CAS 2023 Annual Meeting

Regional & Acute Pain Abstracts

Contents

Adoption and Sustainability of a Regional Anesthesia Quality Improvement Program

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INTRODUCTION

Organizational context influences the adoption and sustainability of quality improvement initiatives. Using the regional anesthesia program at a university-level hospital as a case study for quality improvement, this study addresses two questions: What factors influence the adoption of regional anesthesia into the practice of staff anesthesiologists at a tertiary academic hospital? From an organizational perspective, which factors promote or impair the sustainability of the regional anesthesia program at a tertiary academic hospital?
The hospital features approximately 400 beds. Included in the clinical focus of the centre is care provided to patients with complex orthopedic and oncological pathology. Given the benefits of regional anesthesia in managing this patient population, a regional anesthesia program has been developed and implemented over the last five years.

METHODS

This is an analytical mixed-methods cross-sectional study. Utilizing the Consolidated Framework for Implementation of Research Domains and the National Health Service Sustainability Model, we developed questionnaires to explore barriers and facilitators to the adoption and sustainability of the regional anesthesia program. Billing data supplement data from the questionnaires to characterize the trends in the adoption of regional anesthesia between 2017 and 2021. Finally, we will conduct a thematic network analysis of interview data to identify minor, organizing and global themes in the adoption and sustainability of the program.

RESULTS

Overall, we observed a 345% increase in the total number of regional anesthetics performed (from n=1070 to 3694) from 2017-2021 (compare Figure 1). The number of nerve plexus blocks increased by 1426%, from 171 to 2439 blocks and the number of peripheral nerve block catheter placements even increased by 4612%, from 8 to 369. Contrary to that, neuraxial anesthesia rates have remained relatively stable over the study period. Overall, the agreement on intervention characteristics was high, most stakeholders confirm that staff are supportive of the program and that it fits well within the current workflow. Most providers are comfortable with providing regional anesthesia to patients and confirmed it as a safe and quality service to patients. Communication about patient outcomes to stakeholders could however be improved. We are currently in the process of recruiting participants for the interviews and will present this data at the CAS meeting.

DISCUSSION

This study aims to provide novel perspectives on the influence of context on the sustainability and adoption of quality improvement projects in a tertiary academic setting. Findings from this study may be helpful when planning future quality improvement initiatives.

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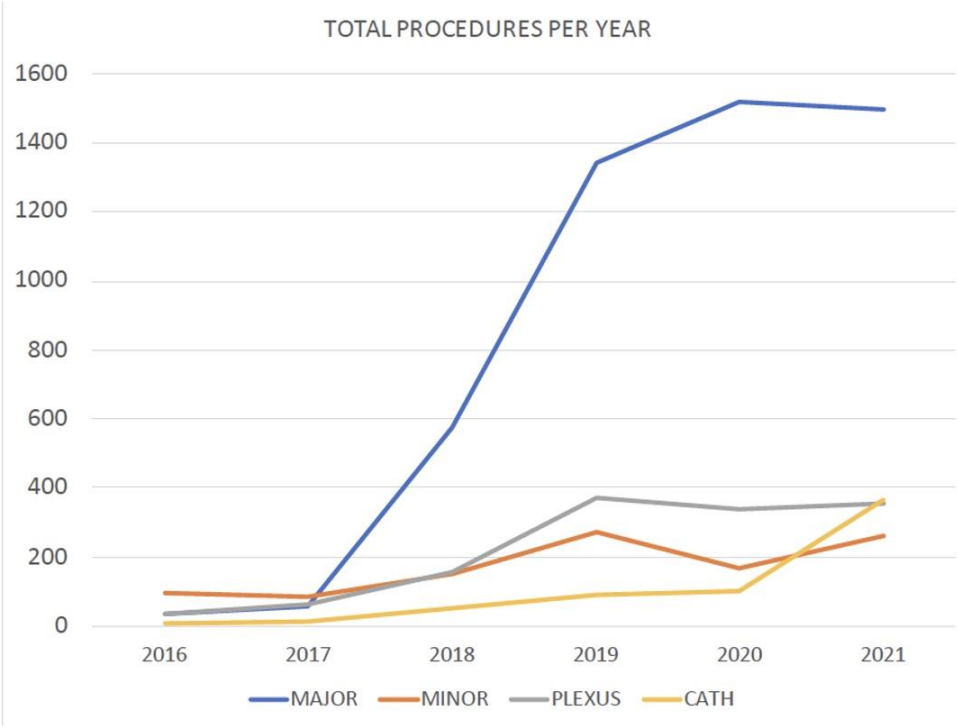

Figure 1: preliminary results of billing data illustrating the increase of regional anesthetic procedures performed over the study period 2017 to 2021

Major: discrete nerve block such as femoral, adductor canal, or sciatic
Minor: fascial plane block such as Transversus abdominis plane block
Plexus: brachial plexus block

Anesthetic Management in a Patient with Spondyloepiphyseal Dysplasia Tarda (SEDT) – A Case Report

AUTHORS

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INTRODUCTION

Spondyloepiphyseal Dysplasia Tarda (SEDT) is a rare X-linked recessive hereditary skeletal disorder characterized by dwarfism, moderate-to-severe spinal deformities, barrel-shaped chest, disproportionately short trunk, and premature osteoarthritis.[1] Affected males exhibit linear growth deficiency beginning around age 6-8 years. Progressive joint and back pain with osteoarthritis ensues; hip, knee, and shoulder joints are commonly involved to a variable degree and hip replacement may be required early.

The surveillance of the cervical spine with an imaging exam is recommended before school age, or any surgical procedure to assess for clinically significant odontoid hypoplasia, which combined with ligamentous laxity, leads to atlanto-occipital instability.[2] Extreme neck flexion and extension must be avoided in individuals with odontoid hypoplasia.

No data regarding the anesthetic management of patients with SEDT were found by the authors. Our case report presents a 44 years-old patient with SEDT that underwent a total hip arthroplasty at our institution.

CASE PRESENTATION

A 44 years-old, male, bearer of SEDT was scheduled for bilateral Total hip arthroplasty (THA). On preadmission assessment, patient denied any cardiovascular or pulmonary symptoms and previous surgical history. He was hemodynamically stable. The airway exam revealed a Mallampati score of 3 with small mouth opening, limited neck extension, and flexion; small thyromental distance. Awake intubation was discussed and planned. A consult with the neurosurgical team was performed and there were no contraindications for neuraxial procedures. On X-ray, the cervical spine showed no subluxation on flexion and extension, the thoracic spine showed mild exaggeration of the superior thoracic kyphosis, and the lumbar spine showed grade 1 spondylolisthesis of L5-S1.

Though it was discussed in the preadmission meeting, the patient refused an awake intubation on surgery day. A debrief was performed by the surgical team. With the patient's consent, the procedure was changed to unilateral THA (right) and spinal anesthesia was selected as the anesthetic plan.

After an arterial line and a large bore IV, a USG scan of the back revealed a shallow intrathecal space (3.5 cm). The spinal anesthesia was done with a 22G Quincke needle,

clear cerebrospinal fluid was aspirated at 3.5cm depth. Twelve mg of 0.5% bupivacaine isobaric was administered intrathecally without complications. The patient was positioned in the left lateral decubitus position. Within 10 minutes, he had a sensory and motor block up to T8.

During surgery, equipment for emergency difficult intubation was immediately available. The procedure was uneventful. No subsequent complications were reported.

CONCLUSION

Regional anesthesia may be technically challenging in patients with SEDT because of possible significant anatomical abnormalities. Many factors such as the reduced interpeduncular distance, the shortened pedicles, an abnormal vertebral body shape, and osteophyte formation may make identification of the epidural and intrathecal spaces difficult.

The importance of pre-procedural ultrasound examination of the spine helps to outline the underlying relevant anatomy and improve the success rate of the neuraxial procedure.[3] In our patient, a shallow intrathecal space was discovered by ultra-sound and it was a useful tool to improve safety for the neuraxial procedure.

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Comparative Efficacy and Safety of Non-Neuraxial Analgesic Techniques for Midline Laparotomy: A Frequentist Network Meta-Analysis of Randomized Controlled Trials

AUTHORS

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INTRODUCTION

Fascial plane blocks are an effective analgesic modality after midline laparotomy; however, the optimal non-neuraxial analgesic strategy has not been elucidated. We conducted a systematic review and network meta-analysis (NMA) of randomized controlled trials to synthesize the evidence with respect to pain, opioid consumption, and adverse events (PROSPERO registration number CRD42021269044).

METHODS

We searched Ovid MEDLINE, Embase, Cochrane central and Scopus databases for studies comparing commonly used non-neuraxial analgesic techniques for midline laparotomy in adult patients. We assessed risk-of-bias appraisal and certainty of evidence for eligible studies. The co-primary outcomes of the study were 24-hour cumulative opioid consumption and 24-hour resting pain score. Secondary outcomes included 48-hour cumulative opioid consumption, 6-hour and 48-hour resting pain, post-operative nausea and vomiting, pooled opioid-related, pooled block-related adverse events, and hospital length of stay. We performed a frequentist NMA assuming a random-effects model with effect sizes reported as intravenous morphine equivalents and 11-point numerical rating scale, for primary outcomes. The probability of an intervention ranking the best for each outcome was assessed with P-scores (1). We performed cluster-rank analysis of the co-primary outcomes, and sensitivity analysis to test the robustness of our results. The active interventions included intravenous (*iv*) lidocaine infusion, transversus abdominis plane block (TAP), rectus sheath block (RSB), quadratus lumborum block (QLB), erector spinae plane block (ESP), and wound infiltration (WI), compared to placebo (sham) or no intervention. Single-shot and continuous catheter techniques were included and denoted by “s” and “c” prefixes, respectively.

RESULTS

Out of 6,111 studies screened, 67 eligible studies published between 1998 - 2021 of 9 active interventions and 4,410 patients were included. Interventions with the greatest reduction in 24-hour cumulative opioid consumption were sQLB (mean difference (MD) -16.09, 95% CI -29.92 to -2.26; very low certainty), cTAP (MD -14.01, 95% CI -21.64 to -6.39, low certainty), sTAP (MD -13.69, 95% CI -17.42 to -9.96, low certainty), and cRSB (MD -13.18, 95% CI -20.27 to -6.10, low certainty) (Figure 1A). Interventions with the greatest reduction in 24-hour resting pain score were cRSB (MD -1.18, 95% CI -1.82 to -0.55, low certainty), cTAP (MD -

0.96, 95% CI -1.70 to -0.21, low certainty), and cWI (MD -0.73, 95% CI -1.07 to -0.38, low certainty) (Figure 1B). Clustered ranking analysis including both primary outcomes demonstrated continuous TAP and RSB blocks were the most effective while WI and ESP were the least effective interventions (Figure 1C).

DISCUSSION

Continuous TAP and RSB blocks were most effective at reducing cumulative opioid consumption and resting pain scores at 24 hours after midline laparotomy (low certainty). Further studies should compare techniques for upper versus lower midline laparotomy as well as other non-midline abdominal incisions.

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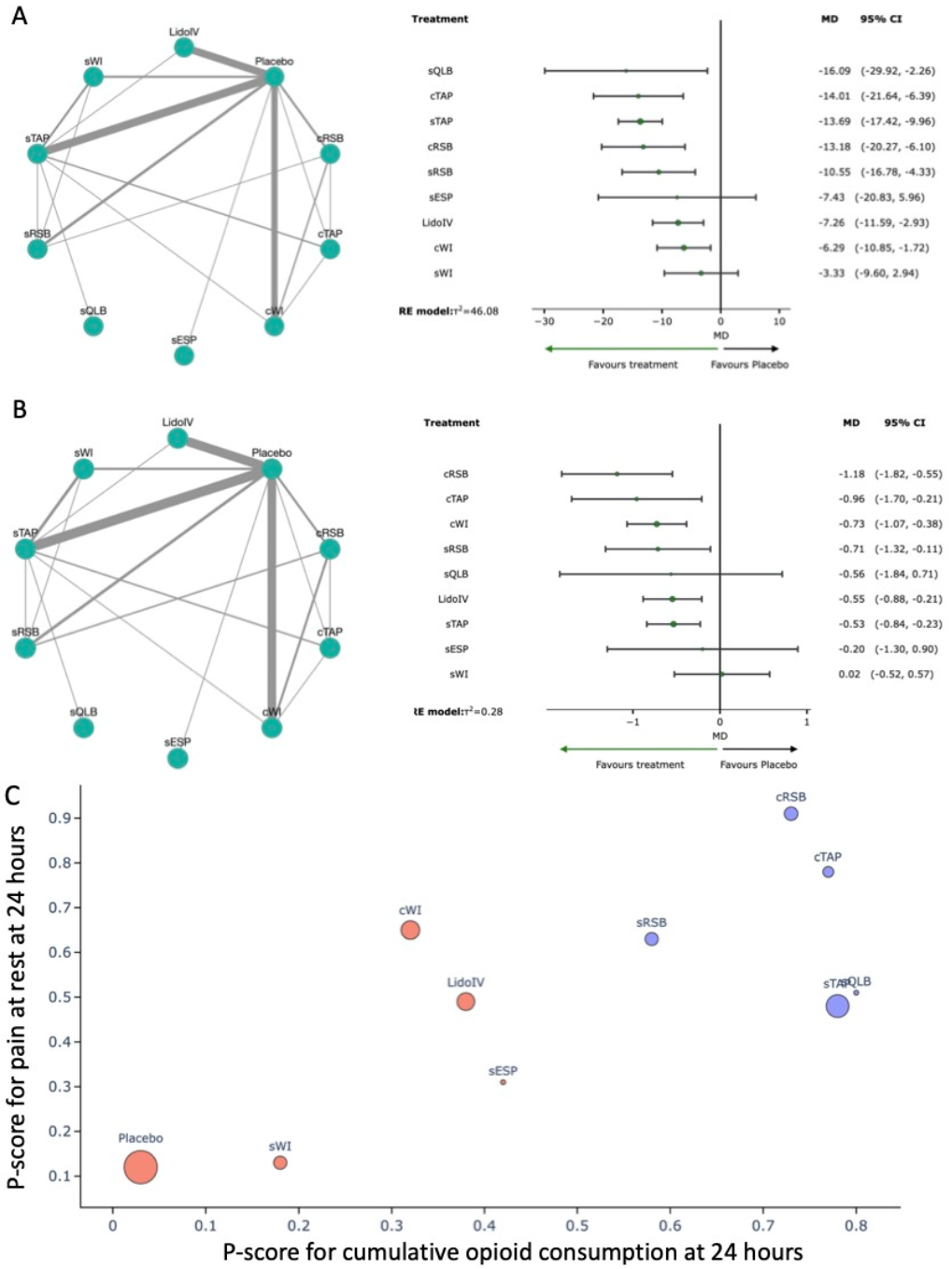
Figure 1. Network geometry and forest plots of fascial plane block interventions for (A) cumulative opioid consumption at 24 hours and (B) resting pain score at 24 hours. Clustered ranking analysis of interventions (C) shows interventions with the highest P-scores values for both primary outcomes towards the top-right.



Electrifying Block Time Out and Post-Block Care Instructions - Reducing Adverse Patient Safety Events in Regional Anaesthesia

AUTHORS

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Introduction

INTRODUCTION

This paper examines current compliance with “block time out” and clear handover of post-block management instructions in a tertiary New Zealand hospital. These safety steps are endorsed by the Australia and New Zealand College of Anaesthetists (ANZCA) in “PG03 - Guideline for the Management of Major Regional Analgesia” to reduce the risk of wrong-sided block and peri-operative nerve injury. (1) ANZCA resources support use of the “Stop before you block” (SB4YB) time out and advise recording this on a surgical safety checklist or equivalent. (2,3) Even though pre-operative safety checklists have been shown to successfully reduce surgical complications their use has not been widely adopted in RA practice. (4) We aimed to establish if an electronic package including a point-of-block checklist and handover note could improve peri-operative patient safety.

METHODS

The operative database 176 patients were identified as having had “regional upper limb block” in the period 1 October 2020 - 30 September 2021. Inclusion criteria were brachial plexus or peripheral nerve arm blocks, and acute and elective surgery. Exclusion criteria included bilateral blocks, cervical plexus blocks and local infiltration or peripheral blocks placed by surgeons. Paediatric cases were not specifically excluded.

32 patients were excluded due to duplication of entries or incorrect recording of block as an upper limb block. The anaesthetic charts of the remaining 144 blocks were retrospectively reviewed by one investigator. Patient identification numbers, and operative information (elective versus acute surgery and type of surgery) was collected. No cases of upper limb RA occurred in patients aged less than 10 years. It was possible to identify all cases as having been either adherent or non-adherent to performance of SB4YB or documentation of post-block care instructions.

RESULTS

Overall compliance was poor; 15.3% for SB4YB and 34.7% for documentation of post-block care instructions. Compliance was higher in plastic surgery compared with orthopaedic and vascular surgery. Rates of compliance were also better in elective than acute surgery; SB4YB 19.7% versus 12.0% and documentation of post-block instructions 41.0% versus 30.1%. There was no incidence of wrong sided block.

DISCUSSION

Our conclusion from this audit was that familiarity alone was not enough to ensure best practice. We proposed that re-education on the recommendations of PG03, formalising trainee block teaching, and adding visual cues in the anaesthetic room may all help prompt a block time out and set a standard of documentation. Success in improving compliance may largely occur with introduction of a newly designed electronic point-of-block checklist which would prompt SB4YB, communicate post-block instructions and allow regular re-audit of local practice.

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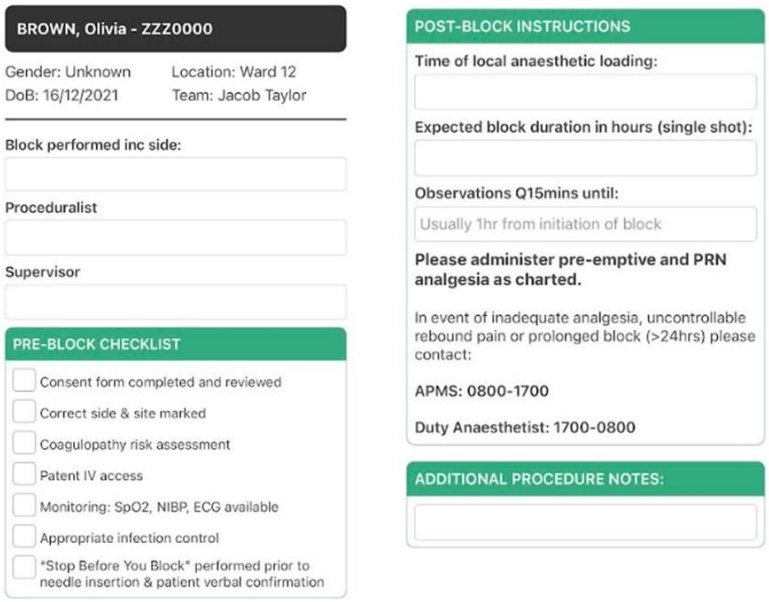

Erector Spinae Plane Block Versus Paravertebral Block in Patients Undergoing Breast Cancer Surgery: A Randomized Controlled Trial Comparing Dermatomal Spread

AUTHORS

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INTRODUCTION

Several ultrasound-guided regional anesthesia techniques have been described for postoperative analgesia in patients undergoing breast cancer surgery including paravertebral, pectoralis and serratus anterior blocks. The paravertebral block (PVB) is frequently considered to be the most efficacious (1). The advantages of PVB include consistently reduced postoperative pain, analgesic consumption, opioid related side effects and shorter post-anesthesia care unit stay (2). Erector spinae plane block (ESP) involves the injection of local anesthetic into the fascial plane, deep to the erector spinae muscle. When compared with the PVB, it is a more superficial block with a better defined end-point. Subsequently it is easier and faster to perform, with a lower risk of pneumothorax. We hypothesize that ESP block is not inferior to PVB with respect to dermatomal sensory spread and analgesic efficacy in patients undergoing breast cancer surgery.

METHODS

A prospective randomized double-blind controlled trial was conducted. Eligible patients undergoing complete mastectomy were randomized to either ultrasound-guided PVB or ESP block. All blocks were performed preoperatively at the T4-5 level with 20 ml of a local anesthetic mixture with a final concentration of 0.5% ropivacaine / 0.125% bupivacaine. The primary outcome was total number of blocked dermatomes as measured using ice, 30 minutes after block completion. Secondary outcomes included Numerical Rating Scale (NRS) pain scores in the first 24 post-operative hours, intraoperative and first 24-hour opioid analgesia administration, block procedural time and patient discomfort during block insertion. Assuming a median difference of 1.5 dermatomal segments, and a pooled standard deviation (SD) of 1.65 segments, α of 0.05, and 90% power, a total sample size of 42 patients was estimated. Dermatomal spread was analyzed using a test of equivalence while the secondary outcomes were analyzed using Mann-Whitney U test method for continuous variables and Chi-square test was used for categorical variables for calculating 95% confidence intervals (CIs) around the median difference.

RESULTS

Forty-two subjects were enrolled, 21 in each group. A test of equivalence for the primary outcome demonstrated that the median difference in dermatomal spread between PVB and ESP methods fell between ±1.5, suggesting that these 2 methods are equivalent. No significant differences in rating for pain scores between PVB and ESP blockade were noted.

There were no significant differences between groups for opioid use intraoperatively, in PACU or at 24 hours post PACU discharge. The mean time for block performance and mean patient discomfort was comparable between groups. There were no reported complications in PVB group; however, in the ESP group one patient experienced hypotension during the block and another patient had a vascular puncture.

DISCUSSION

Ultrasound-guided single-injection ESP block may provide equivalent dermatomal spread and duration of analgesia compared with single-injection PVB block performed at the same level. This supports the findings of recent studies that have reported a similar analgesic effect of ESP in comparison to PVB in the perioperative period when measuring perioperative opioid use (3-5). The present trial found that ESP is non-inferior to PVB as a regional anesthesia technique for breast surgeries. However, there were also no differences with respect to the proposed advantages of ESP such as block performance time or patient discomfort during block performance.

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Implementation of a Multi-Modal Analgesia Pathway for Chest Trauma is Associated with Reduced Incidence of Delirium

AUTHORS

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INTRODUCTION

Rib fractures are diagnosed in up to 10% of hospitalized trauma patients and are associated with significant morbidity and mortality, including severe pain, pulmonary complications and increased hospital length of stay. Regional anesthetic techniques may provide analgesia with fewer side effects compared to other pain management strategies (1-4). The selection of block, however, requires appropriate clinical expertise, as some techniques may be contraindicated in the presence of coagulopathy, hemodynamic instability, or associated injuries. In 2020, a multimodal chest trauma management algorithm, known as the Chest Trauma Algorithm, was implemented at a level 1 trauma centre. There is early involvement of an anesthesiologist with regional anesthetic techniques incorporated into the algorithm. We conducted a retrospective before and after cohort analysis, assessing the effect of the implementation of the Chest Trauma Algorithm.

METHODS

Patients admitted to the trauma service with three or more rib fractures between January 1 2019 and December 31 2019 prior to the implementation of the algorithm were compared to patients admitted between January 1 2021 and December 31 2021 for the same indication. The Chest Trauma Algorithm calculates a Rib Fracture Score (RFS) to identify high risk patients that are referred to the post-operative pain service for a systemic or regional analgesic technique, including, but not limited to, patient-controlled analgesia (PCA), regional anesthesia or neuraxial blockade (Fig 1). Measured outcomes included critical care admission, incidence of delirium, unanticipated intubation, pneumonia, ventilated days, length of stay and mortality.

RESULTS

282 patients were included in the before cohort and 245 patients were included in the after cohort. The before cohort included a higher proportion of patients over the age of 50 compared to the after cohort (mean age 53.3 vs. 49.7 years, $p = 0.008$), but were otherwise comparable in other demographics including pulmonary co-morbidities, RFS, presence of

flail chest and presence of chest tube. Significantly less delirium was observed in the after cohort (16% vs. 9.8%, $p = 0.04$); no other differences in measured outcomes were observed.

DISCUSSION

We hypothesize that the reduction in the incidence of delirium is attributable to the opioid-sparing effect of regional anesthesia and other multi-modal techniques. Furthermore, with an absolute risk reduction of 6.2%, a pathway such as this may be an effective way to reduce delirium in hospital in this patient population. Further analysis will involve stratifying patients on both Rib Fracture Score and type of intervention to delineate which technique would provide the best outcomes for different risk factor scores. Comparative pain scores and opioid consumption will also help quantify the effect of the implementation of the Chest Trauma Algorithm.

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Pain Control & Respiratory Management for Chest Trauma Algorithm
During the First 48 Hours

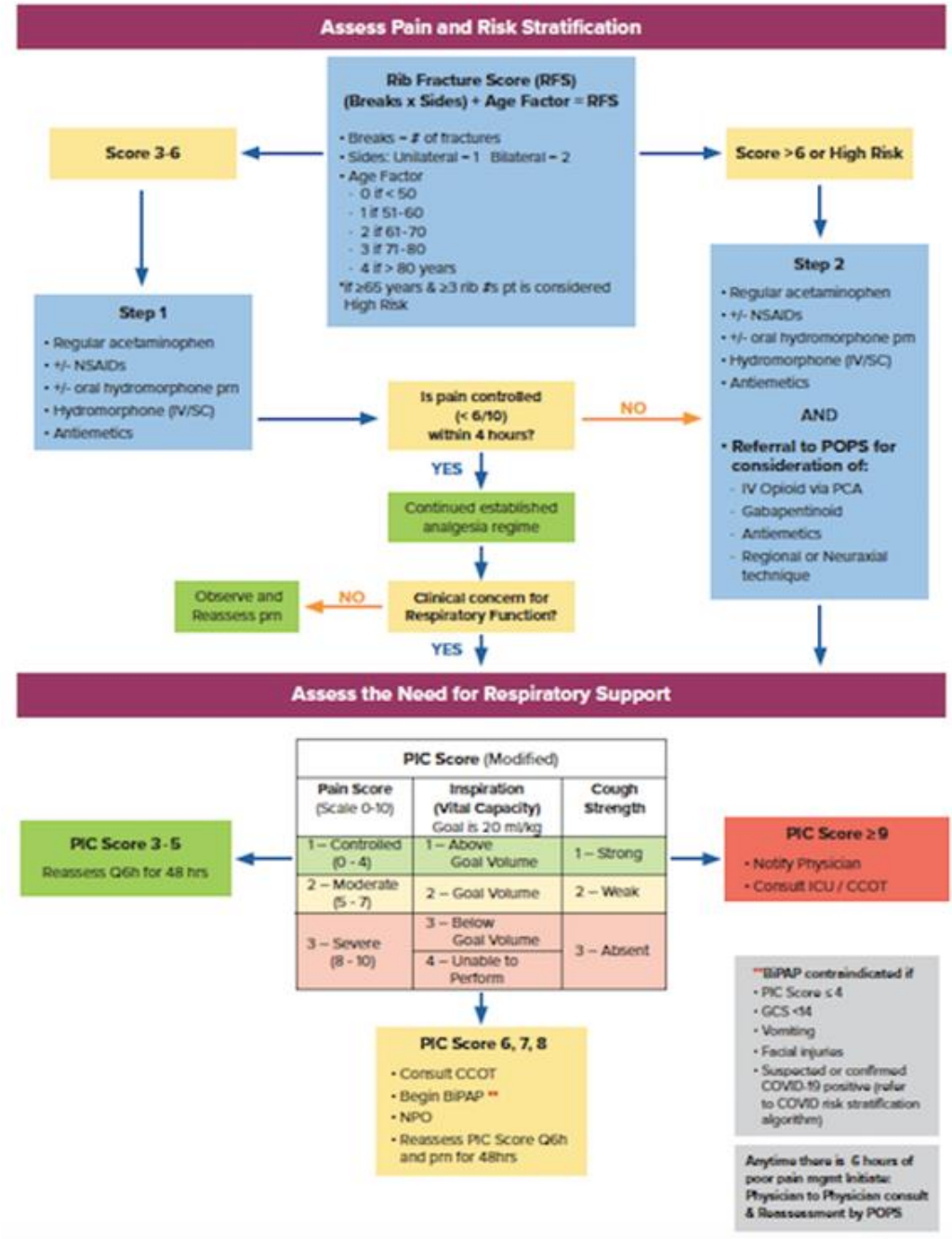

Figure 1

Risk Factors for Postoperative Neurologic Symptoms Following Arthroscopic Shoulder Surgery with Interscalene Block: An Exploratory Secondary Analysis of Pooled Randomized Controlled Trial data

AUTHORS

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INTRODUCTION

Regional anesthesia is recommended for outpatient arthroscopic shoulder surgery to improve postoperative analgesia.[1] Interscalene brachial plexus block (ISB) provides analgesia comparable to other techniques,[1] and is most reliable for surgical anesthesia.

Postoperative neurologic symptoms (PONS) in the operative arm are feared complications of both regional anesthesia and arthroscopic shoulder surgery.[2,3] While most cases of PONS resolve, a few will last longer than 6 months, suggesting a permanent nerve injury.[2] Potential predictors of PONS have been proposed in narrative knowledge syntheses,[2,3] despite clinical studies empirically investigating PONS risk factors being uncommon. Large case series have rarely examined predictors beyond block technique and composition. This knowledge gap hinders research into PONS prevention and prognostication.

The objective of this study was to identify patient, surgical and anesthetic related PONS risk factors. We hypothesized that type of surgery, surgical position, and the use of perineural adjuvants would increase the risk of PONS.

METHODS

With institutional research ethics board approval, this secondary analysis pooled near identical data sets from two randomized controlled trials conducted on arthroscopic shoulder surgery patients at least 18 years of age at a single ambulatory surgical centre. The trials' primary outcome was the analgesic duration of ISB with 30cc of 0.5% bupivacaine and either perineural or intravenous dexamethasone or dexmedetomidine as adjuvants. Excluded from the trials were those with a relative or absolute contraindication to ISB or the adjuvants, or conditions like diabetes mellitus or daily opioid use that could significantly modify the analgesic duration of the ISB.

Patient characteristics and details of anesthetic and surgical care were collected by chart review or postoperative telephone interview for both trials. PONS was a secondary outcome assessed by telephone follow-up at 14 days and 6 months postoperatively. PONS was defined as one or more of numbness, weakness, or tingling in the surgical limb, regardless of severity or assumed etiology.

Maximum likelihood logistic regression was performed to assess for associations between independent variables and PONS at 14 days or 6 months using R version 4.0.5. Firth penalized likelihood logistic regression was applied selectively for independent variables with unstable estimation problems from low variability.

RESULTS

After excluding one patient who withdrew from follow up, PONS prevalence was 83 in 477 patients at 14 days. By 6 months, 73 of 83 cases (88.0%) had resolved, leaving 10 patients with persistent PONS (2.1%). In univariate analyses, only postoperative day one quality of recovery-15 questionnaire score (QoR-15)[4] was significantly associated with 14-day PONS. Higher QoR-15 total (odds ratio (OR) 0.97 (95% confidence interval (95%CI) 0.96 to 0.99), $p < 0.01$) and emotional domain (OR 0.90 95% CI 0.85 to 0.96, $p < 0.001$) scores, suggesting better recovery, were associated with lower PONS risk. The emotional domain specifically assesses comfort, control, anxiety and depression. Report of all three PONS symptoms at 14 days, versus other 14-day symptom combinations, was associated with persistent PONS at 6 months (OR 11.5 95% CI 2.2 to 61.8, $p < 0.01$) (Figure 1). Multivariable analyses were precluded by the limited number of significant univariate associations.

DISCUSSION

Previously proposed PONS risk factors like a history of smoking or hypertension,[2] lateral surgical position,[3] and paresthesia during block performance[2] were not replicated in this study. The observed association with quality of recovery and emotional state should be considered exploratory, though associations between preoperative mental health and postoperative functional outcomes have been observed in arthroplasty populations.[5] The constellation of weakness, numbness and tingling at 14 days may portend a worse prognosis for 6-month PONS than other symptomatology but requires additional validation. Larger studies with standardized PONS outcome reporting are needed for better PONS prediction and prevention.

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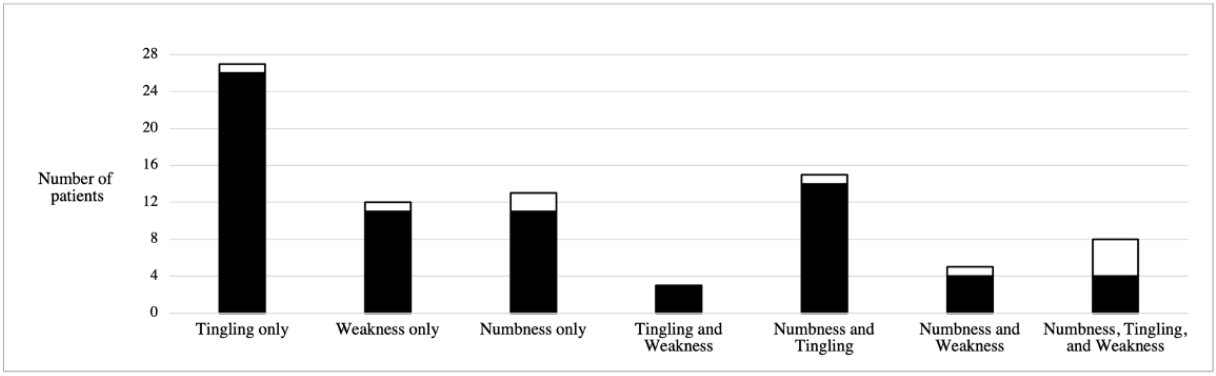

Figure 1: Resolution (shaded) or persistence (unshaded) of postoperative neurologic symptoms at 6 months, by type of postoperative neurologic symptoms at postoperative day 14

Thrus Trail: A Single Centre, Double Blinded, Randomised Study Evaluating Role of Thoracic Spine Ultrasound Pre-Scan for Epidural Catheter Insertion in Adult Patients Undergoing Cancer Surgeries

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INTRODUCTION

Introduction: Thoracic epidural catheterization (TEC) by conventional surface landmark technique is challenging and paramedian approach in the mid thoracic level is preferred. [1] Lately, for neuraxial blocks, ultrasound (USG) imaging has been reported. Pre – procedure ultrasonography has been shown to reduce the number of insertion attempts and enhance patient comfort in lumbar epidural catheterization studies [2]. In our study, we hypothesized that when compared to the standard palpation method, USG pre scan will help reduce the number of attempts required for epidural catheter placement at the mid-thoracic level (Thoracic-T levels 5-8), by para-median approach, by trainee anesthesiologists. In this single center, double blind, randomized trial we aimed to study the benefits of a USG pre-scan done to identify and mark the upper border of the lower lamina (epidural needle entry point) on the first attempt success rate in trainee anesthesiologists.

METHODS

After ethic approval and registration of the trial, adult consenting patients requiring TEC (T5-T8) were included. Patients were given procedural sedation and TEC was attempted in lateral position following all septic precautions. Patients was randomized to Ultrasound (USG)/ control group using sequentially labeled, sealed, opaque envelopes. In the clinical group, the entry point was marked by the consultant anesthesiologist using traditional landmarks (1- 1.5 cm lateral to the lower spinous process). In the USG group the laminar and inter-laminar spaces were visualized using a sterile USG linear probe; the entry point was marked 1-1.5 cm lateral to the midline over the superior edge of the lamina at the desired vertebral level. A 25 G sharp needle was used to inject local anesthetic at the marked entry point and was left in place. Initial attempt at TEC was by senior or junior anesthesiology residents who were familiar with lumbar epidural catheterization with limited expertise in TEC. The blinded trainee was permitted to palpate the spines to orient himself/herself with the anatomy of the spine and attempt TEC at the marked point using loss of resistance technique using a 16 G Tuohy needle. Number of passes/ attempts were noted. Correct placement was confirmed by demonstration of anesthetic band post-surgery. Estimated sample size included 43 cases in each group.

RESULTS

Over three months, from July 2021 to September 2021, 86 patients were randomized (refer to Graph 1). Around 20 trainee anaesthesiologists performed epidural catheter insertion

during the trail. Both the groups were matched with respect to age, gender, ASA status and level of TEC. As per the protocol the epidural catheters were supposed to be placed in mid thoracic level (T5-T8) interspace, but due to palpation error two catheters were placed in lower thoracic spaces for which IEC had been intimated and deviation form filled for the same. Though the success was more in the USG group (65.1%) compared to the clinical group (50.0%), it was not statistically significant (P= 0.16). For the study, withdrawal and re-direction of the needle during the process,was deemed a new pass . A fresh skin puncture was deemed as 'Attempt'. No difference was seen in number of attempts/passes and complications between the two groups, figure 1.

DISCUSSION

The study failed to demonstrate the benefit of prescan to mark the upper border of lamina in improving the first pass success over conventional landmark technique. Most of the evidence in the use of USG in thoracic space is by small groups and/or experts [3,4]. Our study involved a large group of trainees and not experts in TEC, who were blinded to the benefits of the pre scan with respect to three-dimensional orientation and needle direction. This benefit was available to other performers in previous studies [3,4] Further studies would be needed to evaluate if pre scan done by trainees themselves would result in better first pass success.

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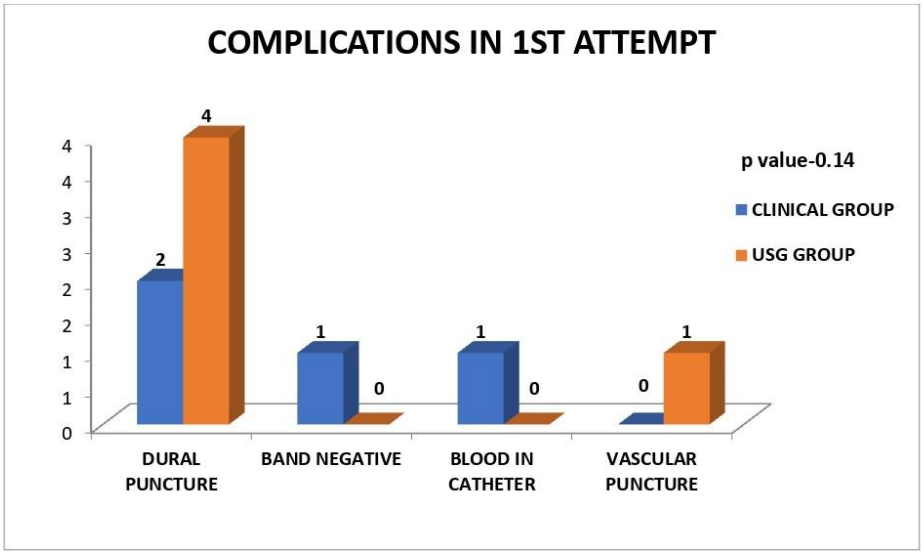
COMPLICATIONS IN 1ST ATTEMPT
p value-0.14
CLINICAL GROUP
USG GROUP
4
2
1
0
1
0
0
1
DURAL PUNCTURE
BAND NEGATIVE
BLOOD IN CATHETER
VASCULAR PUNCTURE

Ultrasound-guided Transversalis Fascia Plane Blocks Provide Clinically Meaningful Post-Cesarean Analgesia in Patients with Spinal Morphine

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INTRODUCTION

Spinal morphine is the standard of care for postoperative analgesia after elective cesarean delivery (CD) performed under spinal anesthesia, providing effective, relatively safe, and cost-efficient analgesia up to 12-24h postoperatively.[1] Transversalis Fascia Plain block (TFP) has recently been proposed for post-cesarean analgesia as an adjunct to spinal morphine.[2] The proximal branches of T12 and L1 are targeted in the plane between the transversus abdominis muscle and the transversalis fascia facilitating cutaneous analgesia for a lower abdominal Pfannenstiel incision.[3] The purpose of this study was to evaluate the additional analgesic effectiveness of TFP block in cesarean delivery with spinal morphine. The primary outcome was opioid consumption in patients receiving a TFP block with local anesthetic compared to patients receiving a TFP block with saline.

METHODS

Ethics approval was obtained from our local REB prior to recruitment. One hundred and six participants provided consent to participate in our prospective, double-blinded, block randomized RCT. Exclusion criteria included language barriers, BMI > 40 kg/m^2, multiple gestation, chronic pain, preoperative opioid use, substance abuse and allergies to medication included in protocol. All patients received spinal anesthesia according to institutional practices. Post-operatively, participants received ultrasound guided bilateral TFP blocks of either 40 mL saline (control) or 0.25% bupivacaine with 2.5 mcg/ml epinephrine 40 ml or a maximum 2.5 mg/kg (treatment). Standardized postoperative analgesia with acetaminophen and diclofenac was administered to all participants. Pain scores and opioid consumption in morphine milliequivalents (mmeq) was assessed at 6-, 12-, 24- and 48-hours following CD. Additionally, data was collected on quality of recovery score and time to first opioid administration post-block. Analysis was completed using both intention to treat (ITT) and per protocol (PP) participants. Complete case and imputed case analyses were completed for our primary outcome of 24-hour post-block administration mmeq consumption. Results are presented as outcome (95% confidence interval).

RESULTS

One-hundred and six and ninety-four participants were included in ITT and PP analyses, respectively. Complete and imputed case ITT analyses presented with adjusted 24-hour mmeq decreases of -17.1 (-26.3 to -8.0, P < 0.001) and -14.4 (-23.8 to -5.0, P = 0.003) with TFP block administration, corresponding to 51% and 44% reductions in 24-hour opioid

consumption, respectively. Similar decreases were found with PP analysis. ITT median time to first opioid administration was 3.0 (2.3 to 5.6) hours and 8.2 (4.4 to 17.5) hours in control and TFP block groups, respectively (P = 0.054). The overall adjusted post-operative TFP block effect was a reduction in NRS pain scores at rest and movement of -0.9 (-1.6 to -0.2, P = 0.013) and -1.2 (-2.1 to -0.4, P = 0.004), respectively. QoR-15 scores 30-days post-block were higher in the TFP block group (P = 0.006). No block related complications were observed.

DISCUSSION

Administration of a TFP block was associated with a significant and clinically meaningful reduction in 24-hour post-block opioid consumption. This agrees with other studies in similar patient populations where a 33% reduction in mmeq of opioid consumption was considered clinically significant.[4] As well, time to first opioid request was extended into those who received a TFP block. Although QoR-15 scores supported improved recovery in the TFP block group 30-days post-administration, this improvement was likely not clinically important.[5] Administration of a TFP block shows good potential as a useful adjunct to spinal morphine for post-CD analgesia.

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