Title:

A Randomized Controlled Trial of Post-operative Acetaminophen versus Nonsteroidal Anti-Inflammatory Drug Use on Lumbar Spinal Fusion Outcomes

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Brief Summary:

Patients undergoing spine surgery often have considerable pain post-operatively and frequently require opioid medication (Percocet, Norco, oxycodone, morphine, etc.) to control their pain postoperatively. The widespread use of opioids, however, is associated with a number of side effects. These include: sedation, dizziness, nausea, vomiting, constipation, dizziness and itching amongst others. Some investigators have suggested that anti-inflammatory medications (the same class of medicines as advil, ibuprofen, etc.) and acetaminophen (Tylenol) can reduce the total dose of opioid required postoperatively and, as a result, lower opioid-related side effects.

The purpose of this study is to test this hypothesis and determine if postoperative anti-inflammatory medications and postoperative acetaminophen can reduce the amount of opioid required to control pain following surgery. A secondary goal of this study is to examine if the change in pain medication will lead to decreased overall pain levels, decreased opioid-related side effects and improved function [quicker ambulation with physical therapy (PT), earlier return to work, etc.].

Detailed Description:

Given the potential for non-steroidal anti inflammatory drugs (NSAIDs) and acetaminophen to decrease opioid requirements following spine surgery, the investigators propose a prospective, randomized, double-blinded clinical trial comparing the efficacy of intravenous (IV) acetaminophen (Group A) or IV ketorolac (Group K) versus placebo (Group P). The impact of treatment on perioperative opioid use, opioid-related complications, functional outcomes and rates of pseudarthrosis following 1 or 2 level lumbar fusion surgery will be measured in each group. The specific aims of this study are as follows:

Specific Aim 1: Determine the impact of IV ketorolac or IV acetaminophen use on immediate postoperative opioid requirements, postoperative pain levels and opiate related symptoms using the Opiate-Related Symptom Distress Scale (ORSDS)

Specific Aim 2: Determine the impact of IV ketorolac or IV acetaminophen use on functional outcomes defined by return to work, Oswestry Disability Index (ODI) and the Veterans Rand-12 (VR-12) Health Survey

The primary outcome is to determine the total postoperative opioid dose (in oral morphine equivalents) in each group. The investigators hypothesize that patients in Group A and Group K will have lower total opioid use, suffer from fewer opiate related symptoms and have similar rates of pseudarthrosis to patients in Group P. The investigators hypothesize that patients in Group A and Group K will have a quicker return to work and improved early functional outcomes although they acknowledge that long term functional outcomes may be the same for all groups.

This is a Randomized Controlled Clinical Trial.

Arms and Interventions:

Arms	Assigned Interventions
Placebo Comparator: Intravenous (IV) Placebo IV Placebo arm	Drug: Placebo Intravenous Normal Saline every 6 hours for 48 hours in addition to patient-controlled analgesia and oral opioids as needed. Other Names: • Normal Saline
Experimental: IV Ketorolac IV Ketorolac arm	Drug: Ketorolac Age 18-64: Intravenous Ketorolac 30 milligrams (mg) every 6 hours for 48 hours in addition to patient-controlled analgesia and oral opioids as needed. Age 65-75: Intravenous Ketorolac 15 milligrams (mg) every 6 hours for 48 hours in addition to patient-controlled analgesia and oral opioids as needed. Other Names: • Toradol
Experimental: IV Acetaminophen IV Acetaminophen arm	Drug: Acetaminophen Intravenous Acetaminophen 1000mg every 6 hours for 48 hours in addition to patient-controlled analgesia and oral opioids as needed. Other Names: • Tylenol, Ofirmev

Eligibility:

Minimum Age:	18 Years
Maximum Age:	75 Years
Sex:	All
Gender Based:	
Accepts Healthy Volunteers:	No
Criteria:	Inclusion Criteria: • Age 18-75 • Require 1 or 2 level lumbar spinal fusion through posterior or lateral approach • No history of long term opioid use (daily or almost daily opioid use > 2 weeks) and not on opiates at time of presentation to clinic Exclusion Criteria: • Documented allergy to NSAIDs or Acetaminophen • History of: Peptic Ulcer Disease, Congestive heart failure, Chronic liver disease, Elevated alanine aminotransferase (ALT)/ aspartate aminotransferase (AST) greater than 1.5 times control, Bleeding disorder, Renal dysfunction (Serum creatinine > 1.5 mg/dL), Glucocorticoid use within 1 month of surgery • Current smokers (quite date < 30 days ago) • Revision for pseudarthrosis • Patients who are unable to physically or mentally provide consent to the study procedures.

Statistical plan:

All normally distributed variables are described using mean and standard deviation (SD) for normally distributed continuous variables, median and interquartile range (IQR) for non-normally distributed continuous variables and counts and percentages for categorical data. Normal distribution was assessed using a q-q plot prior to statistical analysis. Groups were compared using an analysis of variation (ANOVA) for normally distributed variables and a Kruskal-Wallis test for non-normally distributed variables; a chi-squared test was used for categorically distributed variables. Post-hoc pairwise comparisons (adjusted and unadjusted) were also performed.

Assessment of spinal fusion was performed by consensus read with two board-certified radiologists, J.L.C. with certificate of added qualification in Neuroradiology and 9 years of post-fellowship experience and J.A.C. with subspecialty training in musculoskeletal imaging and 20 years of post-fellowship experience. Interbody and posterolateral fusion was assessed on a 4-point scale, 0 = no fusion; 1 = probably not fused; 2 = probably fused; 3 = definitely fused. Fusion assessment was performed on multiplanar CT imaging when available or dedicated lumbosacral radiographs with a minimum of anteroposterior and lateral views.

CONSORT

TRANSPARENT REPORTING of TRIALS