Auricular field nerve stimulation using the NSS-2 Bridge® device as an alternative to opioids following kidney donor surgery

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Introduction: The purpose of this study was to investigate what the role that the NSS-2 BRIDGE® device, an auricular field nerve stimulator, may play in reducing opioid requirement and pain in kidney donor surgery. Electrophysiologic studies have demonstrated that the stimulation of the cranial nerves produced by the NSS-2 BRIDGE® device modulates the ascending/descending spinal pain pathways, especially at the level of the limbic system.

Materials and methods: The design compared the effects of the NSS-2 BRIDGE® device (NSS 2-BRIDGE® device group; n=10) to a control group (n=10). In both groups, the surgery was performed using the same standard Enhanced Recovery after Surgery (ERAS) protocol based on the use of a multimodal analgesic approach. For the active treatment group, the NSS-2 BRIDGE® device was placed in the post anesthesia care unit. The primary endpoint was opioid requirement (oral morphine equivalent; OME) at 24 hrs. Post-surgery. Secondary end-points included pain (0 to 10), at 24hrs and 48hrs., time to discharge from the recovery room, incidence of post-operative nausea and vomiting at 24 hrs., time to oral intake, time to ambulation, and time to discharge from the hospital. Data was analyzed using unpaired t-test and presented as mean ± Standard Deviation (SD).

Results: Compared to control, the use of the NSS-2 BRIDGE® was associated with a 75.4% reduction in OME (33.6 vs 8.3 mg; $p=0.03$) and 57% reduction in pain (5.8 vs 2.5; $p<0.05$) at 24 hrs and a 73.3% difference in pain at 48 hrs. (1.6 ± 1.6, vs 6.0 ± 2.8; $p=0.0004$). There was no difference in non-opioid analgesics administration between groups.

Conclusion: The tolerability of NSS-2 BRIDGE® device was reported by most to be excellent. This study suggests that the NSS-2 BRIDGE® device may represent a complementary approach to minimize the postoperative requirement for opioid.