Incorporating Acupuncture into Enhanced Recovery After Surgery (ERAS) for Ambulatory Total Hip Replacement Surgery (ID: 2318230)

Stephanie I. Cheng MD, DABMA, FAAMA [1,2], Marko Popovic BS [1], Junying Wang PhD [1], Maya Tailor BA [1], Mia Zonies BA [1], Angela Puglisi BS [1], Miriam Sheetz BS [1], Christopher J Li MD, DABMA [1,2], William P. Qiao MD [1,2], Elizabeth B. Gausden MD, MPH [3], Eytan M Debbi MD, PhD [3], Jonathan M. Vigdorchik MD [3], Brian P. Chalmers MD [3], Cynthia A. Kahlenberg MD [3], David J. Mayman MD [3], Seth A. Jerabek MD [3], Michael P. Ast MD [3]

[1]Department of Anesthesiology, Critical Care & Pain Management, Hospital for Special Surgery, New York, NY, USA; [2]Department of Anesthesiology, Weill Cornell Medicine, New York, NY, USA; [3]Department of Orthopedic Surgery, Hospital for Special Surgery, New York, NY, USA

INTRODUCTION

- Nonpharmacologic analgesic adjuncts like acupuncture remain underutilized in the perioperative period.
- Although opioids are effective, they have undesirable side-effects → delaying discharge readiness. This is essential in total joint arthroplasty (TJA), where recovery times are substantially different depending on opioid consumption.
- Given the move towards ambulatory TJA, exploring potential effectiveness of non-opioid approaches like acupuncture in treating post-operative pain should be prioritized.

METHODS

- This **triple-blind randomized controlled trial** (IRB approval #2021-1496) enrolled 484 patients (242/group) aged 18-80 with ASA 1-2 undergoing total hip replacement.
- Exclusions included chronic opioid use, contraindication to neuraxial anesthesia, allergic to NSAIDS/opioids, implanted cardiac device, chronic kidney disease, diabetes or BMI>40.
- Both groups received standard mepivacaine spinal anesthetic with propofol sedation.
- The intraoperative acupuncture group received the **CHENG Protocol** → auricular acupuncture with 30Hz electrostimulation after induction but before incision.
- Follow-ups were conducted during post-anesthesia care unit (PACU), and on Days 1, 2, 14, and 30.
- Group differences were examined using Wilcoxon rank sum or Chi-squared tests.

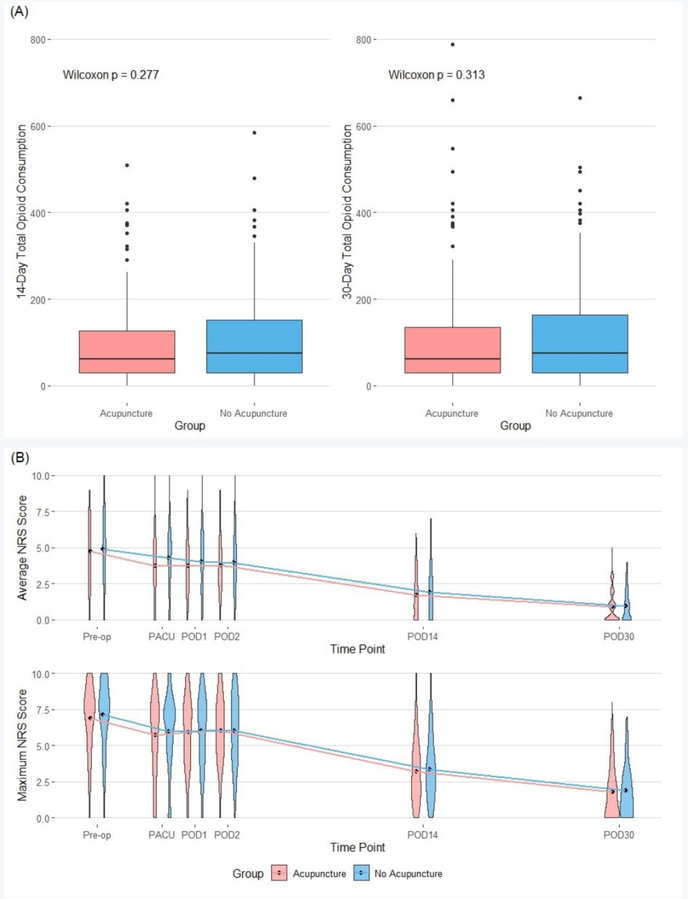
"Patients in the acupuncture group had significantly lower PACU and POD1 NRS scores"

Table 1: post-operative outcomes by acupuncture vs no acupuncture

Post-Operative Outcomes					
Variable	**Level**	**Total**	**Acupuncture**	**No Acupuncture**	**P-Value***
14-Day Total opioids consumption	242 vs 242	67.5 +/- 115.5	61.5 +/- 97.5	75 +/- 122.5	0.2777
14-Day Total opioids consumption	242 vs 242	67.5 +/- 120	61.5 +/- 105	75 +/- 135	0.3134
Hours to Discharge (from Surgery Start)	237 vs 239	7.58 +/- 17.57	7.3 +/- 16.97	8.1 +/- 18.37	0.1274
PACU Length of Stay (mins)	237 vs 239	281 +/- 116	272 +/- 123	283 +/- 101	0.3084
Average Pre-Op NRS Score	241 vs 239	5 +/- 4	5 +/- 3	5 +/- 4	0.3413
Max Pre-Op NRS Score	241 vs 240	7 +/- 3	7 +/- 3	8 +/- 3	0.1736
Average PACU NRS Score	235 vs 239	4 +/- 2	4 +/- 3	5 +/- 3	0.0020
Max PACU NRS Score	235 vs 239	7 +/- 4	6 +/- 4	7 +/- 3	0.4000
Average POD1 NRS Score	235 vs 238	4 +/- 3	4 +/- 3	4 +/- 3	0.0482
Max POD1 NRS Score	235 vs 238	6 +/- 4	6 +/- 4	7 +/- 4	0.5691
Average POD2 NRS Score	229 vs 227	4 +/- 3	4 +/- 3	4 +/- 3	0.3207
Max POD2 NRS Score	229 vs 227	6 +/- 4	6 +/- 4	6 +/- 4	0.8763
Average POD14 NRS Score	218 vs 224	2 +/- 2	1.5 +/- 3	2 +/- 2	0.2716
Max POD14 NRS Score	218 vs 224	3 +/- 3	3 +/- 3	3 +/- 3	0.3987
Average POD30 NRS Score	217 vs 215	1 +/- 2	0 +/- 1	1 +/- 2	0.4702
Max POD30 NRS Score	217 vs 215	1 +/- 3	1 +/- 3	2 +/- 3	0.3230

*: For categorical variables, p-values were based on the Chi-squared test with exact p-value from Monte Carlo simulation; for continuous variables, p-values were based on the Wilcoxon rank sum tests.
Note: For continuous variables, median ± IQR were reported.

Figure 2: Acupuncture vs. No Acupuncture: (A) Boxplots for total opioids consumptions and (B) Violin plots for NRS scores over time



RESULTS

- **Acupuncture patients showed lower total opioid consumption at 14/30 days (p>0.05) and reported significantly lower PACU NRS scores (median+/-IQR: 4+/-3 vs 5+/-3, p=0.002).**
- There were no differences in baseline demographics of age, gender, race, ethnicity, height, weight or BMI.

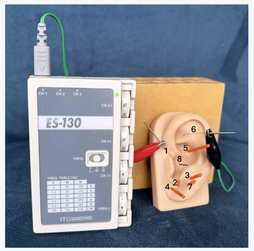


Figure 1: Mockup of the CHENG Protocol. 1. Hypothalamus (Red Lead)2. Amygdala 3.Hippocampus 4.Prefrontal Cortex 5. Point Zero 6. Shen Men (Black Lead) 7. Insula 8.Vagus

DISCUSSION

- Significant progress has been made toward making ambulatory TJA feasible and attractive for select patients without compromising safety or satisfaction.
- Patient perception and pain scores, especially during initial recovery, are very important for discharge and cumulative opioid consumption.
- **Although the decrease in opioid consumption was not statistically significant, it may be still clinically meaningful.**
- As we refine approaches to reduce opioid use and recovery time after joint surgery, it is important to consider acupuncture as part of a multimodal fast-track protocol.