CAS 2023 Annual Meeting

Pain Management Abstracts

Contents

A Retrospective Trial Comparing Erector-Spinae Plane Block Versus Intercostal Nerve Block in Post-Operative Pain Control After Video Assisted Thoracic Surgery (VATS)

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INTRODUCTION

Optimized pain control is at the cornerstone of successful video-assisted thoracic surgery (VATs). The relatively new erector spinae plane (ESP) block is a regional analgesia modality currently being incorporated into VATs pain management guidelines. Several studies demonstrate the benefit of ESP block however none-to-date have compared ESP versus VATs-guided intercostal nerve (ICN) block, a routine standard of care (SOC) strategy in many jurisdictions. The goal of this study was to demonstrate generalizability of ESP block in a regional centre for thoracic surgery.

METHODS

This retrospective cohort study examined patients who underwent VATs from 2018 to 2020 at a single regional thoracic centre. The exposure group was SOC (including VATs-guided ICN block) versus SOC + ESP block. SOC included administration of patient-controlled analgesia (PCA) and consultation by the acute pain service comprised of a dedicated anesthesiologist and nurse practitioner. The primary outcome was cumulative patient-controlled-analgesia. Secondary outcomes included pain at rest, pain with activity, length of stay, 30-day readmission, and complication rates.

RESULTS

51 patients were included for analysis (36 SOC; 26 ESP group). No difference existed in patient demographic or clinical details. The ESP group demonstrated statistically significant reductions in cumulative PCA usage at 2, 12, and 24 hours post-op and had reduced pain at rest at hours 6 and 8 post-op. No differences existed with pain with activity or hospital quality indicators.

DISCUSSION

ESP block appears have additional benefit for pain control following VATs versus standard of care alone at a regional centre.

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Table 1. Demographic information with hospital quality indicators: LOS, complications, and 30-day readmission

	Standard Care (n = 35)	ESP block (n = 26)	p-value
Age (SEM)	71.94 (+/- 1.2)	68.69 (+/- 2.5)	0.20
Sex (% male)	21 (60%)	15 (57.7%)	0.86
Active Smoker (%)	11 (31.4%)	9 (34.6%)	0.79
Right sided (%)	23 (65.7%)	13 (50%)	0.088
Chronic pain (%)	6 (17.1%)	1 (3.9%)	0.061
Average Blood loss ml (+/- SEM)	240 (+/- 31.1)	263 (+/- 86.9)	0.79
Length of stay (+/-SEM)	5.1 (+/- 0.50)	4.8 (+/- 0.58)	0.72
Complication rate (%)	7/35 (20%)	3/26 (11.5%)	0.38
30-day readmission	1/35 (2.86%)	0 (0%)	0.38

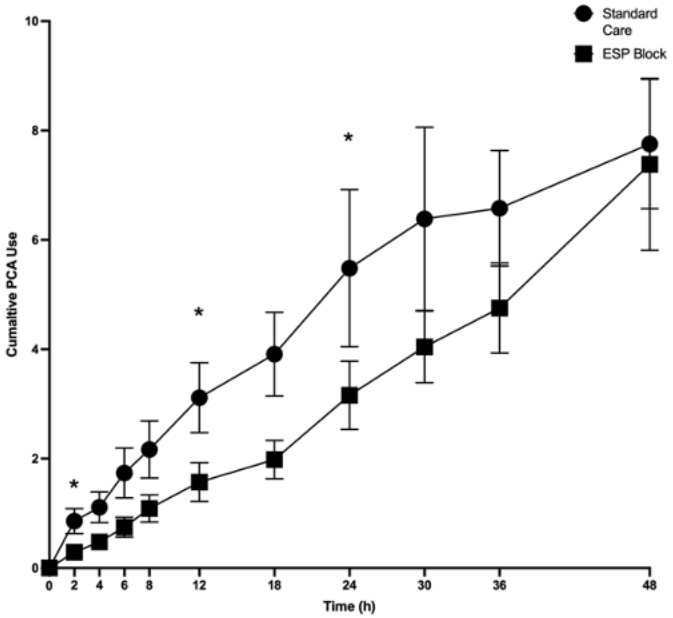

Figure 1. Cumulative PCA usage in first 48 hours of hospitalization ESP vs non-ESP patients

Recreation Therapists' Perspectives of Virtual Reality for Dementia Care

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INTRODUCTION

Virtual reality (VR) has been identified as a novel technology to support well-being among persons living with dementia (PLwD). Our team received funding to develop VR videos to support pain management and well-being in PLwD. From our previous research, family caregivers (FCGs) and PLwD identified recreation therapists (RTs) as an optimal delivery agent to support VR implementation in geriatric care settings. RTs work with patients who have physical, cognitive, or social limitations that affect their ability and motivation to participate in leisure activities, with the goal of improving functioning and well-being for individuals with illness and disabling conditions. To support implementation of VR into geriatric care settings with help from RTs, it is important to identify the RTs' perspectives on VR and barriers and facilitators to implementation. If RTs perceive VR to be a useful addition to their care for PLwD, the findings from this research will be used to inform development of implementation supports for RTs.

METHODS

Participants of the study were n=16 practicing RTs in geriatric care settings recruited through study announcements sent to practicing RTs and snowball sampling. Six videos were available for viewing: Cranberry Flats - at the top of the sandy outlook, view of prairie grasses, river, blue sky and sounds of the geese and gentle breeze. Gentle Movement – at the banks of a river, instructions for a gentle guided movement activity. Breath Control - at the top of a hill overlooking juniper bushes and prairie grasslands, instructions to a relaxing guided breath control practice. Barn - two riders groom and tack horses and prepare them for riding with narration. Arena - in the riding arena, horses are walked and trotted around the sandy arena. Pasture - in the pasture, narrated video describing the horses in the herd. Participants borrowed the headset for 1 week and interviews were 30-60 minutes, in-person or by phone/Webex, and audio recorded between February 1 and April 30, 2022. Interviews were transcribed and produced 300 pages of data. Files were uploaded to NVivo 12 software and analyzed by team members. Qualitative, inductive thematic analysis of interview transcripts and content analysis was done to organize the data into meaningful codes, themes and sub-themes that described participant responses to the research questions.

RESULTS

Two overarching themes were defined from the data:
1) RT evaluations of VR - included subthemes of evaluation of the video content and VR experience as a whole (positive and negative).
2) Consideration for implementation - sub-themes included access options, recipients, barriers, and outcomes to monitor.

Participants positively regarded the immersiveness of VR, relaxing effect of the videos, and comfortable, easy to use interface, that could be used as a substitute when PLwD faced difficulty physically doing an activity. Low visual acuity of far distance objects and length of some videos was negatively evaluated. Implementation could be supported by having a large selection of videos, dedicated VR trained staff or volunteer, and time to monitor the PLwD. RTs felt VR could support PLwD, FCGs, and staff in geriatric care settings. Cost of the headset and videos was the primary implementation barrier.

DISCUSSION

This small sample of RTs view VR as a favourable addition to therapeutic programming for PLwD. RTs perceive certain barriers with implementation, mainly, financial costs for equipment and the need for a large suite of videos to be tailor to individual interests. Findings from this study will be used in future research to develop training materials and program planning for RTs to effectively implement VR and improve functioning and well-being of PLwD locally and nationally.

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Reducing Rebound Pain Severity after Arthroscopic Shoulder Surgery under General Anesthesia and Interscalene Block: A Two-center Randomized Controlled Trial of Pre-emptive Opioid Treatment Compared to Placebo

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INTRODUCTION

A single-injection interscalene block provides effective early postoperative analgesia following arthroscopic shoulder surgery, reducing opioid analgesic requirements, postoperative nausea vomiting (PONV), and length of hospital stay (1). However, some patients may experience "rebound pain" when the block resolves. A recent study showed that rebound pain occurred in approximately half of the patients who received a peripheral nerve block anesthetic for ambulatory upper and lower limb surgery (2). Our objective was to determine if oral hydromorphone (2mg) given six hours after a single injection interscalene block for arthroscopic shoulder surgery leads to a clinically significant reduction in the severity of rebound pain.

METHODS

After clinical trial registration and approval from the Research Ethics Boards at both hospital sites, we conducted a two-center, parallel-group, double-blind, randomized, placebo-controlled superiority trial. Patients received preoperative interscalene block with 10-15ml of ropivacaine 0.5%, general anesthesia, and either hydromorphone or placebo six hours after the block. After discharge, they were instructed to record their pain score and medication use (celecoxib, acetaminophen, and as-needed hydromorphone) every two hours while they were awake. The primary outcome was the worst pain score in the first 24 hours postoperatively, measured on an 11-point (0-10) numerical rating scale (NRS). Secondary outcomes included time from interscalene block to first as-needed opioid use, total cumulative opioid consumption from the PACU period up until 24 hours after hospital discharge, clinically important nausea and vomiting as defined by a Postoperative Nausea and Vomiting Impact Scale score of 5 or greater out of 6 (3), the number of patients failing discharge criteria due to

pain, nausea, vomiting or sedation, the number of patients visiting the emergency department due to pain and needing hospital readmission due to pain within 24 hours of hospital discharge. We utilized an intention-to-treat analysis.

RESULTS

A total of 73 participants were randomly assigned to either the hydromorphone or placebo group. Baseline characteristics were similar between groups, including age, BMI, ASA class, surgical duration, and intra-operative short-acting opioid administration. There was no statistically significant difference in the mean (SD) worst pain score within 24 hours between hydromorphone [6.5 (2.4)] and placebo [5.9 (2.3)] groups; mean difference (95% CI) = 0.6 (-0.5 to 1.8). Similarly, we did not find any significant difference in the pain trajectory, opioid use, or incidence of nausea and vomiting between the groups. The mean time to worst pain was 14.6 hours, and the mean time to first rescue analgesia was 11.3 hours after interscalene block. No patients presented to the emergency department or were readmitted to the hospital due to inadequate pain control after surgery.

DISCUSSION

Hydromorphone 2 mg given six hours after interscalene block did not reduce the severity of rebound pain postoperatively compared with placebo for patients undergoing arthroscopic shoulder surgery. Future randomized control trials should investigate pre-emptive opioid treatment at 12-14 hours after interscalene block, as well as the use of dexamethasone, to reduce rebound pain severity in this population.

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Table 1: Primary and secondary outcomes

Outcome	Hydromorphone *N* = 35	Placebo *N* = 37	Differences in Means (95% CI)	*P* value
Primary Outcome				
Worst pain score within 24 hours (NRS), mean (*SD*)	6.5 (2.4)	5.9 (2.3)	0.64 (-0.5 to 1.8)	0.25
Secondary Outcomes				
Time to worst pain score (hr), mean (SD)	14.9 (4.97) *n* = 32	14.3 (5.7) *n* = 32	0.6 (-2.1 to 3.3)	0.64[a]
Time to first breakthrough hydromorphone dose (hr), mean (*SD*)	11.8 (3.5) *n* = 30	10.7 (4.0) *n* = 26	1.11 (-0.9 to 3.2)	0.28[a]
Total dose of hydromorphone in 24 hours (mg), mean (SD)	4.3 (2.6) *n* = 33	5.7 (5.2) *n* = 33	-1.4 (-3.5 to 0.6)	0.17[a]
Categorical Secondary Outcomes			*Odds Ratio (95% CI)*	
Severe pain (NRS ≥7/10), n/total N (%)	20/35 (57%)	14/37 (38%)	0.46 (0.17 to 1.16)	0.10[b]
Significant nausea or vomiting, n/total N (%)	0/34 (0%)	1/33 (3%)	--	--

[a]**Welch's *t*-test**

[b]**Logistic regression**

CI = confidence interval, PACU = post-anesthetic care unit, SD = standard deviation, NRS = 11-point (0-10) numerical rating scale, Differences in Means = hydromorphone Mean – Placebo Mean. Statistical tests for "significant nausea or vomiting" suppressed due to small cell sizes.

Unravelling the Analgesic Effects of Perioperative Magnesium in General Abdominal Surgery: A Systematic Review and Meta-Analysis of Randomized Controlled Trials

AUTHORS

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INTRODUCTION

Pain management is an important aspect of anesthesia. Pain is thought to be regulated by the ability of magnesium to inhibit calcium entry into the cell by blocking the N-methyl-D-aspartate (NMDA) receptor.[1] This has been explored in clinical trials where magnesium decreased postoperative pain when compared to a placebo (saline solution).[1] Yet, these benefits were not shown in all trials and in fact, some showed deterioration in patients treated with magnesium.[2] The use of magnesium sulphate has also been shown to decrease the postoperative analgesic requirements, notably postoperative opioid consumption.[3] Previous reviews evaluated all kinds of surgeries broadly when looking into the use of magnesium as an anesthetic adjunct. In this review, we systematically evaluated the efficacy of magnesium sulphate for perioperative analgesia in adults undergoing general anesthesia for abdominal surgery when compared with an inactive placebo.

METHODS

This systematic review and meta-analysis (SR and MA) was conducted in accordance with the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) guidelines. A systematic search was conducted within multiple databases for studies that compared magnesium sulphate and placebo in adults undergoing general anesthesia for general abdominal surgery. We included all randomized control trials (RCTs) involving the administration of intravenous (IV) magnesium sulphate administered as a bolus, infusion, or both for analgesia purposes in the perioperative period in adult patients (>18 years) undergoing general abdominal surgeries under general anesthesia. We reported data as mean difference (MD) or odds ratios (OR) and corresponding 95% confidence interval (CI) using random-effects models. A two-sided $P < 0.05$ was considered statistically significant. Our primary objective was to compare the postoperative pain scores between the patient group given magnesium sulphate and those given placebo. Our secondary objectives were to compare the postoperative opioid consumption, intraoperative complications, time to rescue analgesia, and postoperative side effects.

RESULTS

Thirty-one studies with 1762 participants met the inclusion criteria. Patients had significantly lower postoperative pain scores in both early (within six hours) and late (up to twenty-four hours) time points in the magnesium group compared to the placebo group (overall: MD: -0.77; 95% CI: -1.05, -0.48; $P < 0.00001$; $I^2 = 93\%$) (See Figure).
Postoperative opioid consumption in morphine equivalents was significantly lower in both early and late time points with the magnesium group, (overall: MD: -5.81; 95% CI: -9.09, -2.52; $P = 0.0005$; $I^2 = 100\%$).
The time to first analgesic administration was significantly more in the magnesium group (MD: 21.45; 95% CI: 6.62, 36.28; $P = 0.005$; $I^2 = 96\%$).
The number of patients who experienced shivering postoperatively was significantly lower in the magnesium group (OR: 0.19; 95% CI: 0.09 – 0.44; $P < 0.0001$; $I^2 = 0\%$). All other parameters were not significantly different.

DISCUSSION

The existing evidence base shows that perioperative magnesium sulphate use reduces postoperative pain outcomes such as pain scores, postoperative opioid consumption, and postoperative shivering more than inactive placebo trials in adults undergoing general anesthesia for general abdominal surgery. The time to first analgesic administration was greater in the magnesium group, again indicating the need for decreased analgesia postoperatively. The administration of magnesium perioperatively should be strongly considered to manage postoperative pain outcomes in patients undergoing abdominal surgery.

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A. Postoperative Pain Scores