CZECH CARDIOVASCULAR RESEARCH AND INNOVATION DAYS 2022

November 28-29, 2022

Left bundle branch pacing of proximal left bundle branch and septal fascicle produces more physiological activation compared to pacing of the anterior fascicle

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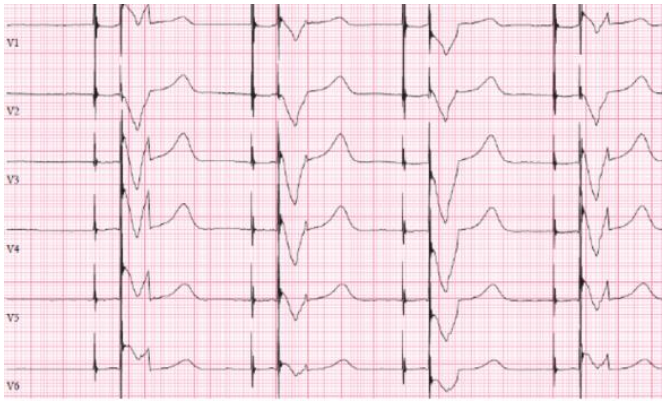
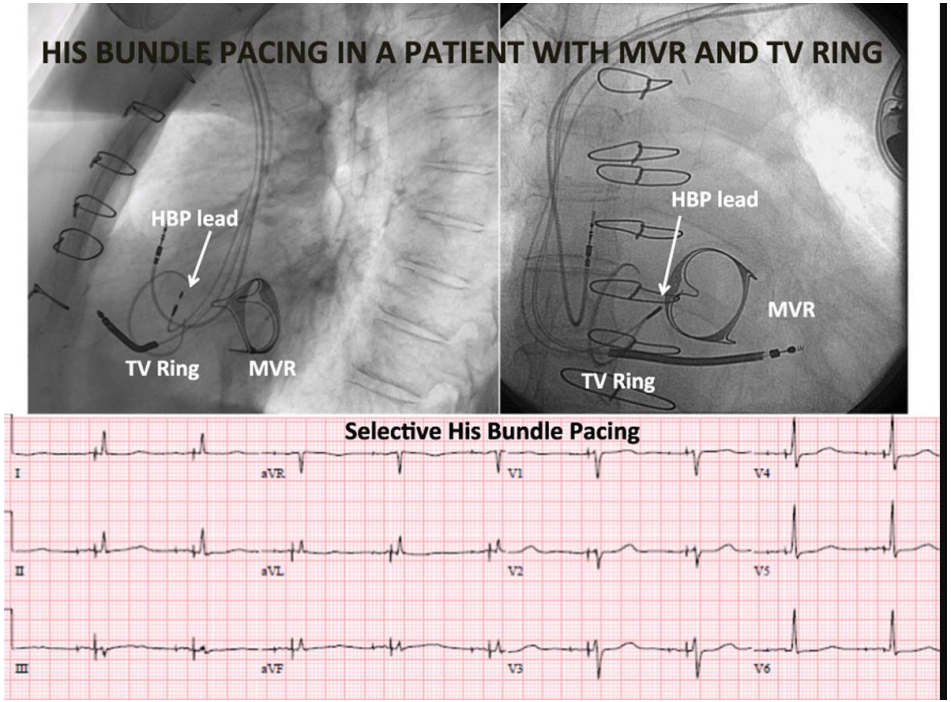
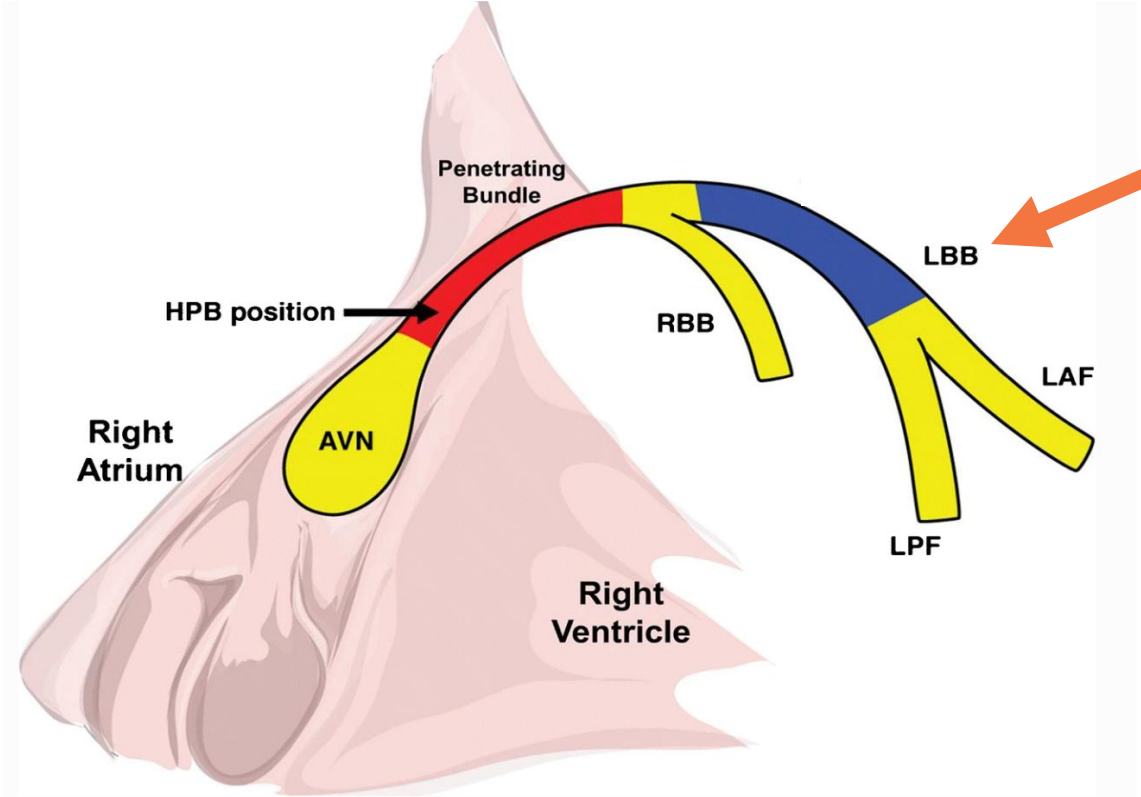
„…**6–22%** of all patients undergoing PPM implantation fulfil the criteria for pacemaker-induced cardiomyopathy within 3–16 years.“ –
Mizner, et al, Arrhythmia and Electrophysilogy Review, 2022



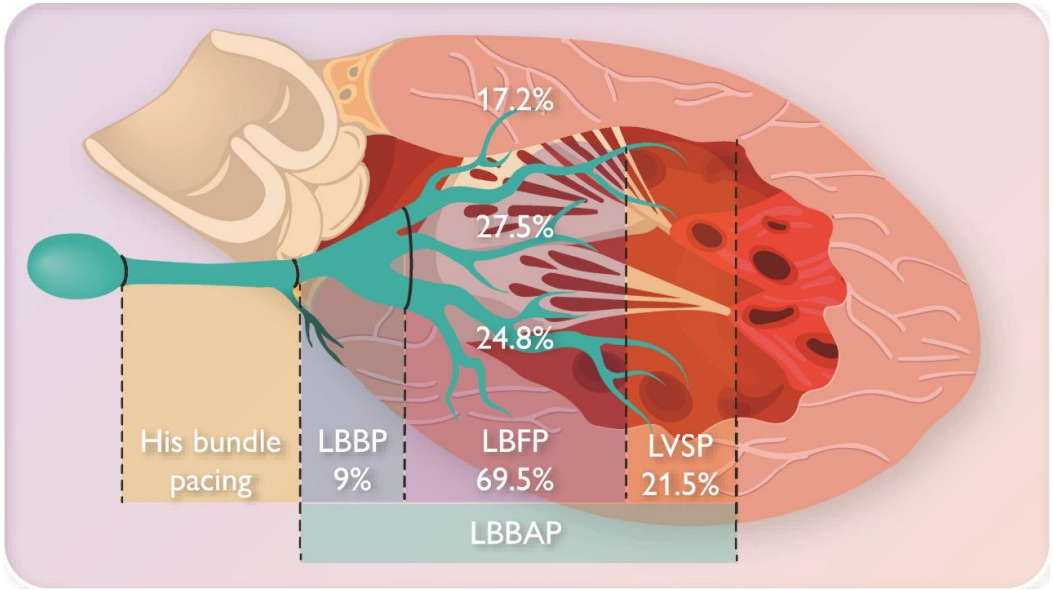


Parikshit S. Sharma, Heart Rhythm 2017


Penetrating
Bundle
HPB position
RBB
LBB
LAF
LPF
AVN
Right
Atrium
Right
Ventricle

Huang, 2019

Location of non-selective LBB pacing – real world data



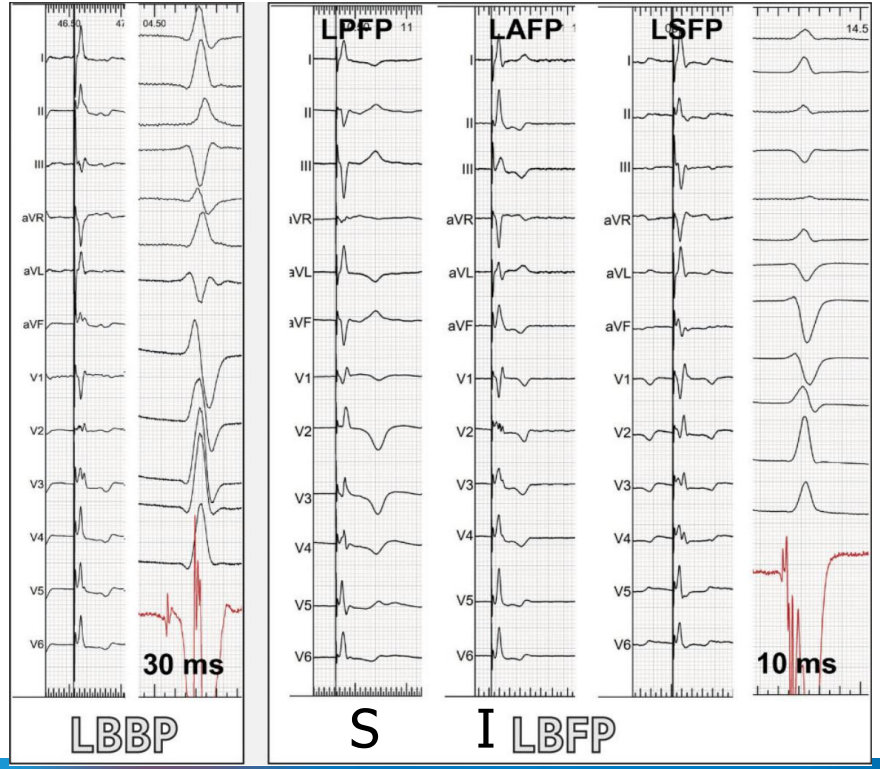
JASTRZĘBSKI et al. European Heart Journal 2022

Proximal left bundle branch (LBBP):
LBB potential to ventricle 25-35ms

Left bundle fascicular pacing (LBFP):
LBBpo-V < 25ms

- Anterior fascicle = inferior axis
- Septal fascicle = normal axis
- Posterior fascicle = superior axis

Location of non-selective LBB pacing



JASTRZĘBSKI et al. European Heart Journal 2022

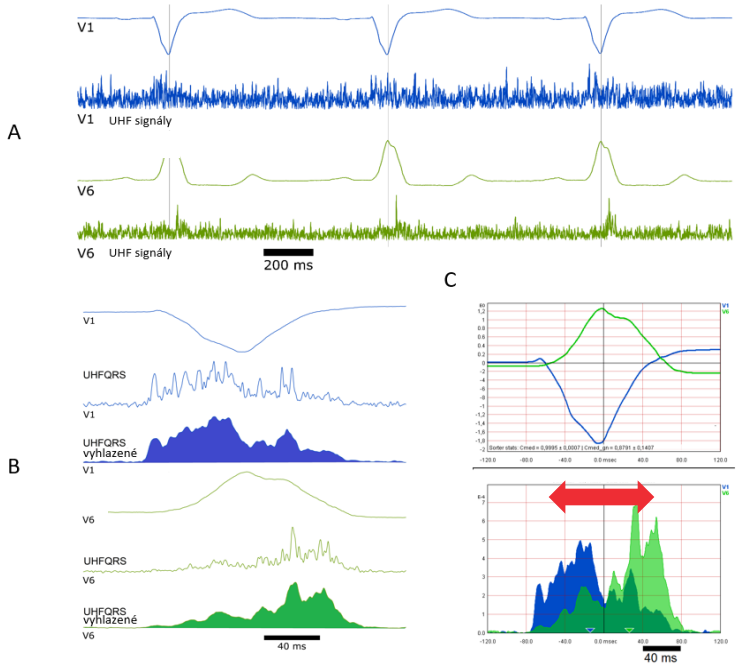
Dyssynchrony assessment:

- QRS duration
- left ventricular activation time (V6RWPT)
- UHF-ECG

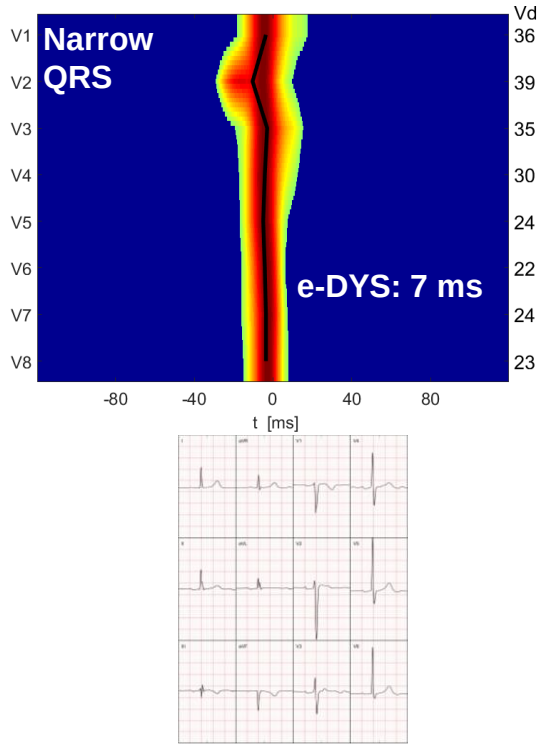
V6RWPT 88ms

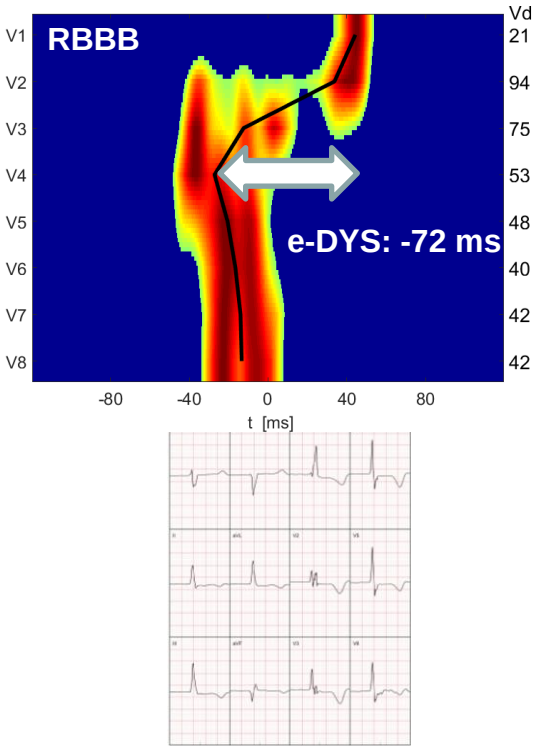
Ultra-high-frequency ECG (UHF-ECG)

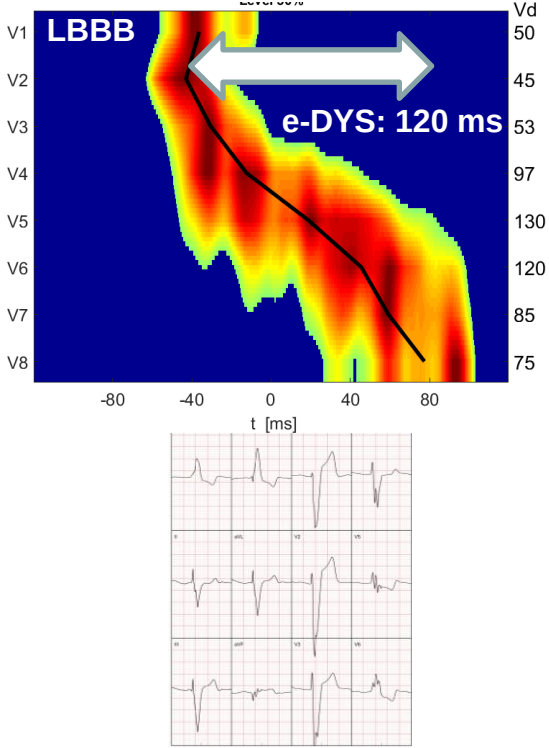
- Collects high-frequency signals from phase 0 of myocytes action potentials
- They attenuate with the square distance
- The frequency passband used by UHF-ECG is 100-1000 Hz
- Uses standard chest leads
- Fast data acquisition, calculation, and live, on-place visualization of dyssynchrony



Ultra high-frequency ECG - examples

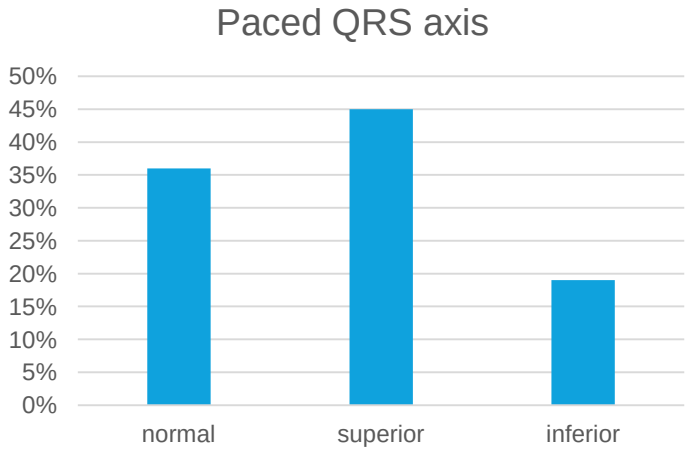


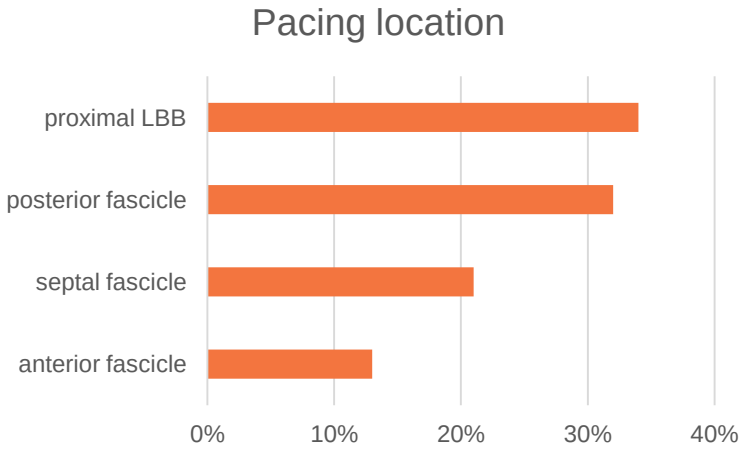




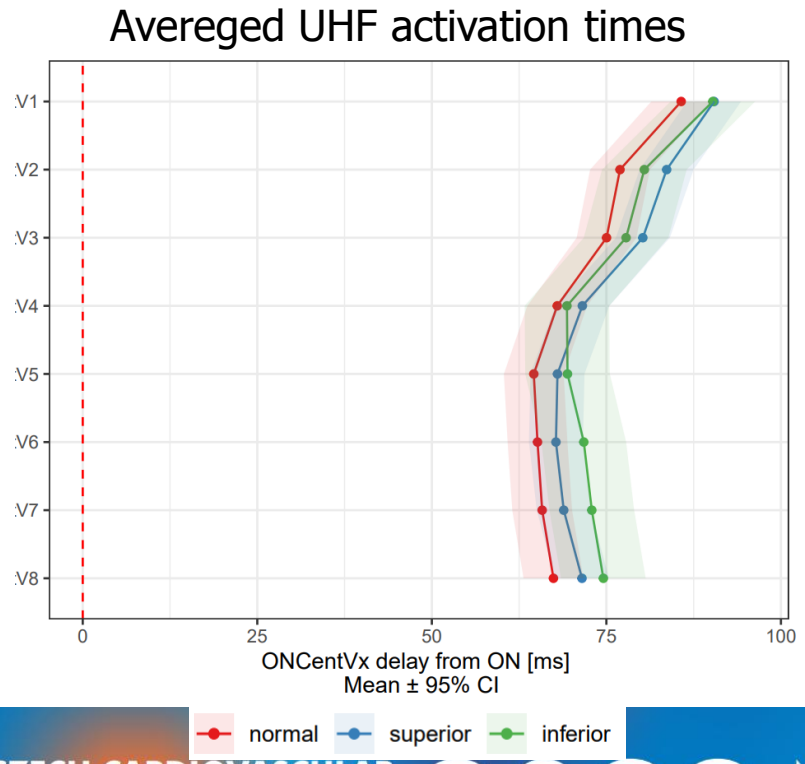
Methods

- 76 UHF-ECG recordings
- Only bradycardia indications included
- 54% narrow QRS, 9% LBBB, 26% RBBB, 11% IVCD





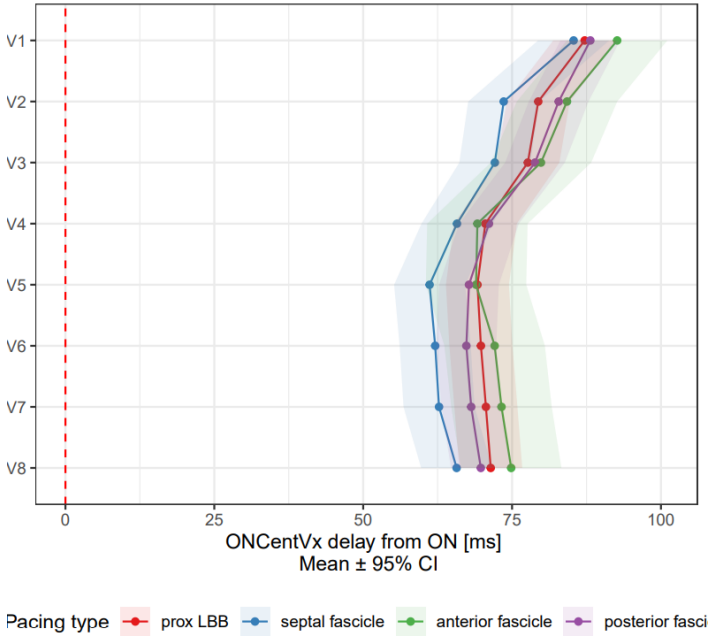
Results according to paced frontal QRS axis



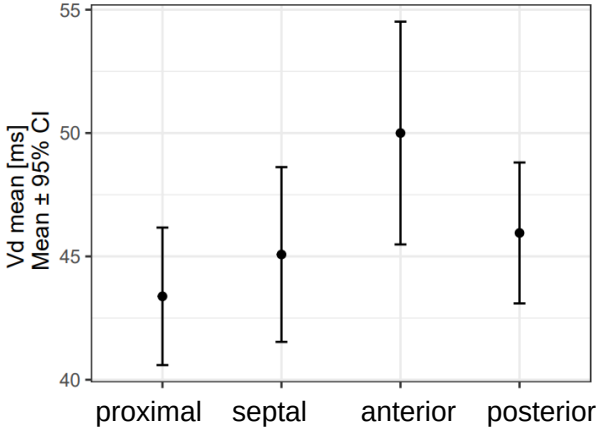
QRSd, E-DYS, Vd mean, V6RWPT - **no difference**

Results according to level of LBB capture

Averaged UHF activation times



Averaged local depolarisation durations



QRSd, V6RWPT– **no difference**

pacing_type	fit	se	lower	upper
prox LBB	43.4	1.4	40.6	46.2
septal fascicle	45.1	1.8	41.5	48.6
anterior fascicle	50.0	2.3	45.5	54.5
posterior fascicle	45.9	1.4	43.1	48.8

p< 0.015

Conclusions

- LBBP is in our experience also dominantly fascicular capture
- No difference in ventricular synchrony was observed between nsLBBP with different axes
- No difference in ventricular synchrony was observed between nsLBBP of the trunk and fascicles
- LAFP had longer averaged local depolarization duration than proximal LBB capture, its clinical significance is however very likely marginal

Thank you for your attention.