Abstract—Chronic baroreflex activation therapy (BAT) has demonstrated long-term blood pressure reductions in a resistant hypertensive population using a first generation system. A second generation system, the Barostim neo, has recently shown comparable chronic blood pressure reductions at 6 months while advancing the safety profile of the therapy. Furthermore, data from studies in heart failure patients suggest BAT may be a promising therapy for heart failure. These early successes have led to the initiation of larger-scale, randomized, controlled trials in both disease populations.

I. INTRODUCTION

Baroreflex activation therapy (BAT), a unique treatment for cardiovascular dysfunction, delivers electrical stimulation to the carotid sinus to elicit the intrinsic baroreflex depressor response, thereby normalizing sympatho-vagal balance. Chronic BAT with a first generation system produced significant and durable reductions in blood pressure (BP) in a resistant hypertension (HTN) population.[1] BAT has also been proposed as a therapy for heart failure (HF) because of its multiple cardiovascular benefits.[2] This overview summarizes results from studies with an advanced second generation system for BAT that demonstrate the promise of BAT for both resistant HTN and HF.

II. THE BAROSTIM NEO SYSTEM

The second generation Barostim neo system employs a unilaterally-implanted miniaturized electrode to facilitate a minimally invasive procedure. The disk-shaped electrode is sutured to the right carotid sinus adventitia and the pulse generator is implanted subcutaneously in the ipsilateral pectoral region. The intensity of stimulation is controlled via radiofrequency telemetry from an external, laptop computer-based programming system.

III. RESISTANT HYPERTENSION

Results from a non-randomized, open-label verification study of 30 patients with resistant hypertension conducted in Germany, The Netherlands and Canada demonstrate that, compared to the first generation system, Barostim neo maintained the same chronic anti-hypertensive efficacy while improving the safety profile. Following 6 months of BAT, systolic BP was 26±4.4 mmHg lower than baseline values [3], which was comparable to historical reductions of BP observed with the previous system in the 322 patient Rheos Pivotal Trial.[1] Patients who had previously undergone renal denervation showed equivalent results. Perioperative and long-term safety were improved, with only 3 minor procedural complications that were easily addressed. 97% of patients were event-free long-term.[3]

IV. HEART FAILURE

Evidence of feasibility for BAT in HF patients with reduced ejection fraction (EF) has emerged from the preliminary results of two European studies. In an 8 patient cohort with NYHA class III and EF < 40%, the 6 minute hall walk distances increased by 76±15 m and muscle sympathetic nerve activity was reduced 14±1.1 bursts/min after 3 months of BAT.[4] These improvements occurred with no hypotensive BP effects. In a separate cohort of 5 patients with NYHA class III HF and EF < 35%, chronic BAT significantly lowered NTproBNP by 47±7%. [5]

V. CONCLUSION

Chronic BAT therapy using an advanced second generation system has shown early success. Larger randomized, controlled trials are currently underway to evaluate the potential of this therapy in both resistant HTN and HF with reduced EF.

REFERENCES