

## Durability of Left Bundle Branch Area Pacing – Long-Term Follow Up on a New Technique

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# Durability of Left Bundle Branch Area Pacing – Long-Term Follow Up on a New Technique

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## Background

Left bundle branch area pacing (LBBAP) is a form of physiologic pacing used as an alternative to His bundle pacing. Long term data post device implantation has not been well described.

## Methods

- 30 patients (17 females) who received LBBAP using the SelectSecure 3830 (Medtronic, MN) for bradycardia or heart failure indications were retrospectively evaluated.
- Capture of the left bundle system guided by fluoroscopy was determined by paced RBBB QRS morphology, presence of a left bundle branch potential, and stim-peak LV activation time <75 ms.
- The QRS duration, pacing thresholds and impedances were obtained at implant, and at regular follow-up.

## Results

- Baseline characteristics are outlined in Table 1.
- Mean age of patients was 76.4 ± 9.9 yrs, mean LVEF was 58.6 ± 12.6%.
- Indications for pacing were AV block 63%, sinus node dysfunction (SND) 23%, AV node ablation 7% and bail out CRT 7%.
- Average procedure time was 76.9 minutes.
- Change in QRS duration and pacing thresholds are outlined in Tables 2(a) and 2(b) respectively.
- Patients with LBBB showed maximum benefit with QRS narrowing by 42 ms, and threshold rising by 23% over 12 months.
- Pacing impedance was relatively unchanged.
- None of the patients experienced short- or long-term procedural complications.

Table 1 Baseline Characteristics

	n=30		n=30
Age	76.4 ± 9.9 yrs	Ejection Fraction	58.6 ± 12.6%
Female % (n)	57% (17/30)	Procedural time	76.9 ± 24.8 mins
Coronary Artery Disease (n)	30% (9/30)	QRS Morphology	
Hypertension (n)	83.3% (25/30)	LBBB (n)	23% (7/30)
Diabetes Mellitus (n)	26.7% (8/30)	RBBB (n)	33% (10/30)
Indications for pacing		Normal QRS (n)	44% (13/30)
Atrioventricular Block	63% (19/30)	Baseline QRS	136 ± 38 ms
Sinus Node Dysfunction	23% (7/30)	Paced QRS	136 ± 28 ms
AV node ablation	7% (2/30)	R wave amplitude	12.46 mV
Bail-out CRT	7% (2/30)	s-LVAT	68.4 ± 16.5 ms

Table 2(a) Change in QRS before and after LBBAP

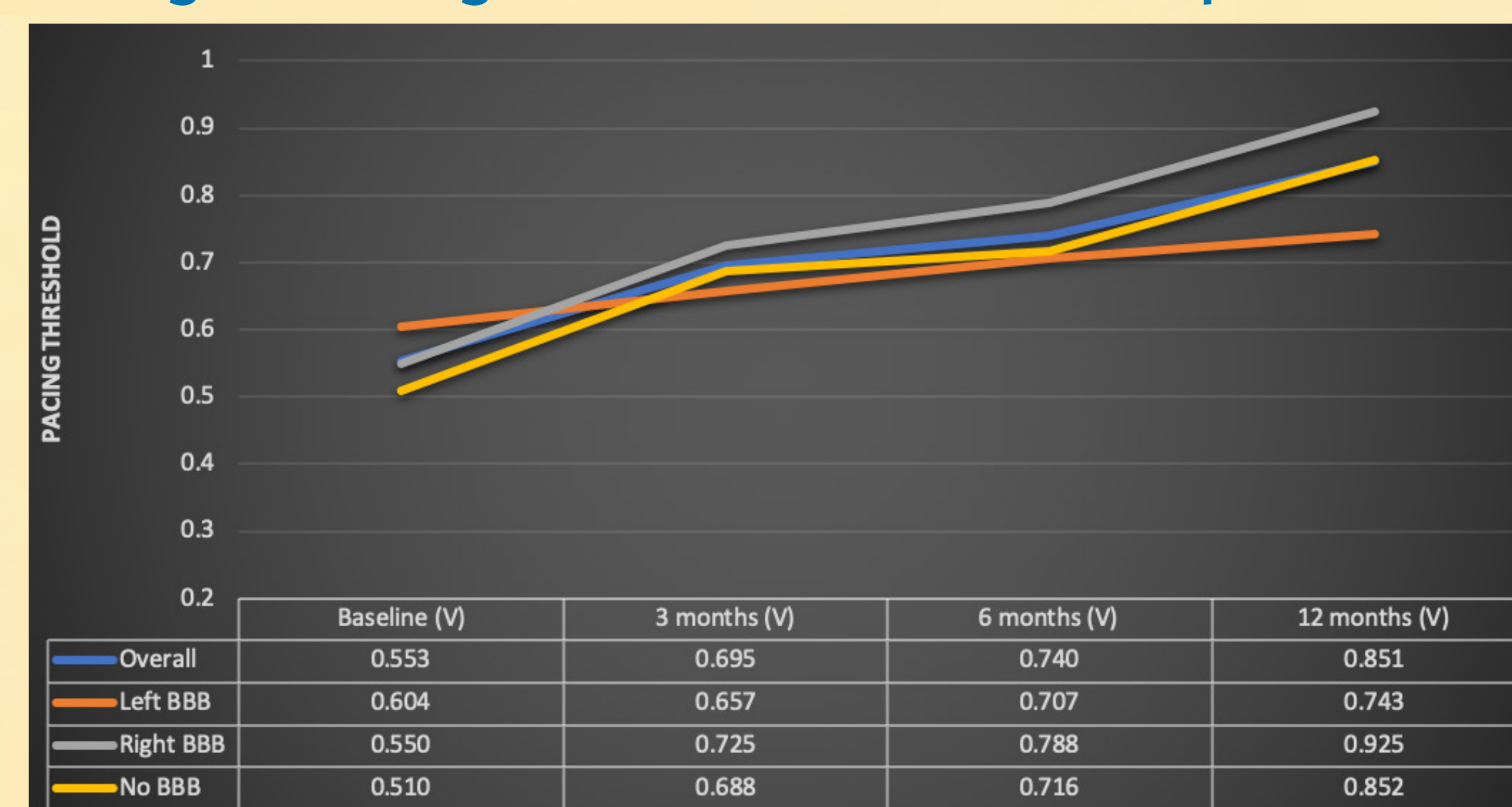
	Baseline QRS	Paced QRS	Net change
Overall (n=30)	136 ± 38 ms	136 ± 28 ms	+ 0 ms
Left BBB (n=7)	158 ± 30 ms	116 ± 13 ms	- 42 ms
Right BBB (n=10)	156 ± 35 ms	157 ± 31 ms	+ 1 ms
No BBB (n=13)	101 ± 12 ms	128 ± 19 ms	+ 27 ms

Table 2(b) Change in Pacing Thresholds at 3, 6, and 12 Months

	Baseline* (V)	3 months* (V)	6 months* (V)	12 months* (V)
Overall (n=30)	0.553 ± 0.119	0.695 ± 0.198 (+26%)	0.740 ± 0.236 (+34%)	0.851 ± 0.330 (+54%)
Left BBB (n=7)	0.604 ± 0.107	0.657 ± 0.174 (+9%)	0.707 ± 0.185 (+17%)	0.743 ± 0.135 (+23%)
Right BBB (n=10)	0.550 ± 0.083	0.725 ± 0.192 (+32%)	0.788 ± 0.210 (+43%)	0.925 ± 0.317 (+68%)
No BBB (n=13)	0.510 ± 0.130	0.688 ± 0.219 (+35%)	0.716 ± 0.277 (+40%)	0.852 ± 0.319 (+67%)

\*At Pulse Width 0.4 ms.

Change in Pacing Threshold Post Device Implantation



## Discussion

- This is the first study looking at the long-term durability of LBBAP up to 12 months from device implantation in the real-world setting.
- We did observe a rise in capture thresholds with LBBAP. However, unlike His-bundle pacing, the magnitude of rise appeared to be minimal with thresholds remaining <1.5V in all patients up to 12 months of follow up. As the target site for pacing is distal to the His-bundle, it goes beyond the fibrous insulation and raises questions on lead maturation and the impact of local tissue healing.
- Impedance measurements and paced R wave amplitudes remained stable despite changes in the pacing threshold, indicating lead stability by virtue of being deeper in the interventricular septum.
- As anticipated, narrowing of the QRS was best achieved in patients with preexisting LBBB due to capture of the left bundle branch conduction system.

## Conclusion

- LBBAP is an effective and safe form of physiologic pacing.
- Pacing thresholds remain relatively stable up to 12 months post device implantation.
- Patients with left BBB appear to show the best outcomes.

### DISCLOSURE INFORMATION

None of the authors have any significant disclosures or conflicts of interest.  
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Babak Bozorgnia – No disclosures  
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