Decreased Opioid Use and Improved Patient Outcomes with Intravenous Acetaminophen in Lumbar Fusions

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INTRODUCTION:

Opioid analgesics are a common choice for the management of post-operative pain subsequent to spinal surgery. Opioid use is associated with an array of side effects, often contributing to increased morbidity and extended hospital stay. Spine surgery is the largest medical contributor to opioid abuse, followed by orthopaedics overall. Combined, spine and orthopaedics account for over one fourth of all cases of opioid abuse stemming from prescription to previously opioid-naïve patients. In pursuit of diminishing opioid consumption, alternatives such as intravenous (IV) acetaminophen have demonstrated considerable potential. An assessment of patient outcomes with the perioperative administration of IV versus oral acetaminophen may demonstrate the value of such medications in the reduction of opioid usage in lumbar spine surgery. The aim of this study is to prospectively evaluate clinical outcomes for patients undergoing lumbar fusion with the administration of either IV or oral acetaminophen perioperatively, with supplemental opioids as needed. We hypothesize that the use of IV acetaminophen will provide significant pain management, thereby reducing hospital stay, opioid consumption, and comorbidity, and that it will do so more effectively than oral acetaminophen.

METHODS:

In this single center, prospective, randomized control trial, patients aged 18-85 undergoing instrumented circumferential lumbar fusion after failing conservative treatment were included in the study. Patients with evidence of prior surgery at the index level(s), elevated surgical risk, opioid dependence, or those who were unable to follow study protocol were excluded. Under IRB approval, consented patients were randomized prior to surgery into either IV or PO acetaminophen groups. Patients underwent circumferential fusion with anterior interbody fusion and posterior pedicle screw fixation at one or two levels. Preoperative baseline surveys including demographics, VR-12, Visual Analog Score (VAS) Pain, Oswestry Disability Index (ODI), and medication use were collected. The first dose of the assigned acetaminophen was administered within 3 hours prior to surgery. Postoperatively, 7 additional doses were given every 6 hours, with access to supplemental opioids as needed. Morphine equivalent opioid consumption was calculated daily until discharge, 6 weeks, and 6 months post-operatively. VAS scores were recorded daily until discharge, 6 weeks, and 6 months post-operatively. ODI was recorded at 6 weeks and 6 months post-operatively. Statistical analysis was performed comparing outcomes in each group.

RESULTS:

Eighty-three patients (36 male, 47 female) were enrolled in the study. Demographics between groups were statistically similar, with the average age of the IV group at 60.2 (+/- 8.83) and PO at 56.3 (+/- 8.96). The length of stay was the same between groups. Daily analgesic morphine equivalent consumption (MME) was statistically significantly lower for the IV group (56.1 +/- 38.1) than the PO group (86.9 +/- 37.6) during the acetaminophen regimen ($p < 0.001$). After the completion of the study regimen, the PO group increased to 109.4 +/- 50.2 MME versus the IV group that averaged 62.5 +/- 51.0 ($p<0.002$). VAS Back pain and VAS Leg pain scores were similar for both groups prior to discharge. ODI decreased similarly by Month 6.

DISCUSSION AND CONCLUSION:

Although both groups (IV vs Oral) reported similar clinical outcomes with regard to pain and disability, the IV acetaminophen group was able to achieve this reduction with statistically significantly less opioid usage and IV patients did not show an increase in MME consumption after the completion of the regimen. Our findings suggest that IV acetaminophen is a safe and effective alternative to current opioid-based postoperative analgesic regimens and should be considered.