



SHG: Klinikum Idar-Oberstein

# ÜÇ- nın müalicəsində „Keçirici sistem stimulyasiyası (HBP və LBBP)“ əsas vaxta hazırdırmı?



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**DGK.**

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**Mübahisəli maraqlar yoxdur.**



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**ESC GUIDELINES**

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# **2021 ESC Guidelines on cardiac pacing and cardiac resynchronization therapy**

**Developed by the Task Force on cardiac pacing and cardiac resynchronization therapy of the European Society of Cardiology (ESC)**

**With the special contribution of the European Heart Rhythm Association (EHRA)**

2021 ESC Guidelines on cardiac pacing and cardiac resynchronization therapy

## Recommendations for cardiac resynchronization therapy in patients in sinus rhythm

Recommendations	Class <sup>a</sup>	Level <sup>b</sup>
<b>LBBB QRS morphology</b>		
CRT is recommended for symptomatic patients with HF in SR with LVEF $\leq 35\%$ , QRS duration $\geq 150$ ms, and LBBB QRS morphology despite OMT, in order to improve symptoms and reduce morbidity and mortality. <sup>37,39,40,254–266,283,284</sup>	<b>I</b>	<b>A</b>
CRT should be considered for symptomatic patients with HF in SR with LVEF $\leq 35\%$ , QRS duration 130–149 ms, and LBBB QRS morphology despite OMT, in order to improve symptoms and reduce morbidity and mortality. <sup>37,39,40,254–266,283,284</sup>	<b>IIa</b>	<b>B</b>
<b>Non-LBBB QRS morphology</b>		
CRT should be considered for symptomatic patients with HF in SR with LVEF $\leq 35\%$ , QRS duration $\geq 150$ ms, and non-LBBB QRS morphology despite OMT, in order to improve symptoms and reduce morbidity. <sup>37,39,40,254–266,283,284</sup>	<b>IIa</b>	<b>B</b>
CRT may be considered for symptomatic patients with HF in SR with LVEF $\leq 35\%$ , QRS duration 130–149 ms, and non-LBBB QRS morphology despite OMT, in order to improve symptoms and reduce morbidity. <sup>273–278,281</sup>	<b>IIb</b>	<b>B</b>
<b>QRS duration</b>		
CRT is not indicated in patients with HF and QRS duration $< 130$ ms without an indication for RV pacing. <sup>264,282</sup>	<b>III</b>	<b>A</b>

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# Klinik t dqiqlarda effektivlik

	Patients Enrolled	Inclusion Criteria	Comparison	Significant Findings
<b>MUSTIC<sup>19</sup></b>	131	LVEF ≤35% LVEDD >60 mm NYHA class III 6-min walk test <450 m QRS >150 ms <b>or</b> Paced QRS >200 & persistent AF	OMT vs OMT + CRT-D <b>or</b> RV pacing in persistent AF vs OMT + CRT-D	Improvement in 6-min walk test Peak VO <sub>2</sub> Quality of life NYHA class
<b>MIRACLE<sup>20</sup></b>	453	LVEF ≤35% LVEDD >55 mm NYHA class III/IV QRS ≥130 ms	OMT vs OMT + CRT-D	Decrease in HF hospitalizations Improvement in 6-min walk test Ejection fraction Mitral regurgitation Quality of life NYHA class
<b>COMPANION<sup>21</sup></b>	1,520	LVEF ≤35% NYHA class III/IV QRS >120 ms	OMT vs OMT + CRT-P vs OMT + CRT-D	Decrease in combined endpoint of hospitalizations or death for CRT-P and CRT-D Decrease in mortality for CRT-D
<b>CARE-HF<sup>22</sup></b>	813	LVEF ≤35% LVEDD >30 NYHA class III/IV QRS ≥150 ms <b>or</b> QRS ≥120 ms and echo dyssynchrony	OMT vs OMT + CRT-P	Decrease in combined endpoint of hospitalizations or death for CRT-P Decrease in mortality for CRT-P
<b>MADIT-CRT<sup>15</sup></b>	1,820	LVEF ≤30 NYHA class I/II QRS ≥150 ms	OMT + ICD vs OMT + CRT-D	Decrease in combined endpoint of hospitalization for HF or death
<b>RAFT<sup>23</sup></b>	1,798	LVEF ≤30 NYHA class II/III QRS ≥120 ms <b>or</b> paced QRS ≥200 ms	OMT + ICD vs OMT + CRT-D	Decrease in death or hospitalization from HF

Jaffe LM, Morin DP. CRT: history, present status, and future directions. *Ochsner J.* 2014;14(4):596-607.

# Klinik tədqiqatlarda effektivlik

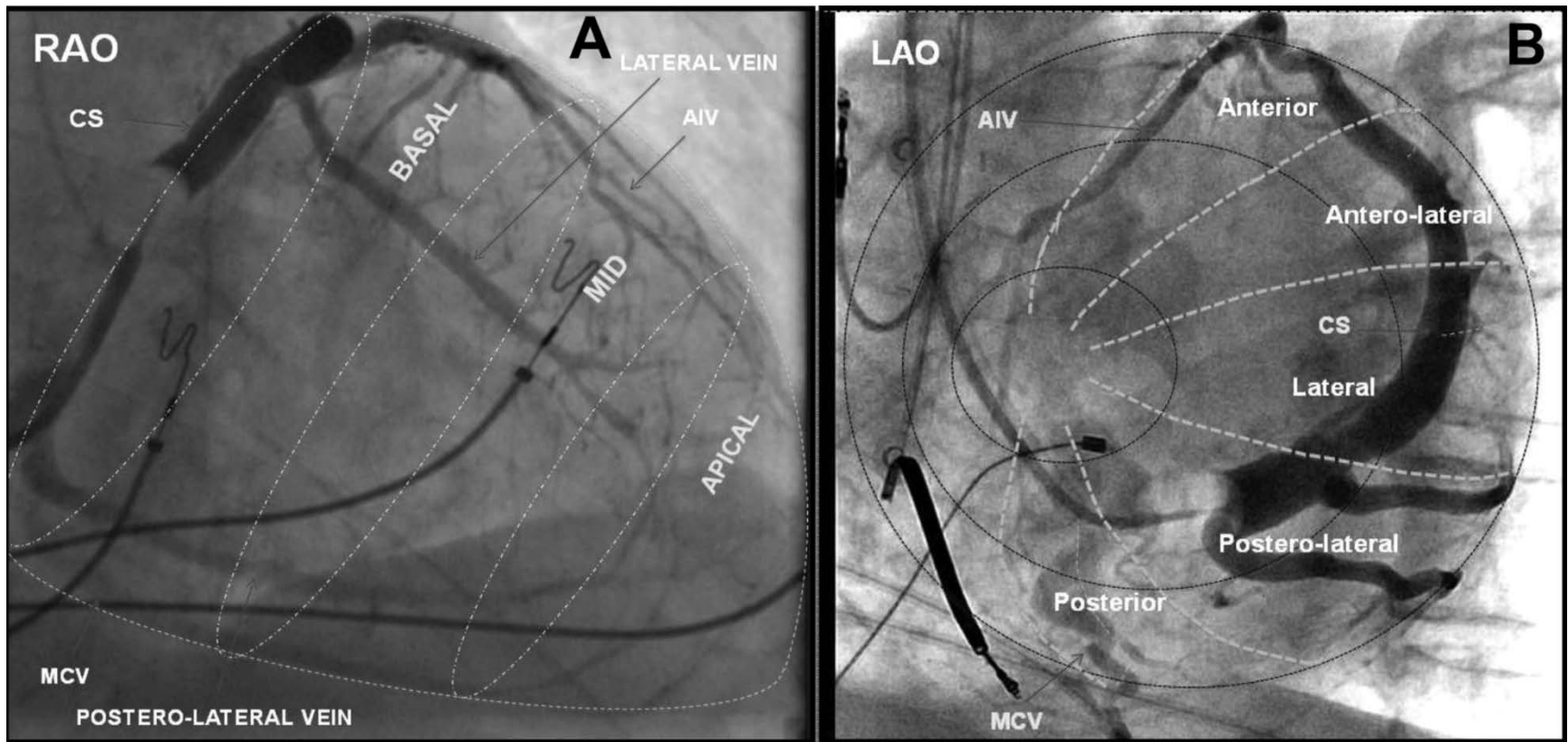
- Mortalitənin azalması (24% - 36%)
- Hospitalisasiyanın azalması (30%)
- 6 dəqiqəlik yürüyüş testində yaxşılaşma (50 - 70 metrə qədər)
- NYHA sinfinin yaxşılaşması
- Həyat keyfiyyətinin yaxşılaşması
- Atım fraksiyasının artması

Jaffe LM, Morin DP. CRT: history, present status, and future directions. *Ochsner J.* 2014;14(4):596-607.

# CRT- yə cavab verməyənlər (non-responders)

- CRT önəmli şəkildə klinik yaxşılaşmaya səbəb olur və sol mədəcik remodelləşməsini geriyyə çevirir; ancaq pasiyentlərin 35–40%-i müalicəyə cavab vermir.
- Kardiyak resinxronizasiya terapiyasının bəzi hallarda uğursuz olması bir çox faktora bağlıdır.
- Uyğun olmayan koronar sinus anatomiyası, diafraqmal sinirinin stimulyasiyası, yüksək enerji sərfiyyatı, və ya leadin qeyri stabil stimulyasiyası, hədəflənən venalara çatmaq problemi və s..

# Koronar sinus anatomiyası

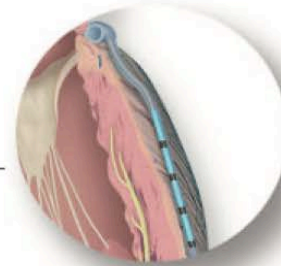




## New in these guidelines



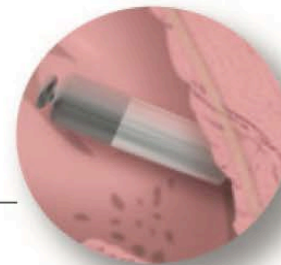
Pacing in TAVI patients



CRT indications



HBP in bradycardia or CRT



Leadless pacing

Preimplant evaluation

Minimizing complication risk

Pacing for bradycardia

Pacing in patients with rare diseases

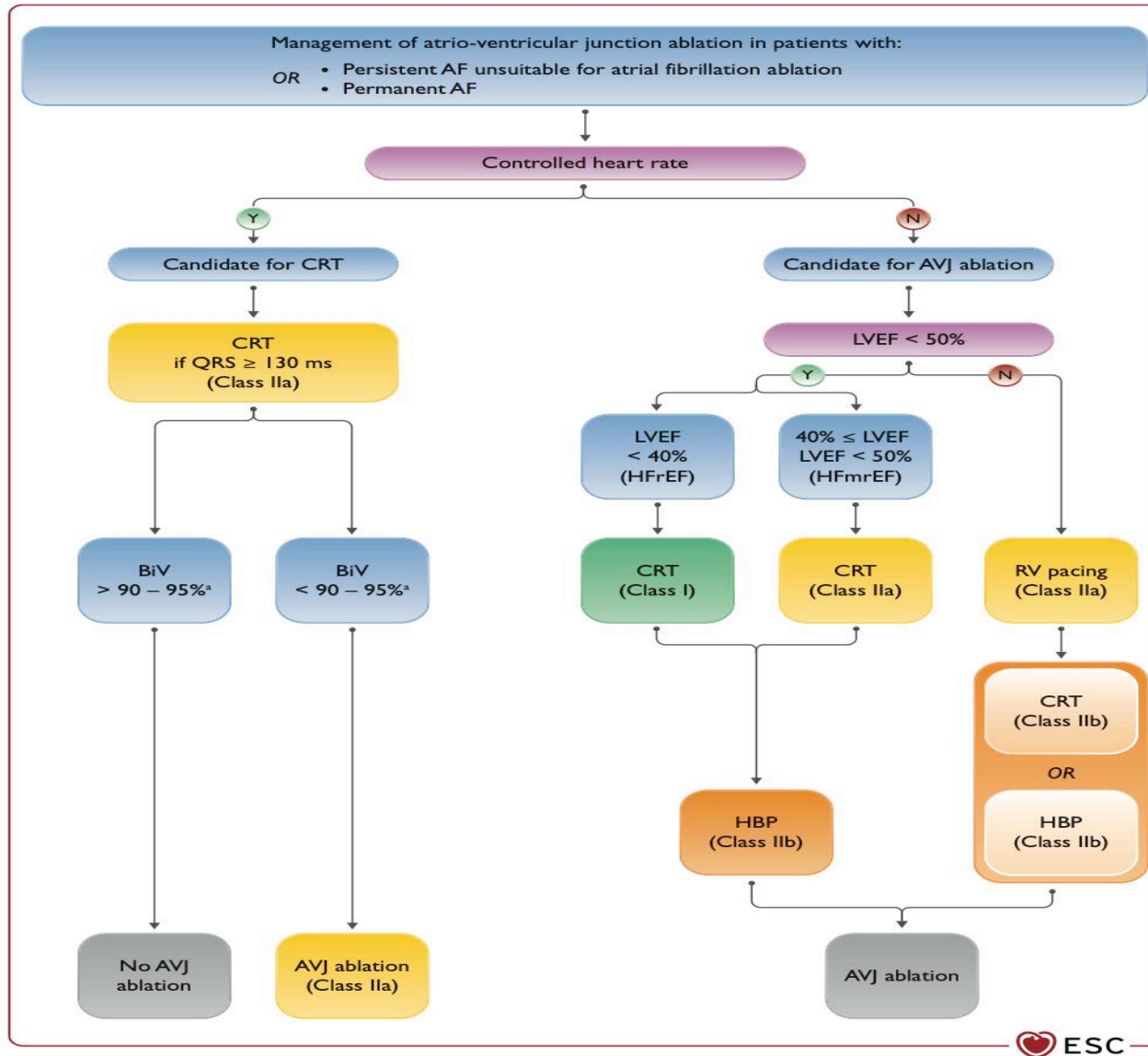
Pacing in patients after cardiac surgery

High risk reflex syncope



2021 ESC Guidelines on cardiac pacing and cardiac resynchronization therapy

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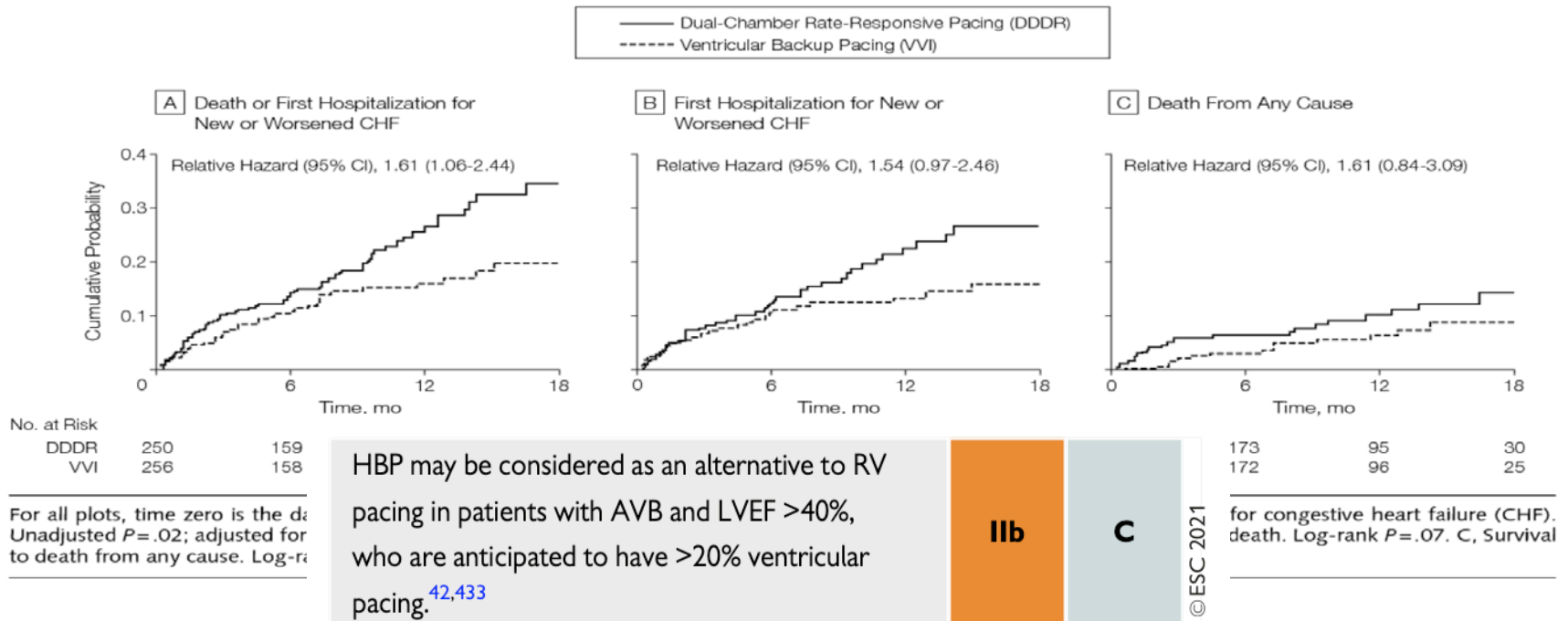
2021 ESC Guidelines on cardiac pacing and cardiac resynchronization therapy

## Recommendations for using His bundle pacing

Recommendations	Class <sup>a</sup>	Level <sup>b</sup>
In patients treated with HBP, device programming tailored to specific requirements of HBP is recommended. <sup>430,431</sup>	<b>I</b>	<b>C</b>
In CRT candidates in whom coronary sinus lead implantation is unsuccessful, HBP should be considered as a treatment option along with other techniques such as surgical epicardial lead. <sup>318,424,440,443</sup>	<b>IIa</b>	<b>B</b>
In patients treated with HBP, implantation of an RV lead used as 'backup' for pacing should be considered in specific situations (e.g. pacemaker dependency, high-grade AVB, infranodal block, high pacing threshold, planned AVJ ablation) or for sensing in the case of issues with detection (e.g. risk of ventricular undersensing or oversensing of atrial/His potentials). <sup>423,426,444</sup>	<b>IIa</b>	<b>C</b>
HBP with a ventricular backup lead may be considered in patients in whom a 'pace-and-ablate' strategy for rapidly conducted supraventricular arrhythmia is indicated, particularly when the intrinsic QRS is narrow. <sup>197,199,200,318</sup>	<b>IIb</b>	<b>C</b>

*Continued*

# RV Pacing



AVB = atrioventricular block; AVJ = atrioventricular junction; CRT = cardiac resynchronization therapy; HBP = His bundle pacing; LVEF = left ventricular ejection fraction; RV = right ventricular.

<sup>a</sup>Class of recommendation.

<sup>b</sup>Level of evidence.

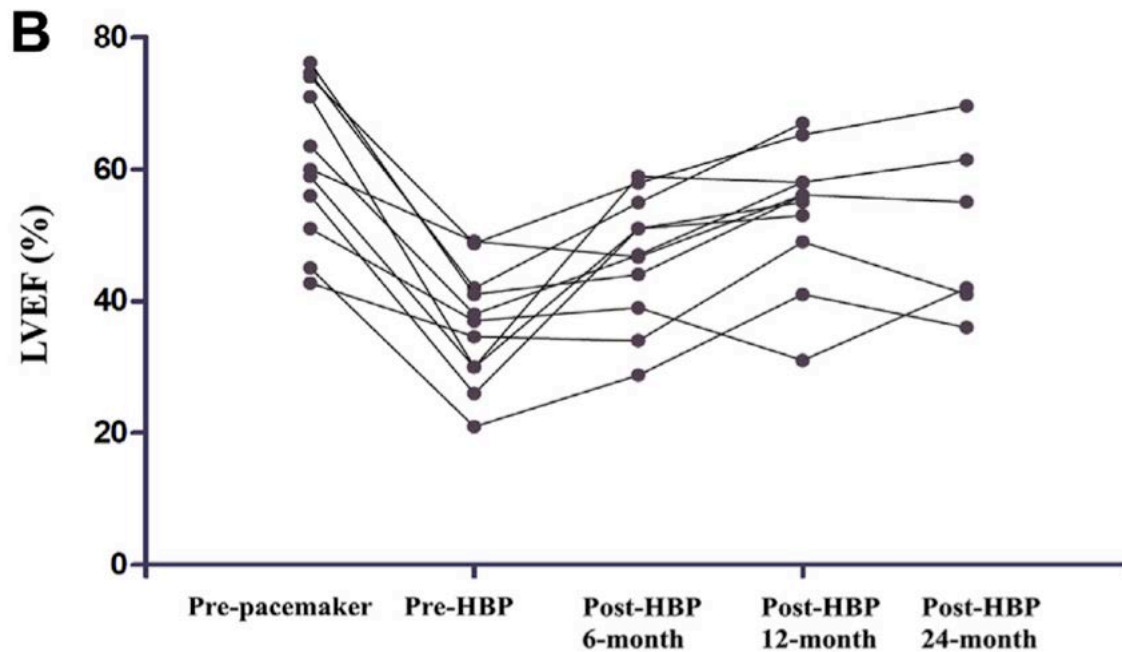
Wilkoff, Bruce L. et al. (DAVID) Trial." *JAMA* 288 24 (2002): 3115-23 .

# Beneficial effects of upgrading to His bundle pacing in chronically paced patients with left ventricular ejection fraction <50

Peiren Shan <sup>1</sup>, Lan Su <sup>2</sup>, Xiaodong Zhou <sup>1</sup>, Shengjie Wu <sup>1</sup>, Lei Xu <sup>1</sup>, Fangyi Xiao <sup>1</sup>, Xiaohong Zhou <sup>3</sup>, Kenneth A Ellenbogen <sup>4</sup>, Weijian Huang <sup>5</sup>

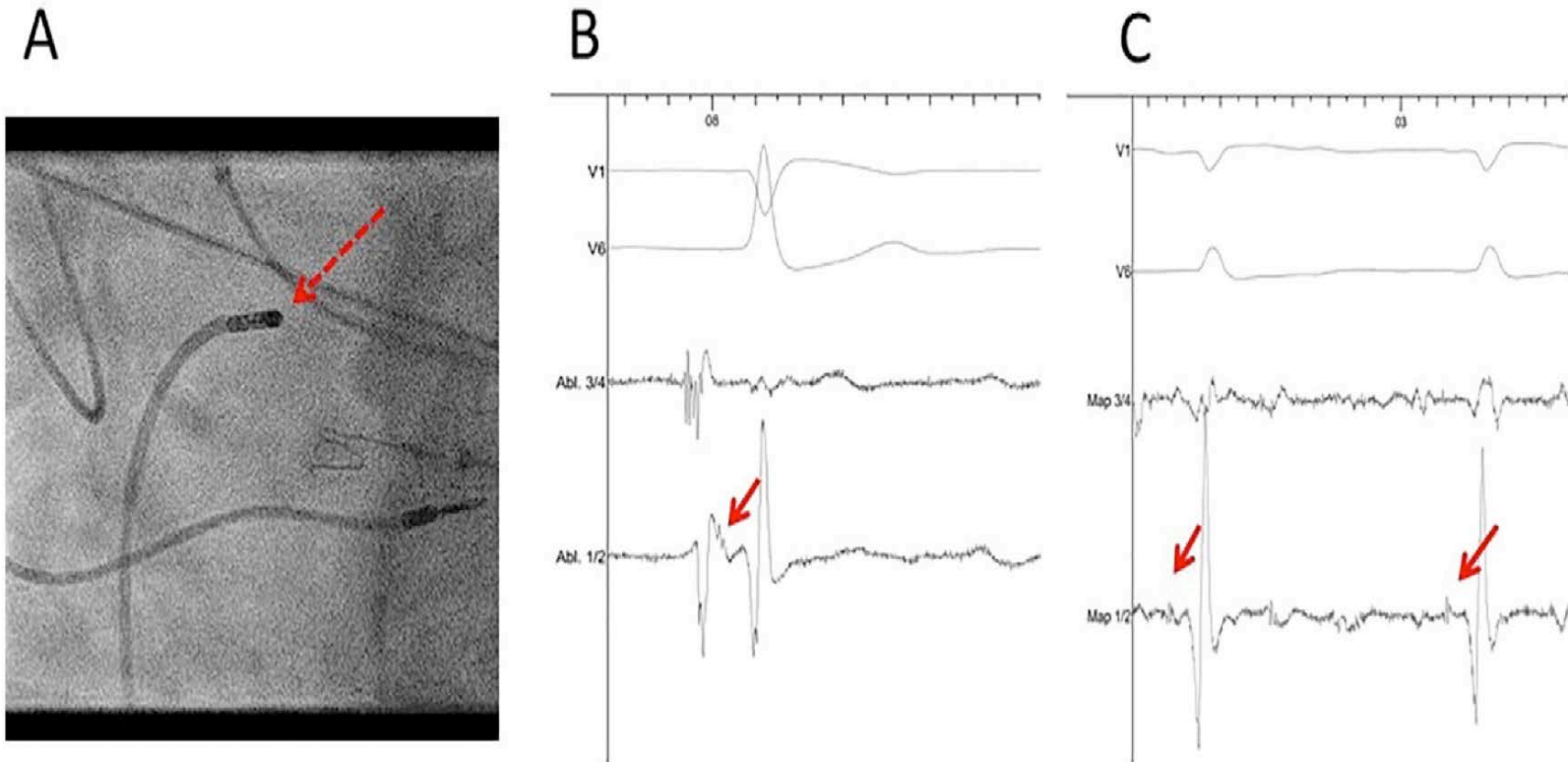
Affiliations + expand

PMID: 29081396 DOI: [10.1016/j.hrthm.2017.10.031](https://doi.org/10.1016/j.hrthm.2017.10.031)



Shan et al. Heart Rhythm 2018;15:405–412)

# Bəsit görünən hallar həmişə sadə olmaya da bilər...



Kaess, B. M., & Ehrlich, J. R. (2017). *International journal of cardiology*, 245, 185–186.

# HBP-in üstünlükləri və çatışmazlıqları

## Advantages

- Increased safety (in case of loss of capture of the HBP lead)
- Can be used for sensing (lower risk of ventricular undersensing, no risk of His or atrial oversensing)
- Programming of pacing output with lower safety margins
- May serve to narrow the QRS with fusion pacing in the case of selective-HBP with uncorrected RBBB

## Disadvantages

- Higher cost
- More transvenous hardware
- Risk associated with the additional lead (e.g. ventricular perforation)
- More complex programming
- “Off-label” use (current regulatory approval and MRI-conditionality for HBP is only granted for His leads connected to the RV port)

HBP = His bundle pacing; MRI = magnetic resonance imaging; RBBB = right bundle branch block.

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# Keçirici Sistem Stimuliyası (CSP)



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of Cardiology

Europace (2023) 25, 1208–1236

<https://doi.org/10.1093/europace/euad043>

**EHRA DOCUMENT**

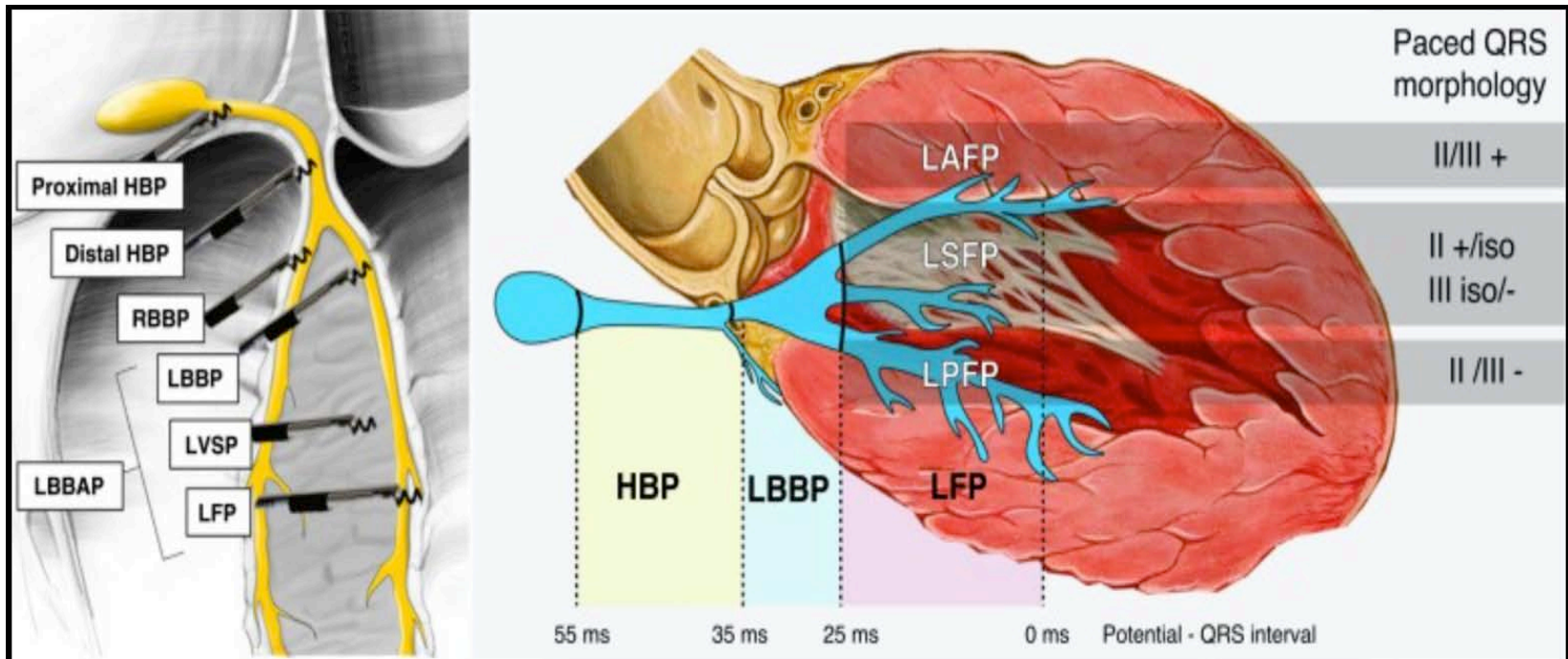
## **EHRA clinical consensus statement on conduction system pacing implantation: endorsed by the Asia Pacific Heart Rhythm Society (APHRS), Canadian Heart Rhythm Society (CHRS), and Latin American Heart Rhythm Society (LAHRS)**

Burri, Haran et al. “EHRA clinical consensus statement on CSP(2023): 1208-1236.

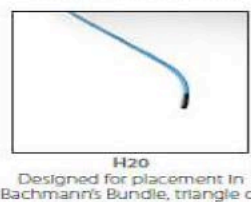
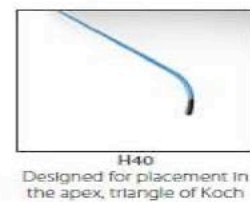
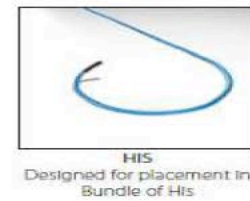
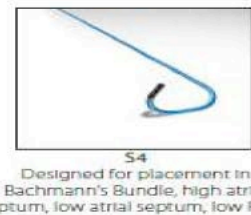
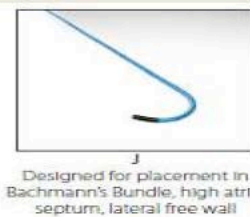
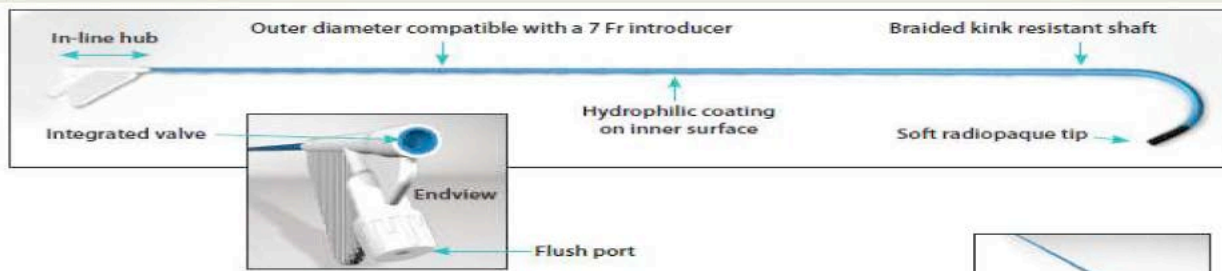
# Keçirici Sistem Stimuliyası

- CSP sağ ventrikulyar stimuliyasına daha fizioloji alternativ olaraq meydana gəlmişdir və seçilmiş klinik hallarda kardiyak resinxronizasiya müalicəsi kimi tətbiq olunmaqdadır
- His dəstəsinin stimuliyası ilk dəfə olaraq 20 il öncə tətbiq olunmuşdur, lakin implantasiyani asanlaşdıran avadanlıqların istifadəyə verilməsindən sonra son 5 ildə tətbiqi daha da genişlənmişdir.
- His dəstəsinin sol ayaqcığının stimuliyası daha yeni bir metod olduğuna baxmayaraq, daha geniş bir hədəf sahəsi və mükəmməl elektriksel parameterlər səbəbi ilə daha sürətlə tətbiq edilməkdədir.

# Keçirici Sistem Stimuliyası



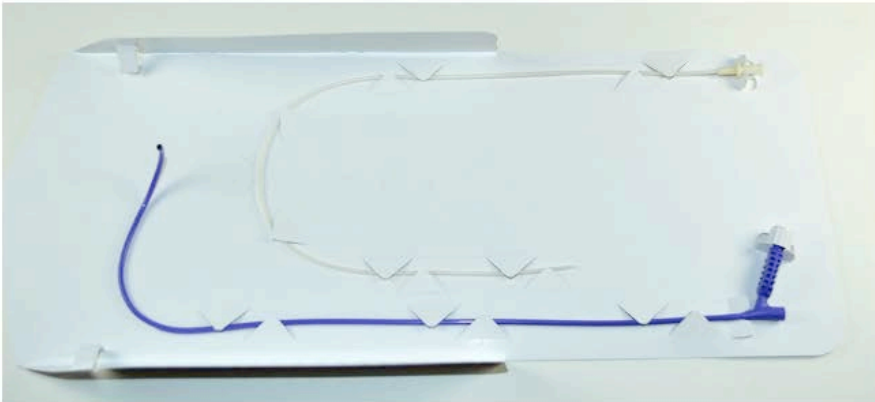
Burri, Haran et al. "EHRA clinical consensus statement on CSP(2023): 1208-1236.



### C315 Delivery Catheter Specifications

<b>Length</b>	20 cm – C315H20, for 49 cm leads or longer 30 cm – C315J, C315S4 and C315S5, for 59 cm leads or longer 40 cm – C315S10 and C315H40, for 69 cm leads or longer 43 cm – C315HIS, for 74 cm leads or longer
<b>Inner diameter</b>	5.4 Fr (1.8 mm)
<b>Outer diameter</b>	7.0 Fr (2.4 mm)
<b>Dilator is compatible with 0.96 mm (0.038 in) guide wire</b>	
<b>SelectSecure® Lead – Models 383049, 383059, 383069, 383074, 3830110</b>	
<b>Polarity</b>	Bipolar
<b>Chamber</b>	Atrium/Ventricle
<b>Fixation</b>	Nonretractable screw-in
<b>Insulation</b>	
Inner insulation:	Silicone (MED-4719)
Redundant inner insulation:	ETFE
Outer insulation:	Polyurethane 55D
<b>Steroid</b>	17.9 µg beclomethasone dipropionate, anhydrous
<b>Lead body diameter</b>	4.1 Fr (1.4 mm)
<b>Helix length</b>	1.8 mm
<b>Tip-to-ring spacing</b>	9 mm
<b>Standard lengths</b>	49, 59, 69, 74, 110 cm
<b>Connector</b>	IS-1B1

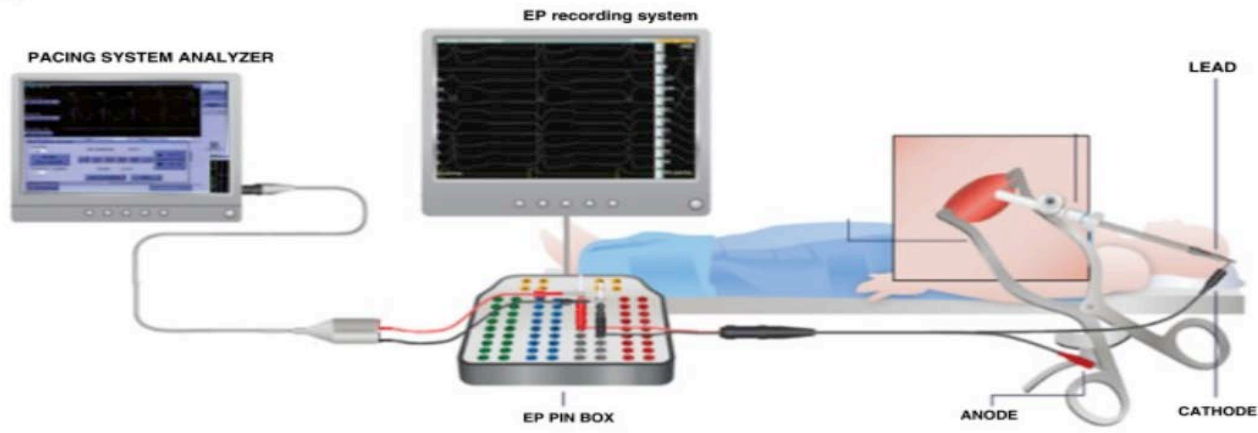
Indications for Use



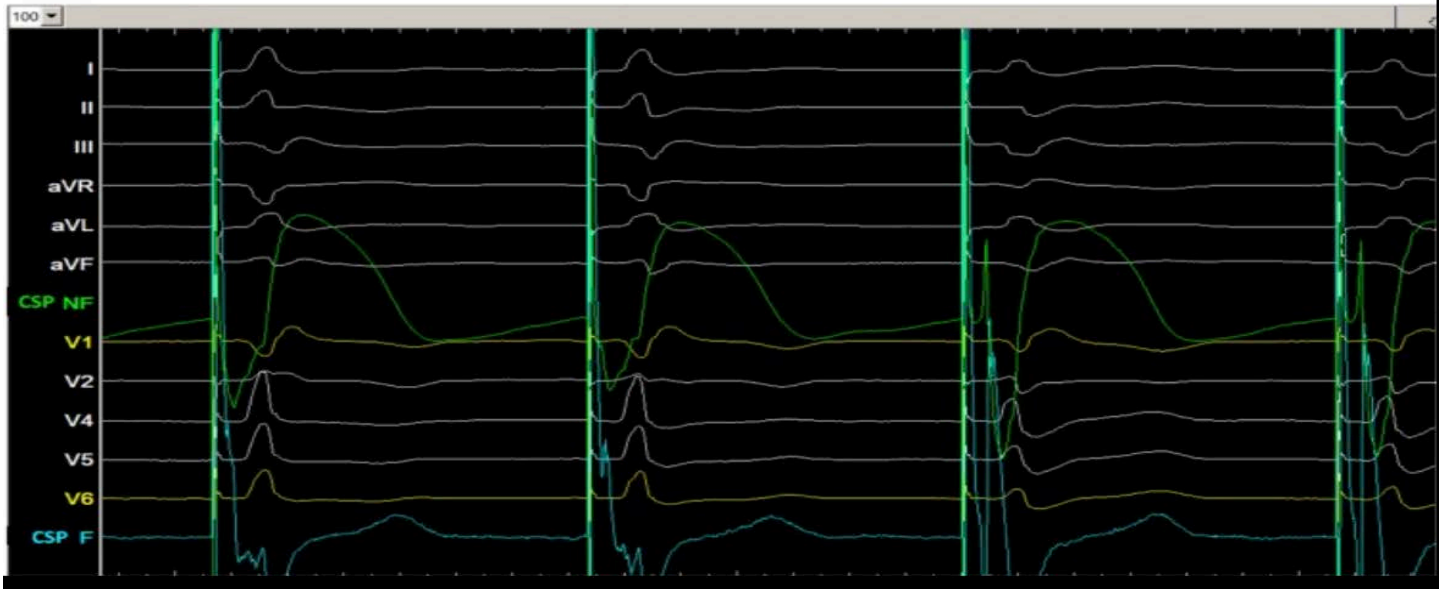
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**A**

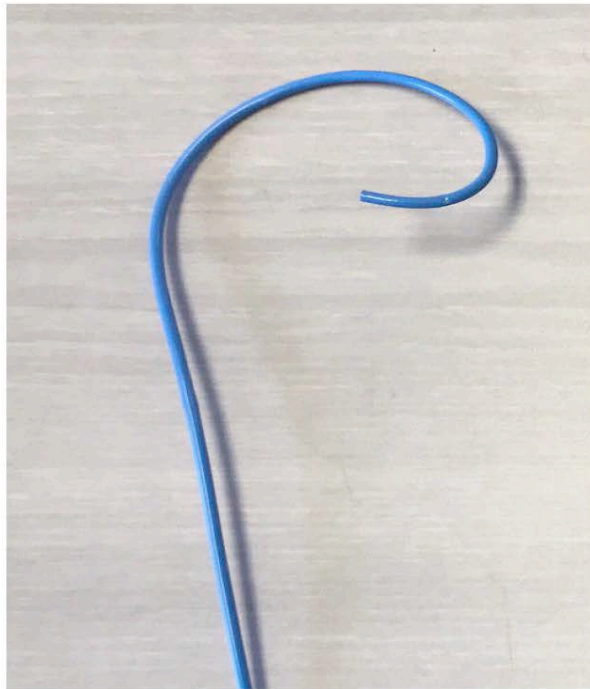


**B**



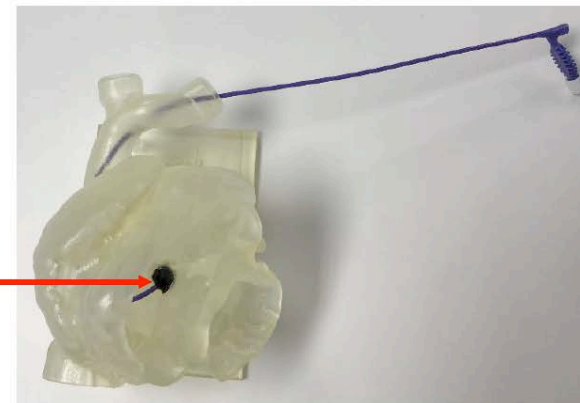
Burri, Haran et al. "EHRA clinical consensus statement on CSP(2023): 1208-1236.

# SSPC 1 Shape



Designed for RA septal wall

- Place tip of the catheter in RV outflow track
- Pull back along the RVOT to AV annulus with counter-clockwise torque
- Map the cardiac electrical signal with pacing lead inside the catheter



## SSPC 2 Multi Purpose Shape



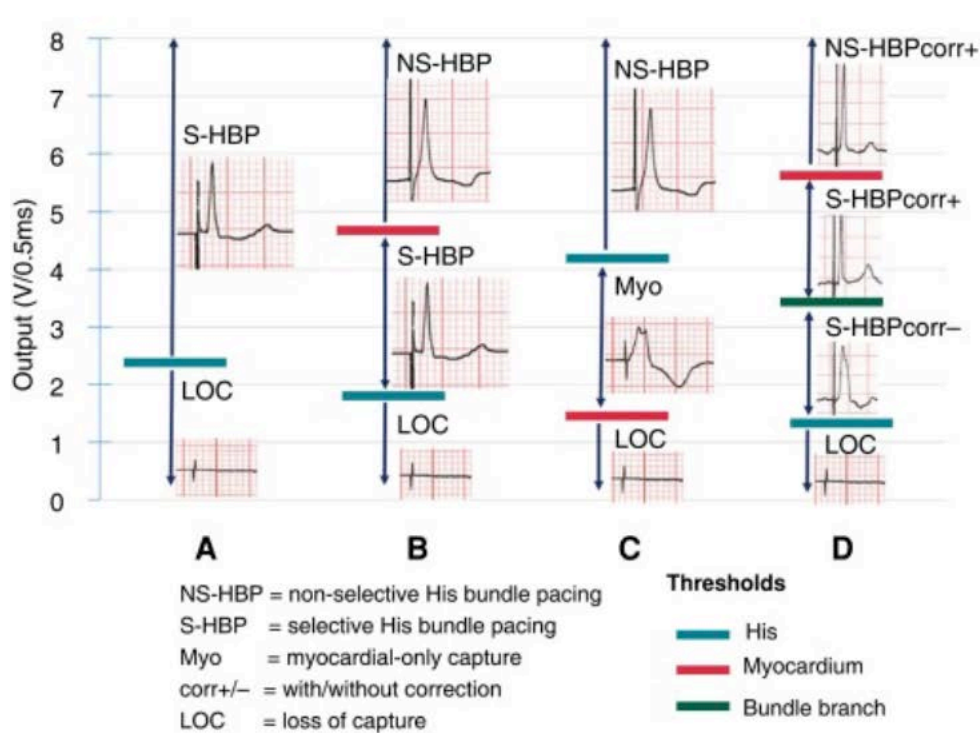
Designed for RA and RV septal locations

- Place tip of the catheter in RV towards septum
- Torque slightly clockwise or counter-clockwise and pull back along the septal wall towards RA
- Map the cardiac electrical signal with pacing lead inside the catheter

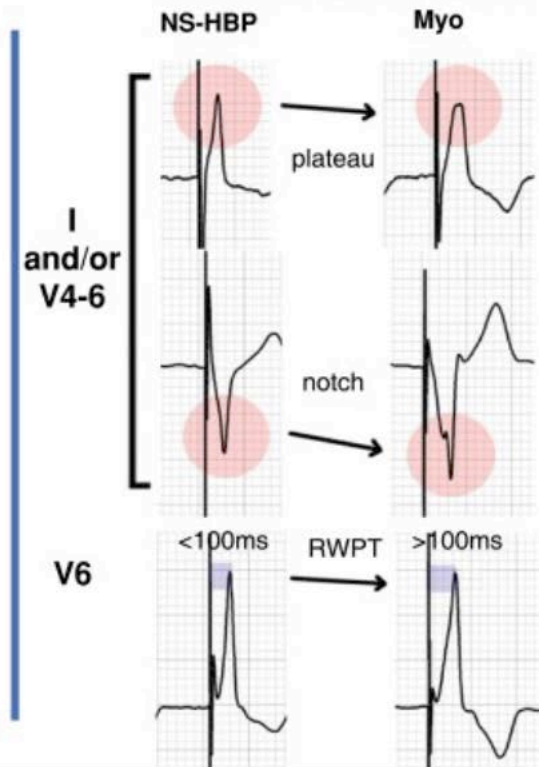


## ECG confirmation of His bundle capture

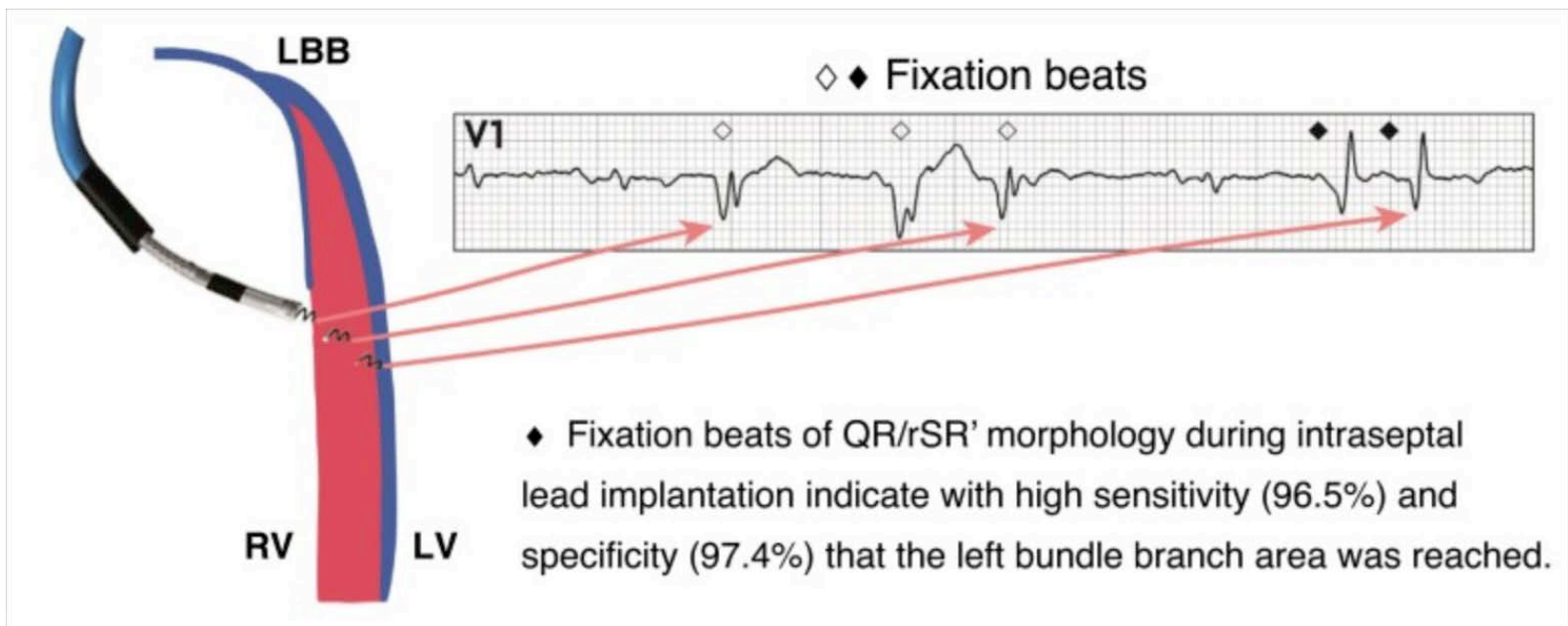
### Transitions in QRS morphology with $\nabla$ pacing output



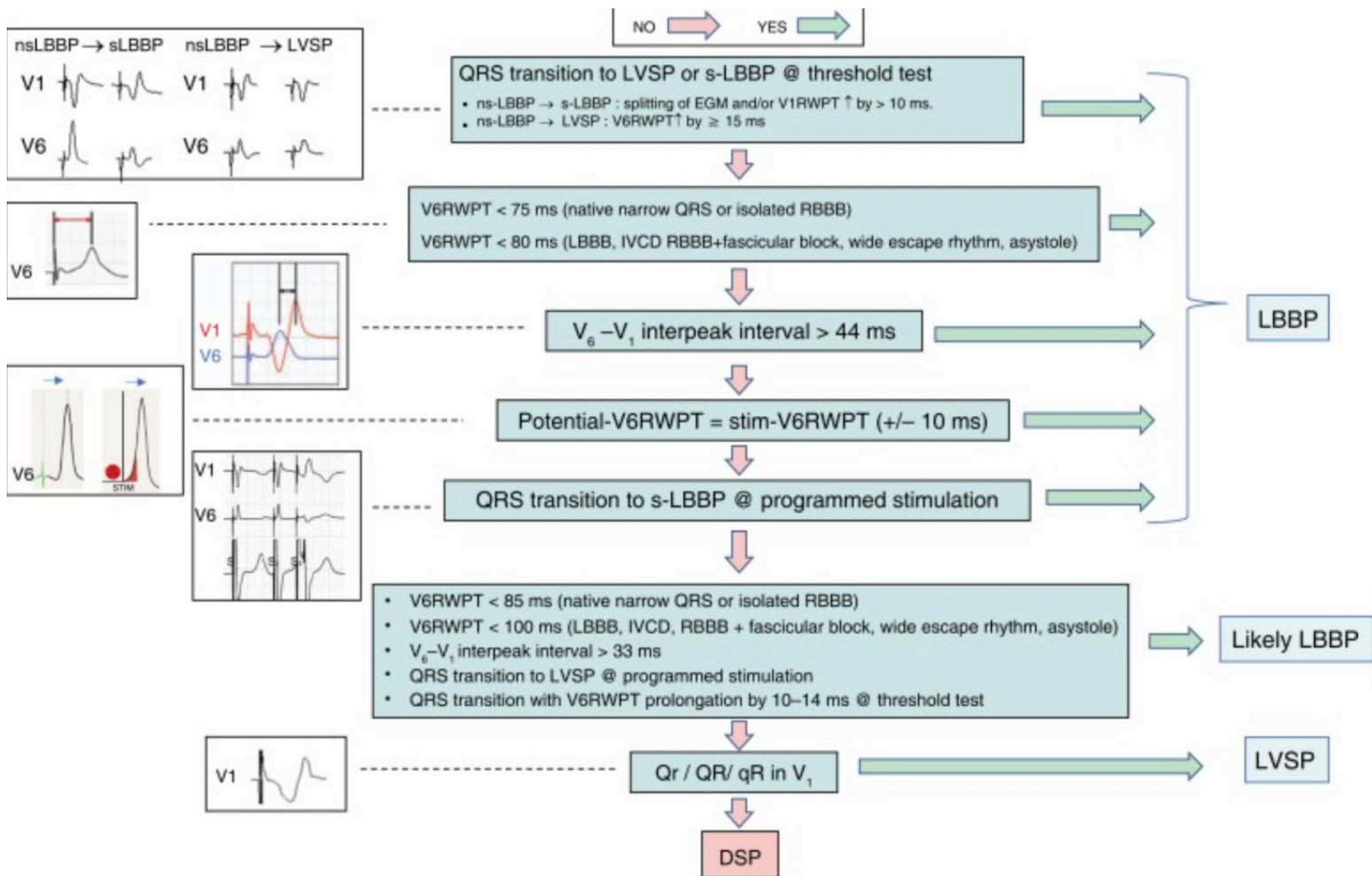
### Morphological features



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Burri, Haran et al. "EHRA clinical consensus statement on CSP(2023): 1208-1236.



Burri, Haran et al. "EHRA clinical consensus statement on CSP(2023): 1208-1236.

# Yekun olaraq...

- ✓ Ənənəvi biventrikulyar stimulyasiya ürək funksiyalarını yaxşılaşdırmaqla bərabər hospitaliyanı və mortalitəni azaldır. Ancaq bəzi hallarda müalicəyə cavab verməmək kimi hallar da izlənilə bilər .
- ✓ Keçirici sistem stimulyasiyası (CSP), HBP və LBBP daxil olmaqla, daha fizioloji alternativ olaraq meydana gəlmişdir və seçilmiş klinik hallarda kardiyak resinxronizasiya müalicəsi kimi tətbiq olunmaqdadır.
- ✓ CSP ventrikulyar stimulyasiya üçün His-Pukinye sistemini aktivləşdirir, ancaq HBP in əməliyyat gedişatına bağlı bəzi məhdudiyyətləri vardır. LBBP isə bu metodla müqayisədə kardiyak resinxronizasiya üçün daha ideal və daha yeni fizioloji stimulyasiya metodudur.
- ✓ Randomizə olunmayan tədqiqatların bəziləri CSP nin BVP lə müqayisədə daha üstün olduğunu sübut etmişdir (daha dar QRS kompleksi, daha yaxşılaşmış NYHA sinifi və LVEF).

# Diqqətinizə görə təşəkkürlər!

