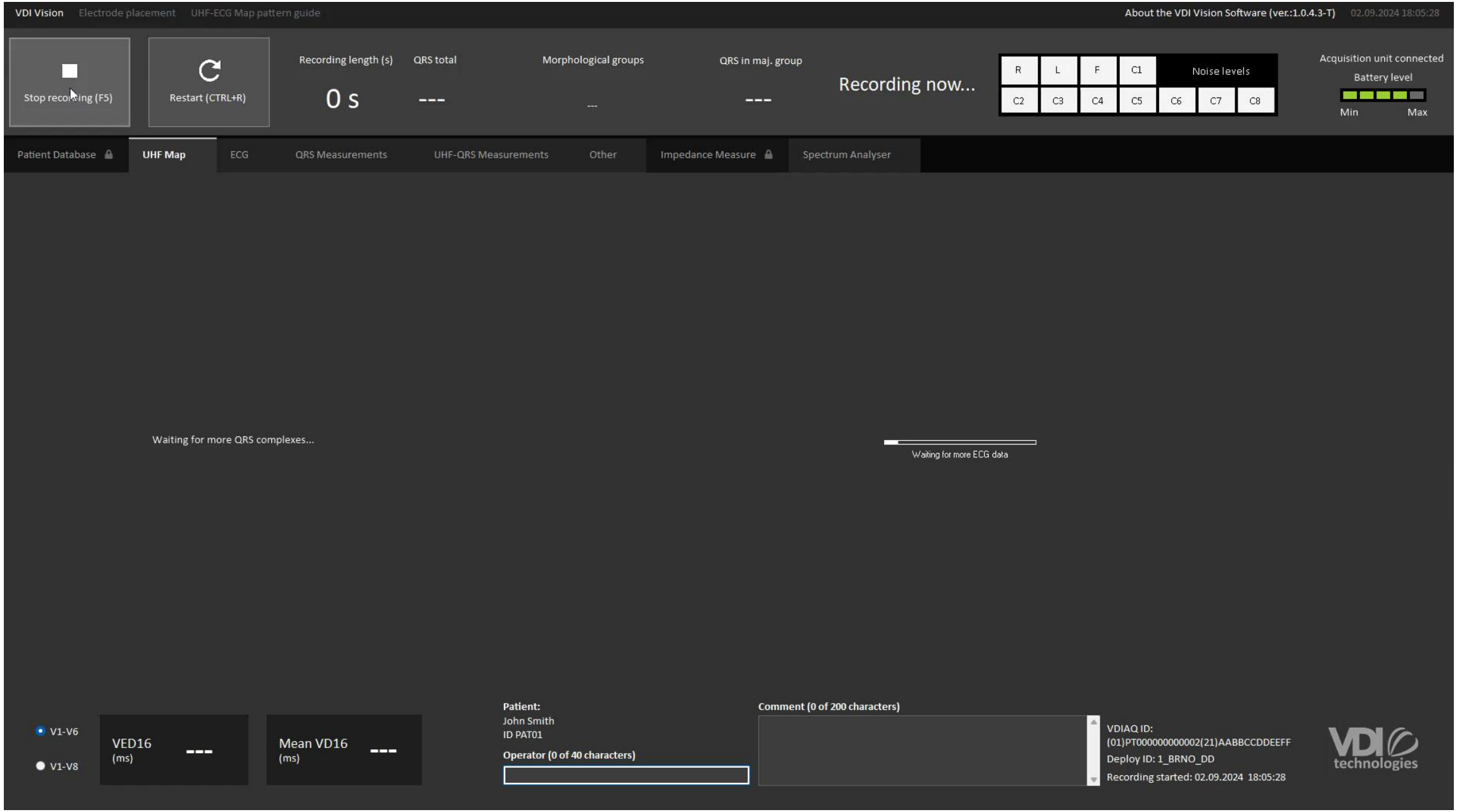
QRSd 154 ms





IVCD = distal LV block




VDI Vision
Electrode placement
UHF-ECG Map pattern guide
About the VDI Vision Software (ver.:1.0.4.3-T)
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Stop recording (F5)
Restart (CTRL+R)
Recording length (s)
0 s
QRS total

Morphological groups

QRS in maj. group

Recording now...
R
L
F
C1
Noise levels
C2
C3
C4
C5
C6
C7
C8
Acquisition unit connected
Battery level
Min
Max
Patient Database
UHF Map
ECG
QRS Measurements
UHF-QRS Measurements
Other
Impedance Measure
Spectrum Analyser
Waiting for more QRS complexes...
Waiting for more ECG data
V1-V6
V1-V8
VED16
(ms)

Mean VD16
(ms)

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Operator (0 of 40 characters)
Comment (0 of 200 characters)
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Deploy ID: 1_BRNO_DD
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VDI technologies

Závěr

- UHF-ECG efektivně rozlišuje trueLBBB od IVCD

- Má větší přesnost než Straussovy kritéria
- UHF-ECG přesnost 98% vs. 75% u Staussové definice

- Praktické implikace pro CRT:

1/ TrueLBBB budou odpovídat na CRT

2/ Pacienti s trueLBBB můžou být léčení pomocí jiné CRT metody, tj. CSP CRT

3/ IVCD pacienti budou horší responděři než LBBB pacienti

4/ Měli bychom lépe stratifikovat IVCD pacienty na základě jejich dyssynchronie?