J Shoulder Elbow Surg (2016) ■■, ■■–■■

ELSEVIER

Journal of Shoulder and Elbow Surgery

www.elsevier.com/locate/ymse

ORIGINAL ARTICLE

Continuous versus single shot brachial plexus block and their relationship to discharge barriers and length of stay

Matthew Thompson, MD[a,*], Robert Simonds, BS[b], Bryce Clinger, BS[b], Kristen Kobulnicky, NP[a], Adam P. Sima, PhD[c], Laura Lahaye, MD[d], N. Douglas Boardman III, MD[a]

[a]*Department of Orthopaedic Surgery, Virginia Commonwealth University Medical Center, Richmond, VA, USA*
[b]*School of Medicine, Virginia Commonwealth University Medical Center, Richmond, VA, USA*
[c]*Department of Biostatistics, Virginia Commonwealth University Medical Center, Richmond, VA, USA*
[d]*Department of Anesthesia, Virginia Commonwealth University Medical Center, Richmond, VA, USA*

Background: Brachial plexus block has been associated with improved pain control and decreased length of stay in patients undergoing upper extremity arthroplasty. Continuous delivery is associated with a shorter length of stay; however, comparisons to single-shot delivery in this setting are scarce. As the paradigm shifts to outpatient arthroplasty in the era of bundled payments, there exists a strong impetus to identify the most effective mode of analgesia associated with the least risk to patients.

Methods: This is a retrospective review of 697 patients undergoing upper extremity arthroplasty comparing the rate of complications and incidence of potential barriers to discharge and length of stay of patients receiving continuous vs. single-shot perineural brachial plexus block.

Results: No difference was observed in the complication rate between indwelling (n = 63 [12%]) and single-shot groups (n = 30 [17%]; $P = .137$). The majority of complications were pulmonary, 72% attributable to oxygen desaturation. The indwelling catheter group had 1.61 times higher odds (95% confidence interval, 1.07-2.42; $P = .023$) of exhibiting any potential barrier to discharge and exhibited a longer length of stay ($P = .002$).

Conclusion: There was no demonstrated disparity in the rate of complications associated with single-shot vs. continuous brachial plexus block. However, the continuous indwelling catheter was associated with an increased incidence of potential barriers to discharge and an increased length of stay compared with patients receiving single-shot regional anesthesia.

Level of evidence: Level III; Retrospective Cohort Design; Treatment Study

© 2016 Journal of Shoulder and Elbow Surgery Board of Trustees. All rights reserved.

Keywords: Total shoulder arthroplasty; brachial plexus block; interscalene block; supraclavicular block; postoperative pain; regional anesthesia; length of stay

The Institutional Review Board of Virginia Commonwealth University Medical Center approved this study: HM20005626.

*Reprint requests: Matthew Thompson, MD, Department of Orthopaedic Surgery, Virginia Commonwealth University Medical Center, P.O. Box 980153, Richmond, VA 23298-0153, USA.
E-mail address: matthew.thompson@vcuhealth.org (M. Thompson).

1058-2746/$ - see front matter © 2016 Journal of Shoulder and Elbow Surgery Board of Trustees. All rights reserved.
http://dx.doi.org/10.1016/j.jse.2016.09.026

Perineural brachial plexus block is effective as part of a multimodal pain control regimen following upper extremity surgery.[1,2,8,13,16] Continuous interscalene block (ISB) is gaining popularity as an effective means of outpatient analgesia after ambulatory upper extremity surgery.[7,9,15] It is associated with improved pain control, early range of motion, and decreased length of hospital stay after total shoulder arthroplasty.[14]

The low incidence of discrete complications associated with brachial plexus block is well described.[1,2,4,16] The majority of reported complications consist of transient paresthesias.[1,2,8,13,15] In addition, it is important to consider that brachial plexus blocks have been associated with a high rate of ipsilateral phrenic nerve block,[6,19] which may be associated with adverse effects on pulmonary function.[6,10,18] The incidence of complete hemidiaphragmatic paralysis has been significantly decreased by the administration of a continuous dilute solution,[3] and smaller volumes of injection are associated with a more favorable risk profile overall.[17] For continuous blocks, agent[5] and delivery methods[5] are comparable in terms of pain relief and safety profile.

The perceived effectiveness of brachial plexus block is high among shoulder and elbow surgeons, with 75% of surveyed surgeons recommending it to their patients.[15] In comparing analgesic effectiveness of single-shot vs. continuous ISB, results are mixed[8] but suggest that continuous ISB provides better pain reduction than single-shot ISB.[8,9] Despite this, only 15% of surveyed American Shoulder and Elbow Surgeons members would elect for a continuous block (59% single shot, 26% no block) if undergoing elective surgery themselves.[15]

Continuous ISB combined with general anesthesia has previously been associated with a decreased time to discharge in patients undergoing upper extremity arthroplasty.[12] However, the study did not compare purely single-shot block with continuous block and evaluated a healthy patient population in the ambulatory setting. Thus, it is difficult to adequately define the population amenable to this modality within the general population of patients undergoing arthroplasty at urban academic centers.

As the paradigm shifts to outpatient arthroplasty in the era of bundled payments, there exists a strong impetus to identify the most effective mode of analgesia associated with minimal risk to patients. We hypothesized that continuous brachial plexus block would be associated with an increased rate of complications, barriers to discharge, and an increased length of stay compared with single-shot nerve block in all comers at a tertiary care center.

Materials and methods

We performed a retrospective case-control review by identifying all consecutively treated patients meeting the eligibility requirements undergoing shoulder or elbow arthroplasty by a single surgeon at a single tertiary institution between January 2010 and January 2015. All patients aged 18 years or older with a recorded preoperative anesthesia clinic visit and who had received a supraclavicular or interscalene regional nerve block were identified. Exclusion criteria included history of tracheostomy, body mass index (BMI) <18 or >45, pneumonectomy, home oxygen use, and disorders of the diaphragm or airway affecting ventilation. There were 720 patients who met inclusion criteria. After application of exclusion criteria, 697 patients remained eligible for study inclusion. Patients were divided into groups based on delivery method of the regional block—those administered as a single shot and those administered by a continuous indwelling catheter continued into the postoperative period. Continuous blocks were preceded by a variable single-shot bolus at the time of placement and were continued in the home environment after discharge until reservoir depletion. All patients who left the postanesthesia care unit with an indwelling catheter and the intention to maintain the continuous block after discharge were placed in the continuous group. The block was titrated by the acute pain service to optimize the patient's comfort according to our standard clinical practice in the postoperative period, and the patient was discharged at a continuous rate based on these titrations. Duration was not recorded for patients, but on average, catheters typically remain in place for 4 to 5 days after surgery based on experience with the device. All patients received general anesthesia and completed the minimum follow-up time of 90 days.

Administration of opioid analgesics was not standardized in the postoperative period and followed our routine hospital and provider procedures. Because of charting practices for patient-controlled analgesics at the study institution, we were unable to determine the total dose of narcotic administered to accurately compare between groups; thus, the efficacy of pain control was not assessed between block types owing to potential for confounding.

The clinical criteria used to define "potential barriers to discharge" and "complications" are listed in Table I. Potential barriers to discharge are defined as those events that require further workup or treatment, delay discharge, change discharge disposition, increase resource utilization, or increase the complexity of care significantly.

Patient characteristics (age, sex, BMI, American Society of Anesthesiologists score, Charlson Index, history of asthma, history of chronic obstructive pulmonary disease, and smoking status) and outcomes (potential barriers to discharge [Table I], complications [Table I], length of stay, and disposition) were recorded by retrospective review of the electronic medical record. All variables were summarized using means and standard deviations or frequencies and percentages. Separate summaries were computed for each level of the anesthesia delivery type. χ^2 tests and 2-sample *t*-tests were used to compare the anesthesia delivery methods for each outcome. Multivariable linear and logistic regression models were used to assess these relationships adjusted for a subject's sex, age, BMI, American Society of Anesthesiologists class, and Charlson Index and the incidence of asthma, chronic obstructive pulmonary disease, and smoking. All of the continuous outcomes were transformed to the log scale before the adjusted analysis. All inference was performed using SAS software, version 9.4 (SAS Institute, Cary, NC, USA).

Results

There were 697 patients who met the eligibility criteria; 181 (26%) patients had an indwelling catheter, and the remaining 516 (74%) patients received a single-injection nerve block. Patient summary information is shown in Table II. None of

Download English Version:

https://daneshyari.com/en/article/5710223

Download Persian Version:

https://daneshyari.com/article/5710223

Daneshyari.com