A16.E152
JACC March 9, 2010
Volume 55, issue 10A

CARDIAC FUNCTION AND HEART FAILURE

TRANSVENOUS VAGUS NERVE STIMULATION: A POTENTIAL HEART FAILURE THERAPY IS FEASIBLE IN HUMANS

ACC Oral Contributions
Georgia World Congress Center, Room B408
Monday, March 15, 2010, 4:45 p.m.-5:00 p.m.

Session Title: Novel Electrical Stimulation Therapies in Heart Failure
Abstract Category: Myocardial Function/Heart Failure--Clinical Nonpharmacological Treatment
Presentation Number: 0913-04

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Background: Vagus Nerve Stimulation (VNS) has shown promising results for heart failure therapy. Current practice for VNS involves surgical dissection of the cervical vagus nerve. Transvenous stimulation near the vagus nerve might be less traumatic.

Methods: We evaluated the acute feasibility and safety of cervical VNS from the internal jugular vein (IJV) in patients (N=30) indicated for electrophysiology (EP) study. A decapolar EP catheter was positioned at various cervical levels in the IJV from the femoral (n=26) and left subclavian veins (n=4). Successful VNS was confirmed with laryngeal vibration (LVib) (innervation via recurrent laryngeal nerve). VNS thresholds were tested at 20Hz and 500µs, at various current amplitudes for 15-20 seconds. Side effects of skeletal muscle stimulation or pain were noted.

Results: LVib was produced in all patients. The average threshold for LVib (1.4 ± 1.0 mA) was significantly lower than for side effects (2.8 ± 2.0 mA, p<0.0001). VNS at the level of the 3rd cervical vertebra (C3) produced LVib without side effects in the most subjects (n=13). Location C2 had the lowest average threshold for LVib (0.97 ± 0.4 mA). Thresholds were significantly higher at locations lower down the spine (p <0.0001) but the correlation was weak (r2=0.22). See Figure 1 below.

Conclusions: This data suggests that VNS, at amplitudes necessary for laryngeal vibration, is safe and well-tolerated by transvenous approach from the IJV, and may offer an alternative approach for heart failure therapy.