# Use of Zynrelef (Bupivacaine and Meloxicam) to Eliminate the Need for Opioids in Laparoscopic Pre-peritoneal Inguinal Hernia Repairs (TEP)

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## Background

Inguinal hernia repairs are a common procedure, occurring in 800,000 patients across the United States and 20 million patients worldwide annually (2, 3, 4). Currently the most common form of pain management used by providers has been opioids despite unwanted side effects and risk for dependence. Studies show up to 71% of patients undergoing TEP are prescribed opioids for pain management (7). The growing national misuse of opioids and risk of developing opioid dependence stresses the importance for alternative pain management options. Zynrelef has proven effective for managing post-op pain up to 72 hours following several other surgeries but has not been tested in TEP(s) (1, 6, 8). This study observed opioid usage in patients following the use of Zynrelef during TEP procedures to determine if Zynrelef proved to be an effective alternative to opioid usage.

## Research Questions

Does the application of Zynrelef during TEP reduce or eliminate the need for opioid use in the immediate post-op period?

## Methods

43 subjects (42 male and 1 female) between ages 32-79 years old, scheduled to undergo TEP were enrolled in the study and received between 7-14 mLs of Zynrelef prior to wound closure in the pre-peritoneal space via the most inferior 5mm trocar. Subjects were instructed to take multimodal agents (Acetaminophen 1000mg Q6 and Ibuprofen 800mg Q6) and given a prescription for opioids if their NRS pain score was greater then 6/10 in recovery. Subjects were then followed for 10 days after surgery to observe and record all medication usage and pain levels.

## Targeted Population

Subjects meeting inclusion/exclusion criteria were enrolled in study following signing an informed consent prior to procedure. Subjects were included if they were scheduled to undergo a unilateral laparoscopic pre-peritoneal inguinal hernia repair, were between the ages of 18-90 years, if their BMI were between 20-40, and did not utilize illegal drugs including cannabis. Subjects with a history of recurrent hernias, bilateral hernias, chronic pain syndrome or chronic opioid use, or an inability to comply with MMA regimen due to allergies were excluded.

## Results

39 subjects completed the study period (2 subjects excluded due to multiple hernias found during surgery and 2 lost to follow up). 6 (15.4%) subjects received an opioid prescription, 33 (84.6%) did not. Mean pain immediately following surgery was 3.51 (SD +/-1.94), 2.63(SD +/-1.73) on POD1, 2.51(SD +/-1.57) on POD3, 2.00(SD+/-1.34) on POD5, and 1.11(SD+/-0.98) on POD10. Mean discontinuation of acetaminophen and ibuprofen was 6.23 and 5.63 days post-op, respectively. Of the six subjects that received opioids post-op the mean time to opioid discontinuation was 5 days.

## Charts and Figures

Figure 1: Subject Demographics and Total Opioid Utilization

| | Number of Patients | Minimum | Maximum | Mean | Std. Dev. |
|---|---|---|---|---|---|
| Age (Years) | 39 | 32 | 79 | 58.77 | 11.937 |
| Weight (Kg) | 39 | 56.69 | 113.85 | 85.17 | 12.89 |
| Zynrelef (mL) | 39 | 7 | 14 | 13.18 | 2.21 |
| Number of Opioid Tablets Used | 6 | 1 | 6 | 3.08 | 1.74 |

Figure 2: Average pain experienced by all subjects by post-op day.

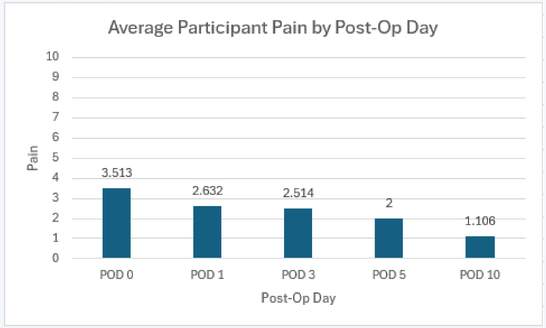



Figure 3: Average time in days to discontinuation of MMA's and opioids by participant.

| | Number of Patients | Minimum | Maximum | Mean | Std. Dev. |
|---|---|---|---|---|---|
| Discontinued Acetaminophen | 30 | 2 | 10 | 6.23 | 2.569 |
| Discontinued Ibuprofen | 30 | 0 | 10 | 5.63 | 3.243 |
| Discontinued Opioid | 6 | 1 | 9 | 5.00 | 3.033 |

## Discussion and Future Implications

Results of this study display adequate pain management following TEP procedures with the use of Zynrelef and a reduction in the use of opioids compared to patients undergoing TEP without Zynrelef. Of the 39 subjects who completed study, only 6 (15.38% of subjects) required the use of opioid medication with the mean time to discontinuation at 5 days post-op. The findings from this study are in alignment with findings from other studies such as the HOPE trial in which Zynrelef was used in patients with open inguinal hernias and displayed an opioid-free rate of 91% compared to this study's 84.6%

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