Bluewind Medical system safety and performance in treatment of patients diagnosed with overactive bladder (OAB) – amendment to allow extended follow up of the patients

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INTRODUCTION

Overactive bladder (OAB) affects millions of people worldwide with neuromodulation offering a minimally invasive and reversible treatment option for patients who have failed first-line therapy. Multiple neuroanatomical pathways have been described for neuromodulation including the S3 nerve root, pudendal nerve or tibial nerve (1), with limited and preliminary publications on implantable tibial nerve stimulators (2, 3). A novel peripheral neurostimulator device (BlueWind Medical Ltd.) for the treatment of OAB was developed; the implantable device electrically stimulates the tibial nerve at the site just proximally of the medial malleolus. The assumed working mechanism is that it modulates the neuronal afferent signals to the bladder, urinary sphincter and the pelvic floor. The implant is wirelessly powered by an external control unit (ECU) that controls the therapeutic parameters and is worn by the patient during treatment at home. A Physician Programmer is used to remotely set individual stimulation parameters for each patient to optimize therapeutic outcome *(Figure 1)*. Herewith, the long-term safety and performance of the newly developed implantable peripheral neurostimulator, intended for home care use, is being observed for the treatment of patients with OAB.

Figure 1: Surgical procedure
The wireless implantable neurostimulator components including the implant, External Control Unit (ECU) and the Physician Programmer.

METHODS

Thirty-six patients with overactive bladder (OAB) with or without urge incontinence were enrolled in the original pilot study and implanted in a minimally invasive procedure of about 30 min, with an implant that was secured close to the tibial neurovascular bundle approximately 5 cm proximally to the medial malleolus *(Figure 2).* All patients were followed for 6 months. In the present prospective, multi-center extension study, those patients are followed semi-annually for a period of 36 months after the system activation. Three months results in a subgroup of 15 patients were published so far (4).

The endpoints of the study:

1. Incidence of serious adverse events
2. Assessment of the OAB symptoms 36 months post activation as compared to baseline.

Data is being collected via voiding diaries, quality of life questionnaire (OAB-q), and recording of adverse events.

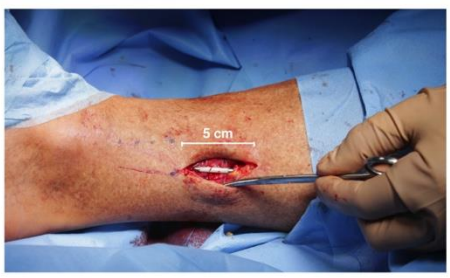


Figure 2: Surgical procedure

RESULTS

Overall, most of the study patients who participated in the original pilot study have agreed to participate in the extended follow up. Up to now, 18 patients have reached either 18 or 24 months follow up (n=13 and n=5, respectively). No SAE were reported so far. Out of 18 patients, 1 patient withdrew after 18 months follow up. Hence, performance analysis was based on 17 patients. Clinical success was defined as ≥50% reduction in the number of leaks/day or number of voids/day or number of episodes with degree of urgency > 2 or a return to <8 voids/day. Twelve out of 17 patients (71%) experienced clinical success as compared to baseline and 2 (12%) have shown between 30-50% improvement as compared to baseline *(Figure 3)*. Clinical improvement was also supported by statistically significant improvements in all quality of life aspects (concern, coping, sleep, and social) and in symptom severity scores *(Figure 4)*. The ITT analysis includes the patients' last observations (17 patients reached 18- or 24-mo follow up visits; and for the other 17 we used their 6 month data). Out of 34 patients, 25 (73.5%) experienced clinical success vs. baseline, and 5 (~15%) shown 30-50% improvement.

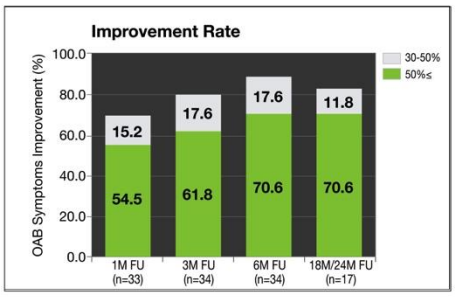


Figure 3: OAB symptoms Improvement.
Comparison of voiding diary data from baseline and follow-up visits 1, 3, 6 and 18/24 months (30-50% and ≥50% improvement in OAB symptoms).

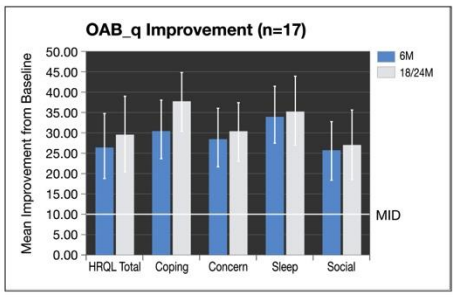
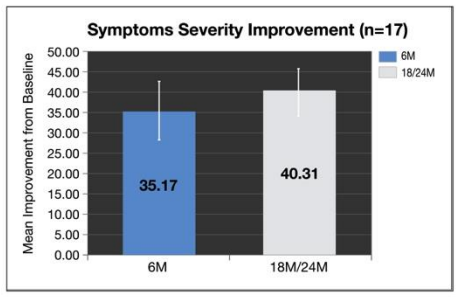


Figure 4:OAB quality of life and symptoms severity improvement
All measures: HRQL total, coping, concern, sleep, social and symptoms severity, demonstrated a statistically significant improvement at each follow-up visit as compared to baseline (Paired t-test, P<0.05). All HRQL subscales displayed an average score greater than the minimally important difference of 10 points (MID; the smallest score change that is perceived beneficial to patients and is often used to determine whether changes in scores are considered clinically significant).



CONCLUSION:

The BlueWind system, a novel minimally invasive tibial implantable neuromodulation system, which offers home based, self-applied treatment, demonstrated high clinical performance in OAB patients, which was maintained throughout the follow up period. This was also supported by improvement in the patients' quality of life where significant improvement was observed at the 6 months follow up visit and maintained through the 18 and 24 months follow-up visits, while keeping a low risk profile.

References:

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