

Randomized Controlled Trial of Erector Spinae Plane (ESP) Block versus Local Infiltration in Minimally Invasive Spine Surgery

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DISCLOSURES: J.R. O'Brien: 1; Seaspine, Nuvasive. 3B; Globus Medical Inc. 4; Medtronic, 4Web Medical, Alibaba. 5; Innovaxis, OssDsign. E. Feuchtbaum: None. C. Taylor: None. C. Van Ekdorn: None.

INTRODUCTION: Managing post-operative pain in spine surgery patients poses significant challenges. The efficacy of liposomal bupivacaine in addressing this challenge has been established. This study aims to assess the effectiveness of liposomal bupivacaine administered through direct infiltration versus erector spinae plane (ESP) block during minimally invasive lumbar spine surgeries to determine if the route of administration affects patient postoperative pain outcomes.

METHODS: After obtaining study approval from WCG IRB, patients over 18 years old, scheduled to receive posterior minimally invasive lumbar spine instrumentation between one and four levels, and able to understand informed consent were screened for study inclusion. Patients with an active infection, acute lumbar fracture, prior lumbar or thoracic spinal instrumentation, or an allergy to local anesthetic were excluded. After obtaining informed consent, patients were randomized, using an excel formula, to receive either ESP block or local wound infiltration of liposomal bupivacaine and data was collected prospectively.

Postoperative pain scores and narcotic usage were monitored and recorded by postoperative nurses until hospital discharge. Daily pain scores were found by calculating the average of scores taken across three time intervals (0000-0800, 0800-1600, 1600-2400). Narcotic usage, including patient controlled analgesia (PCA), was converted to morphine milligram equivalents (MME). A statistically significant difference was defined as having a P-value less than .05.

RESULTS SECTION: The VAS pain score was significantly higher for the group receiving the ESP block compared to the group receiving direct infiltration on POD 1 (4.29 vs 3.18, P=0.02). However, there was no significant difference in VAS pain scores on POD 0, 2, or 3 (POD 0: 4.99 vs 4.19, P=0.15) (POD 2: 4.79 vs 3.96, P=0.16) (POD 3: 5.33 vs 4.20, P=0.08).

ESP block (n=20) versus direct infiltration (n=21) did not show a significant difference in the MME usage on POD 0-3 (POD 0: 27.60 MME vs 22.68 MME, P=0.40) (POD 1: 37.44 MME vs 27.93 MME, P=0.28) (POD 2: 39.09 vs 25.45, P=0.17) (POD 3: 45.89 MME vs 28.41 MME, P=0.28). There was no significant difference found between groups for patient prior narcotic usage, age, total hospital stay, or number of levels operated on.

DISCUSSION: This study shows significantly lower pain scores on POD 1 when liposomal bupivacaine was administered through direct infiltration compared to an ESP block. The group receiving direct infiltration also has consistently lower pain scores and narcotic usage compared to ESP block across all monitored days. Our findings show that the ESP block may not be superior to local infiltration. This study will benefit from continued enrollment to increase the sample size in each group.

SIGNIFICANCE/CLINICAL RELEVANCE: This study compared pain outcomes between patients receiving liposomal bupivacaine during spine surgery via ESP block versus local wound infiltration. Our data provides compelling evidence that local wound infiltration, compared to ESP block, may be a superior method of administration of liposomal bupivacaine to prophylactically control pain in the acute postoperative period.

FIGURES/ IMAGES:

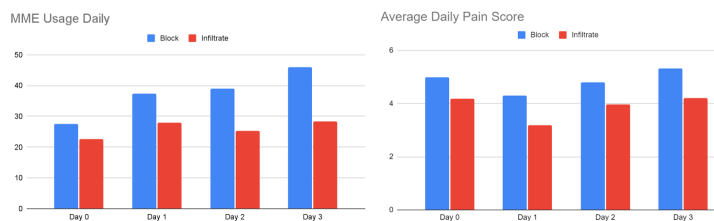


Figure 1: Comparison of MME usage and average daily pain scores between ESP block and wound infiltration groups.



Figure 2: Pre-operative and post-operative X-Ray images of a typical study candidate.

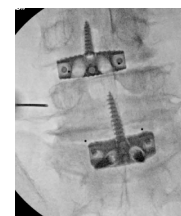


Figure 3: Intra-operative X-Ray image of subject receiving ESP block.