Identifying Barriers and Facilitators to a Successful Student Registered Nurse Anesthetist's Clinical Education

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PROBLEM INTRODUCTION

The more than 2,400 student registered nurse anesthetists (SRNAs) that graduate annually experience unique challenges in their clinical training including:

Role Transition

- Most SRNAs were in leadership roles and struggle with the transition from preceptor to preceptee, especially as adult learners.

Communication Barriers

- The lack of formal CRNA preceptor training combined with ill receptivity to preceptor feedback by SRNAs can be a source of stress negatively affecting learning.

Eliciting and Accepting Feedback

- The SRNA should be empowered with the skills necessary to seek out, accept, and utilize feedback, even in less-than-ideal scenarios. These skills are not inherent, nor do they receive heavy focus within the traditional nurse anesthesia curriculum.

Goal: Use current literature combined with an evidenced-based survey to identify present barriers and facilitators to SRNA clinical education

LITERATURE REVIEW

Literature Search

Databases: Cumulative Index of Nursing and Allied Health Literature (CINAHL), MEDLINE Complete, Google Scholar, ERIC, and Pubmed.

A search of current literature yielded 34 articles, primarily surveys and literature reviews, regarding SRNA and medical professional trainees' positive attributes and barriers to clinical education.

Findings

Barriers: inconsistent feedback and evaluation, lack of interest from the preceptor, poor preceptor teaching skills, limited access to preceptors, inadequate or unprofessional communication, and instances of intimidation or harassment.

Facilitators: Ability to seek and receive real time feedback, forming an educational alliance with preceptors, embracing vulnerability, engage in self reflection, obtain a high level of emotional intelligence.

PROJECT METHODS

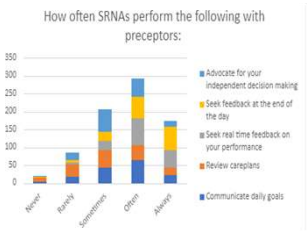
- Recognize that SRNAs face unique challenges in the clinical realm related to eliciting and utilizing feedback.
- Approval by the SIUE Nurse Anesthesia Educational Program as stakeholder and SIUE IRB for a quality improvement project.
- Review current literature related to the clinical training of SRNAs and other healthcare professionals.
- Create and disseminate an evidence-based Qualtrics survey identifying the perceived barriers and facilitators to clinical education as reported by SRNAs nationwide and within SIUE.

EVALUATION

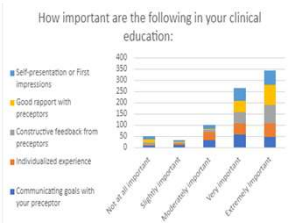
Free Text Responses and Recommendations

- A thorough clinical site orientation
- Formal preceptor training for CRNAs
- Developing a strong emotional intelligence for SRNAs
- Periodic program director follow-ups/check-ins
- Introductory and reflection discussions with preceptors
- Appropriate level of autonomy for clinical education

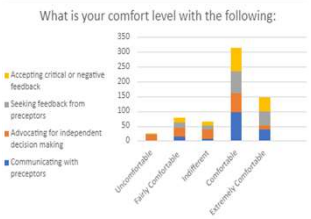
SRNA communication:



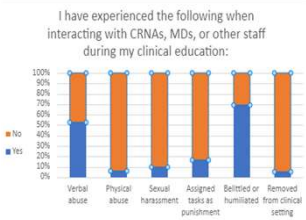
SRNA educational needs:



SRNA comfort level:



SRNA experiences:



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IMPACT ON PRACTICE

- Limited literature exists highlighting the barriers and facilitators specific to the SRNA's clinical education.
- Survey data allows for more detailed indicators of what the SRNA perceives during their clinical training.
- Many reported barriers and facilitators were related to the psychosocial aspects of education and feedback.
- Existing research among other medical specialties supports the utility of implementing pre-clinical seminars to empower the learner with tools to elicit feedback and promote communication.
- A pre-clinical seminar may be targeted at the perceived issues identified specially by SRNAs in the survey.

CONCLUSIONS

There has been little attempt by academic programs to provide students with skills for seeking and handling clinical performance feedback.

Survey results combined with evidence from the literature may be used to create a formal educational program for SRNAs to facilitate positive clinical experiences and effective preceptor feedback.

The development of the educational program could be an aim for future scholarship and translate evidence on this topic into practice, closing the knowledge gap by focusing on methods that empower SRNAs to actively participate in their clinical education.

References

The Effectiveness of Using the Anatomage Table as a Learning Adjunct to Peripheral Nerve Blocks Among Student Registered Nurse Anesthetists

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PROBLEM INTRODUCTION

- Student Registered Nurse Anesthetists (SRNAs) are clinically trained to perform invasive procedures including (Corvetto et al., 2015):
  - Neuraxial Anesthesia
  - Tracheal Intubation
  - Peripheral Nerve Blocks (PBNs)
  - Central and Arterial Line Placement
- Cadaver labs have historically been used to teach essential anatomy principles related to these procedures, however they are costly to maintain and are not feasible for some institutions.(Anatomage, 2018).
- Advanced technology resources, such as the Anatomage Table (AT), have increased student access to these educational opportunities (Al-Elq, 2010).
- Supplementing learning with high-fidelity simulation through the AT improves patient safety and provider competency (Al-Elq, 2010).

LITERATURE REVIEW

- ***Increasing popularity toward opioid free/sparing anesthesia*** (Soffin & Wu, 2018).
- ***Main barriers reported by CRNAs = lack of experience with alternative techniques such as PNBs*** (Valesco et al., 2019)
- ***Five of the most widely used PNBs in anesthesia include***:
  - Interscalene Block (ISB),
  - Axillary Block,
  - Transabdominus Plane (TAP) Block,
  - Adductor Canal Block (ACB),
  - Popliteal Sciatic Block (PSB) (Covetto et al., 20215; Hernandez et al., 2020; Pani et al., 2019).
- ***PNB benefits for special populations***:
  - Critically-ill/high-risk patients for hemodynamic instability during general anesthetics (Arjun et al., 2020)
  - Rescue blocks for acute injuries such as falls/hip fractures (Scurrah et al., 2017).
  - Opioid-free/sparing anesthesia (Soffin & Wu, 2018).
- ***Virtual simulation, including use of the AT, leads to improved test scores and technical skills among medical students*** (Frendo et al., 2020).
- ***Adequate PNBs led to lower readmission rates and decreased morbidity and mortality*** (Joshi et al., 2016).

PROJECT METHODS

- **Second-year SRNAs attended a lab in which they completed a guided lesson with the AT, locating key landmarks for each type of block outlined in Figure 1.**
- **They were then given the opportunity to utilize what they learned at the AT with hands-on experience with the ultrasound.**

Anatomage Table Peripheral Nerve Block Content Outline

Block	Landmarks	Target Nerve(s)
Interscalene Block (ISB)	Subclavian Artery; Middle Scalene Muscle; Anterior Scalene Muscle; Sternocleidomastoid Muscle	Nerve ROOTS C5, C6, and C7 of the brachial plexus
Axillary Block	Axillary Vein; Axillary Artery; Biceps Muscle; Coracobrachialis Muscle; Triceps Muscle	Radial Nerve; Ulnar Nerve; Median Nerve; Musculocutaneous Nerve
Transabdominis Plane (TAP) Block	External Oblique Muscle; Internal Oblique Muscle; Transversus Abdominis Muscle	Fascial plane providing coverage of T7-T10
Adductor Canal Block	Femoral Artery; Sartorius Muscle; Vastus Medialis; Adductor Longus Muscle	Saphenous Nerve
Popliteal Sciatic Block	Popliteal Artery; Popliteal Vein; Biceps Femoris Muscle; Semimembranosus Muscle	Common Peroneal Nerve and Tibial Nerve

Figure 1. Outline of learning objectives for AT

EVALUATION

- 29 SRNAs completed pre (Table 1) and post (Table 2) workshop surveys consisting of 7 Likert scale questions to assess confidence and self-efficacy in their ability to perform PNBs in the clinical setting.

PRE-SURVEY	*Percentage*				
Confidence Items	**Not at all confident**	**Not confident**	**Neutral**	**Confident**	**Very Confident**
I am confident in my ability to identify landmarks on the US when performing an adductor canal block	34.5% (10)	44.8% (13)	7% (2)	10.3% (3)	3.4% (1)
I am confident in my ability to identify landmarks on the US when performing a TAP block	41.5% (12)	31% (9)	7% (2)	20.7% (6)	0% (0)
I am confident in my ability to identify landmarks on the US when performing an interscalene block	31% (9)	44.8% (13)	13.8% (4)	7% (2)	3.4% (1)
I am confident in my ability to identify landmarks on the US when performing an axillary nerve block	51.7% (15)	27.6% (8)	7% (2)	10.3% (3)	3.4% (1)
I am confident in my ability to identify landmarks on the US when performing a popliteal sciatic block	44.8% (13)	37.9% (11)	10.3% (3)	7% (2)	0% (0)
I can adequately perform a PNB under the guidance on my preceptor	10.3% (3)	20.7% (6)	44.8% (13)	20.7% (6)	3.4% (1)
I am confident in my ability to perform a PNB alone	72.4% (21)	17.2% (5)	7% (2)	3.4% (1)	(0)

Table 1. Summary of results from the pre-workshop survey

POST-SURVEY	*Percentage*				
Confidence Items	**Not at all confident**	**Not confident**	**Neutral**	**Confident**	**Very Confident**
I am confident in my ability to identify landmarks on the US when performing an adductor canal block	0% (0)	7% (2)	34.4% (10)	48.3% (14)	10.3% (3)
I am confident in my ability to identify landmarks on the US when performing a TAP block	0% (0)	3.4% (1)	10.3% (3)	44.8% (13)	41.5% (12)
I am confident in my ability to identify landmarks on the US when performing an interscalene block	0% (0)	3.4% (1)	27.6% (8)	44.8% (13)	24.2% (7)
I am confident in my ability to identify landmarks on the US when performing an axillary nerve block	0% (0)	7% (2)	24.2% (7)	51.6% (15)	17.2% (5)
I am confident in my ability to identify landmarks on the US when performing a popliteal sciatic block	0% (0)	20.5% (6)	41.5% (12)	31% (9)	7% (2)
I can adequately perform a PNB under the guidance on my preceptor	0% (0)	3.4% (1)	13.8% (4)	58.6% (17)	24.2% (7)
I am confident in my ability to perform a PNB alone	20.5% (6)	31% (9)	37.9% (11)	10.3% (3)	0% (0)

Table 2. Summary of results from post-workshop survey

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IMPACT ON PRACTICE

Successful peripheral nerve blocks administered by well-educated providers improves patient safety, reduces mortality and morbidity, and decreases hospital readmissions (Joshi et al., 2016).

As anesthesia providers, we are dedicated to patient safety, which is why it is so imperative to use our resources, such as the AT, in order to optimize our learning and skills of the techniques pertaining to anesthesia throughout our educational program

CONCLUSIONS

- Overall, student confidence in performing a PNB in the clinical setting rose 58.7% after attending the AT workshop
- Incorporation of the AT in an ultrasound guided PNB lab improved SRNA knowledge of the anatomy associated with each block.
- The lab fulfilled the needs of SRNAs by filling knowledge gaps and exposing them to regional techniques earlier on in their clinical training.
- A self-guided lab was created for future SRNAs to continue to utilize the AT to learn and understand the anatomy associated with PNBs at their own pace.

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Intrathecal & Epidural Dexmedetomidine (Precedex) for Obstetric Patients

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PROBLEM INTRODUCTION

Neuraxial opioids in the obstetrical population provide analgesia for both labor and cesarean deliveries (Armstrong & Fernando, 2016).

Neuraxial opioids are associated with negative side effects such as pruritis, nausea, vomiting and respiratory depression (Armstrong & Fernando, 2016).

Perioperative opioid use has been linked to an increased risk for opioid abuse and addiction with potentially fatal side effects (Falières, 2020).

The negative side effects associated with opioids warrant a search for alternative adjunct medications.

Multimodal pain management utilizing opioid free or opioid sparing anesthesia techniques have improved surgical outcomes (Boysen, Pappas, & Evans, 2018).

Dexmedetomidine, an alpha-2 agonist, has potent analgesic properties, lowering opioid requirements, while decreasing anxiety and postoperative nausea and vomiting (Bohringer et al., 2020).

LITERATURE REVIEW

- **Databases:** EBSCO, MEDLINE, Cochrane, CINHAL, and Academic Search Complete databases
- **Keywords:** obstetrics, neuraxial dexmedetomidine, intrathecal dexmedetomidine, epidural dexmedetomidine, opioid free or sparing anesthesia

50 articles resulted; 23 articles met inclusion criteria

- Dexmedetomidine produces analgesia, speeds block onset and duration, and can reduce shivering without opioid side effects
- Optimal dosing: spinal 5mcg; epidural 0.5mcg/ml in infusion bag
- Most common side effects: Hypotension and Bradycardia; correlate with doses of 7.5mcg or higher

Dexmedetomidine has potential use as primary pain management therapy when providing opioid free or opioid sparing anesthesia technique

PROJECT METHODS

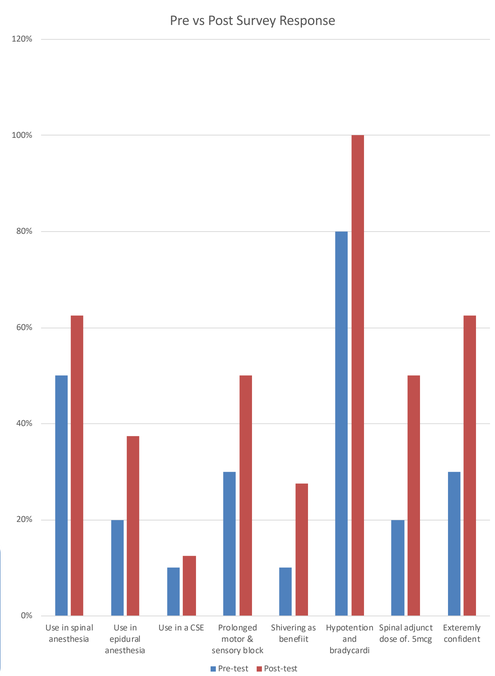
A convenience sample was obtained from a regional medical center in a suburban area in the midwestern United States, consisting of certified registered nurse anesthetists and physician anesthesiologists of the pilot hospital.

Assess baseline use and understanding of dexmedetomidine in neuraxial anesthesia for obstetric patients via electronic anonymous questionnaire.

Present the current literature on dexmedetomidine use in obstetric patients via PowerPoint presentation.

Reassess participants' knowledge and likelihood to adopt the use of dexmedetomidine in neuraxial anesthetics.

EVALUATION



Participant demographics

Pre-presentation survey n=10 ; Post n = 8

Attrition: 2 participants called away

Characteristics	Participants % (n)
Number of Years in Job Title	
0-2 years	25 (n= 2)
3-5 years	0
6-10 years	37.5 (n= 3)
11-15 years	0
16-20 years	12.5 (n= 1)
20+ years	25 (n= 2)
Frequency of OB Practice	
Never	0
Less than 6 weeks/year	50 (n= 4)
6-12 weeks/year	0
12-24 weeks/year	12.5 (n= 1)
>24 weeks/year	25 (n= 2)
I only work OB	12.5 (n= 1)

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IMPACT ON PRACTICE

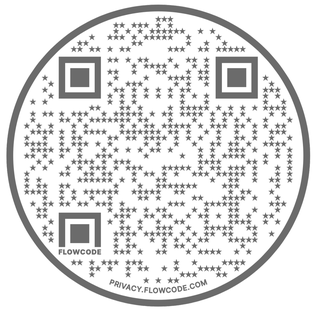
Impact

- Improve patient satisfaction
- Increase provider knowledge of current literature
- Create potential for standardized dosing protocol
- Boost provider confidence with use of dexmedetomidine as adjunct
- Promote research within the United States on intrathecal dexmedetomidine

CONCLUSIONS

- The evidence presented in this literature review supports dexmedetomidine holds promising implications for OSA and OFA practice for OB patients.
- Providers demonstrated an increased willingness to use dexmedetomidine as a neuraxial adjunct after receiving an evidenced based review of risks, benefits and optimal dosing recommendations.
- Further research encompassing diverse patient populations and with varying amounts of local anesthetic are needed to develop best practice dosing for dexmedetomidine as a neuraxial adjunct.

REFERENCES



Development of a Protocol to Manage Postdural Puncture Headache

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PROBLEM INTRODUCTION

In 2019, over 3.7 million births occurred in the United States, in Illinois, over 140,000 births occurred (US DHHS, 2020)

Neuraxial analgesia or anesthesia were utilized to improve the labor process in over 2.8 million patients in the United States and over 96,000 patients in Illinois (US DHHS, 2020)

Accidental dural puncture (ADP) with epidural placement carries of 0.5-4% in the United States (ASA, 2020)

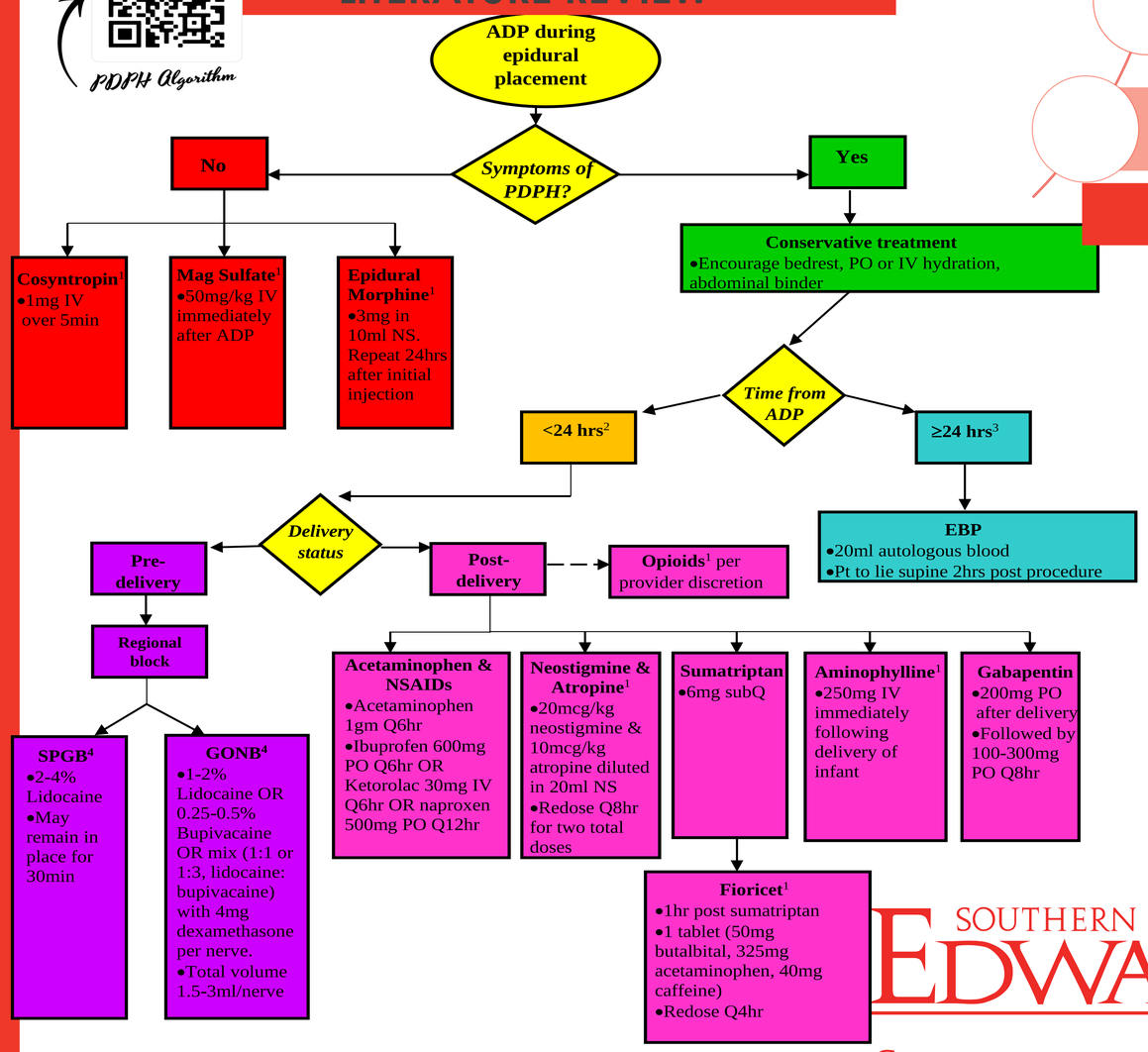
After ADP, 45-85% of patients will develop a postdural puncture headache (PDPH) (ASA, 2020)

Symptoms of PDPH may range from mild to debilitating and develop within five days of ADP (Vaida & Prozesky, 2016)

Numerous provider-specific techniques and non-standardized treatment options yield a variety of patient outcomes

LITERATURE REVIEW

PDPH Algorithm



[1]=See breastfeeding recommendations (Table 1)
[2]=Pharmacological and regional block interventions may be performed prior to or after 24hrs
[3]=EBP efficacy improves if performed after a minimum of 24hrs with greatest efficacy rates after 48hrs from ADP
[4]=SPGB-Sphenopalatine ganglion block, GONB-Greater occipital nerve block

PROJECT METHODS

- Project Aim: To develop and introduce a standardized evidence-based treatment protocol for PDPH
- A non-experimental, convenience sample, survey design was utilized
- Review of current literature and evidence-based treatment options
- Specialized algorithm development for pilot facility presented after educational PowerPoint presentation
- Anonymous ten-question pre and post presentation survey administered for evaluation

EVALUATION

- The evaluation survey consisted of demographic information, multiple-choice, and true or false questions.
- Convenience sample included nine anesthesia providers (n=9), with anywhere from 0 - > 20 years of professional experience
- Results of the study indicated the educational presentation increased provider knowledge of PDPH pathophysiology, symptoms, management and treatment.
- A general question and answer period was also permitted to the participants following the presentation.

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IMPACT ON PRACTICE

- Prior to project implementation, the host facility lacked a standardized approach to PDPH treatment and anesthesia providers employed a variety of different treatment modalities for PDPH patients.
- Post presentation survey results demonstrated improved correct response rate
- A standardized, evidence-based protocol will provide anesthesia providers a pathway of preventative therapies, an algorithm for symptom management, and treatment options should a PDPH occur.

CONCLUSIONS

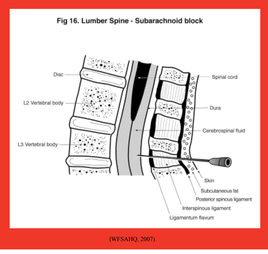
This project provided a standardized readily accessible protocol with a myriad of treatment options for PDPH

Applicable for parturients through the postpartum period

Algorithm provides uniform approach for patients suffering from PDPH

The inclusion of this protocol can have a significant positive impact on patient outcomes and anesthesia practice

References



(WESAHQ, 2007)

Neuraxial Anesthesia for Total Joint Arthroplasty

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PROBLEM INTRODUCTION

- **Relevance:** Total joint arthroplasty is one of the most common surgical procedures performed in the United States.
- Exponential growth is expected: aging patient population, the obesity epidemic, and continued improvements in technique (Singh et al., 2018).
- **Project site:** critical access hospital in Illinois required a more uniform approach and practice methodology for total joint arthroplasty
- **Main objective:** improvement in postoperative pain scores and the implementation of best practice guidelines regarding total joint arthroplasty

LITERATURE REVIEW

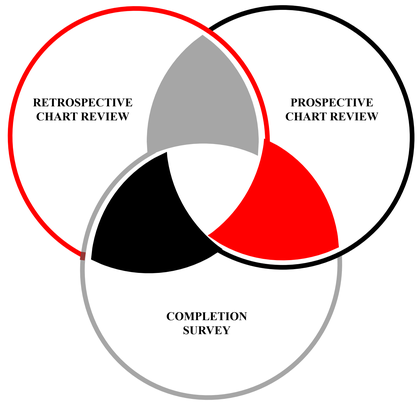
General Anesthesia (GA) -

- GA for hip arthroplasty may lead to an enhanced incidence of overall death, respiratory failure, and ICU admission (Chu et al., 2015).
- Enhanced risk for overall complications and nonhome discharge when GA is utilized (Warren et al., 2020).
- Enhances risk for DVT, ileus, blood loss, and PONV (Pellegrini, 2018).
- Can be associated with difficult airway management, dental damage, aspiration, and allergic drug reaction.

Neuraxial Anesthesia (NA) –

- Statistically decreased in-hospital mortality (p= 0.004) and shorter LOS (p=0.0001) for NA was demonstrated (Van Waeberghe et al., 2017).
- Reduced zero to 30-day mortality for NA compared to GA in patients with intermediate to high cardiac risk (Guay et al., 2016).
- May reduce the risk for postoperative cognitive dysfunction (Edipoglu & Celik, 2019).
- Reduced LOS and overall cost was found (Chakladar & White, 2010).
- Blunts the body's sympathetic stress response to surgery and may offer superior pain control, supporting Enhanced Recovery After Surgery (ERAS) protocols (Oseka & Pecka, 2018).
- NA took no longer than GA to perform and demonstrated shorter surgical duration periods by up to 11 minutes (Johnson et al., 2016).
- NA & peripheral nerve blockade (PNB) should be utilized in a multimodal approach to prevent chronic post-surgical pain development (Fergoso et al., 2019).

PROJECT METHODS



EVALUATION

Retrospective Chart Review: Initial Data Collection	Patient 1	Patient 2	Patient 3	Patient 4	Patient 5	Patient 6	Patient 7	Patient 8	Patient 9	Patient 10	Patient 11
Age	61	53	55	64	73	76	62	78	62	77	60
Sex	Male	Female	Male	Female	Female	Male	Female	Female	Female	Female	Female
Type of Surgery	Total Hip	Total Knee	Total Knee	Total Knee	Total Hip	Total Hip	Total Knee	Total Knee	Total Knee	Total Knee	Total Knee
Type of Anesthesia	General	Spinal	Spinal	General	General	General	General	General	General	General	General
Peripheral Nerve Block	Fascia Iliaca	ACB	ACB	ACB	Fascia Iliaca	Fascia Iliaca	ACB	ACB	ACB	ACB	ACB/IPACK
Postoperative Pain Score	8	0	0	10	8	5	0	7	0	0	6
PACU time	60 min	26 min	61 min	62 min	84 min	46 min	23 min	35 min	24 min	35 min	31 min
Rescue required?	Yes	No	No	Yes	Yes	No	No	Yes	No	No	Yes
Hospital LOS	1	3	2	2	2	2	2	1	1	5*	1

Prospective Chart Review: Ongoing Data Collection	Patient 1	Patient 2	Patient 3	Patient 4	Patient 5	Patient 6	Patient 7	Patient 8	Patient 9	Patient 10
Age	56	55								
Sex	Male	Female								
Type of Surgery	Total Knee	Total Knee								
Type of Anesthesia	Spinal	Spinal								
Peripheral Nerve Block	ACB	ACB/IPACK								
Postoperative Pain Score	0	0								
PACU time	17 min	24 min								
Rescue required?	No	No								
Hospital LOS	3	2								

- **Presentation results:** 60% of the anesthesia staff was in attendance and 100% of attendees surveyed acknowledged the project's value

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IMPACT ON PRACTICE

- Arthroplasty is projected to grow to 3.48 million procedures/year by 2030 (Healy et al., 2011). This is expected to result in an estimated 50 billion in annual Medicare expenditures (Lopez et al., 2020).
- Orthopedic arthroplasty will remain one of the mainstays of anesthesia service.
- Reduced opioid consumption equates to reduced adverse events (hypoventilation, acid/base disturbance, slowed GI function).
- Opioid addiction risk quantified: some experts believe addiction can occur after 5 days of opioid consumption (Shah et al., 2017).
- Anesthesia providers should strategize analgesia plans with the goal of reducing opioid consumption when feasible.
- Knowledgeable anesthesia providers should strive to provide the more superior anesthetic choice for this patient population.
- ICAROS recommends NA as the supreme anesthetic technique for total hip and knee arthroplasty (Memtsoudis et al., 2019).
- NYSORA & ASRA recommend NA and PNB for total joint arthroplasty.

CONCLUSIONS

- Despite an initial plan to pursue total NA where applicable, reluctance towards the change process was evident concerning surgeon buy-in.
- Another implementation barrier was due to the small sample size and lack of a larger pool for verifiable data.
- Limited size and power of the study as this critical access hospital does not perform total joint procedures on a daily basis.
- Overall, the change process was deemed relevant for the institution, which will continue pushing for neuraxial anesthesia for total joint arthroplasty.

Difficult Labor Epidural: Intrathecal Catheter Management

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Southern Illinois University Edwardsville

PROBLEM INTRODUCTION

- Labor epidural analgesia is the most common method used to control pain associated with labor and vaginal delivery in the United States (Borne, 2015; Onuoha, 2017)
- Accidental dural puncture (ADP) is a potential complication associated with epidural placement (Rajagopalan et al., 2019; Peralta et al., 2015; Uyl et al., 2019)
- Continuous spinal analgesia (CSA) is not a common technique used in managing labor pain
- This lack of experience can limit options for the management of labor pain after difficult epidural placement resulting in ADP (Prada et al., 2019; Velickovic et al., 2017)
- A tertiary care medical facility in central Illinois lacks an evidenced-based protocol and educational resources for the management of ADP with CSA after failed epidural catheter placement

LITERATURE REVIEW

Databases: CINAHL, PubMed, Medline-OVID, EBSCO Host, Google Scholar

- The risk for ADP was related to increasing depth to the epidural space, which increased by about 19% for every 1 cm of tissue the needle must penetrate (Hollister et al., 2012).
- 3 independent risk factors correlated with difficult epidural placement: difficult intervertebral space palpation, spinal deformity, and inability to flex the back (Guglielminotti et al., 2013).
- Advantages of using CSA in laboring patients, such as the 10% reduced risk of a second ADP, easy catheter insertion, the establishment of rapid analgesia, reduction of post-dural puncture headache (PDPH), and epidural patch requirement (Heesen et al., 2020; Izquierdo et al., 2019; Moaveni, 2020)
- Medication errors are a concern during CSA management, epidural dose into the intrathecal space can produce high spinal anesthesia resulting in hypotension and respiratory collapse requiring mechanical ventilation (Cohn et al., 2016; Delhaas & Huygen, 2019).

PROJECT METHODS

- Development of ADP management with Intrathecal catheter protocol
- Onsite and online educational presentation to anesthesia providers on protocol utilization
- Laminated reference tool were issued to anesthesia providers and attached to all epidural carts

ACCIDENTAL DURAL PUNCTURE MANAGEMENT/ INTRATHECAL CATHETER PROTOCOL

1

DECISION TO PLACE CATHETER INTRATHECALLY OR REATTEMPT EPIDURAL AFTER ADP

Accidental dural puncture
↓
Place catheter intrathecally?
↓
Maternity unit familiar with ITC?
Multiple epidural attempts?
Difficult/uncooperative patient?
Patient in severe pain?
Patient near delivery?

NO → Reattempt epidural catheter

YES → Place intrathecal catheter (ITC)

Do NOT give lidocaine test dose (3ml 1.5% Lido with 1:200,000 epi)
if you suspect/know that the catheter is intrathecal.
Patient may develop a high spinal block.

2

INTRATHECAL CATHETER DOSING FOR LABOR ANALGESIA

Continuous intrathecal labor analgesia
Initial bolus: 0.5-1ml 0.25% bupivacaine +/- 10-20mcg fentanyl OR 5-10 mcg dexmedetomidine
Infusion: 0.125% bupivacaine + 2 mcg/ml fentanyl
Infusion rate: 0.5-3ml/hr

Breakthrough pain
Bolus: 1ml of 0.25% bupivacaine **+/-** 10-20mcg fentanyl **OR** 5-10mcg dexmedetomidine
Adjust infusion rate: by 1ml/hr increments

Post-delivery management
Flush ITC with 2 ml PF NS and cap. Reinforce dressing.
Inform patient to keep dressing dry, and ITC will be removed by anesthesia in 24 hrs. Encourage PO fluids.
Place nursing communication order "Anesthesia will dc ITC with date and time."
Address pain management as needed.
Consider flushing the ITC with 10 ml PF NS prior to removing.
Instruct patient to wear an abdominal binder after ITC removal.

3

INTRATHECAL CATHETER DOSING FOR C-SECTION

Do NOT give lidocaine test dose (3ml 1.5% Lido with 1:200,000 epi)
if you suspect/know that the catheter is intrathecal.
Patient may develop a high spinal block.

INTRATHECAL ADJUNCT DOSING FOR C-SECTION

Fentanyl 15mcg **OR** Duramorph 0.1mg **OR** Dexmedetomidine 5-10mcg

INITIAL INTRATHECAL BUPIVACAINE DOSE

0.5% Isobaric bupivacaine: give 2ml	0.75% hyperbaric bupivacaine: give 1.5ml
Dead space= Patient receives 1ml (5mg)	**Dead space=Patient receives 0.5ml (3.75mg)**
(0.8ml in filter and 0.2ml catheter dead space)	(0.8ml in filter and 0.2ml in catheter dead space)
Check sensory level first, if level is >T10,	Check sensory level first, if level is >T10,
may consider giving <2ml as initial dose	may consider giving <1.5ml as initial dose

OBTAIN T4-T6 LEVEL

Bolus Q3 min, **Monitor Level Closely**

0.5% isobaric bupivacaine: 0.5ml doses (2.5mg) 0.75% hyperbaric bupivacaine: 0.3ml doses (2.25mg)

MAINTAIN T4-T6 LEVEL

Repeat bolus dose as needed to **maintain anesthetic level and patient comfort** intraoperatively

Intrathecal catheter
during labor...
What to do next

Label
Intrathecal
Catheter
Infusion tubing
Infusion pump
Above patient bed
Anesthesia record

Inform
Patient
Support person
Nurse
Obstetrician
Anesthesia provider

Postpartum Care
Flush catheter with 2 ml PFNS + cap.
Reinforce dressing.
Inform patient & RN to keep dressing dry.
Leave ITC in for 24 hr then remove.
Encourage abdominal binder.

PFNS-preservative free normal saline

EVALUATION

Post-education evaluation	➢ Multiple-type questions and open commentary ➢ 100% provider satisfaction ➢ 100% agreement on reference tool being easy-to-use and thorough in context ➢ 100% provider intent to use in practice
Limitations and barriers	➢ A small and convenience sample of participants ➢ Failure to recruit obstetric nurses for the educational presentation ➢ Staffing education as the most significant barrier to protocol implementation ➢ Reluctance to adjust current practice

IMPACT ON PRACTICE

- A standardized reference tool is now available on all epidural carts for continuous catheter administration following ADP in laboring patients
- Increased provider anesthesia arsenal and knowledge of CSA technique

CONCLUSIONS

- Evidence recommends placement of a continuous spinal catheter over re-siting an epidural catheter after ADP in certain types of parturients (See Box 1 & 2).
- The cognitive aid developed, has the potential to reduce anesthesia provider hesitancy in using CSA and improve patient satisfaction

References

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Assessment of Gastric Content with Point of Care Ultrasound

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PROBLEM INTRODUCTION

- Pulmonary aspiration of gastric content is physiologically deleterious and potentially a fatal complication of anesthesia (Neilipovitz and Crosby, 2007).
- Financially burdensome (Society of Critical Care Medicine, n.d.).
- Risk factors for aspiration: full stomach, diabetes, chronic kidney disease, obesity, pregnancy, gastroparesis, surgical procedure type, and certain medications (Nason, 2016) & (Sharma, Jacob, Mahankali, and Ravindra, 2018).
- Point of care ultrasound (POCUS) can assess gastric content (Perlas et al., 2011).
- Community hospital in Jacksonville, Illinois requested research on gastric POCUS and airway management implications.

LITERATURE REVIEW

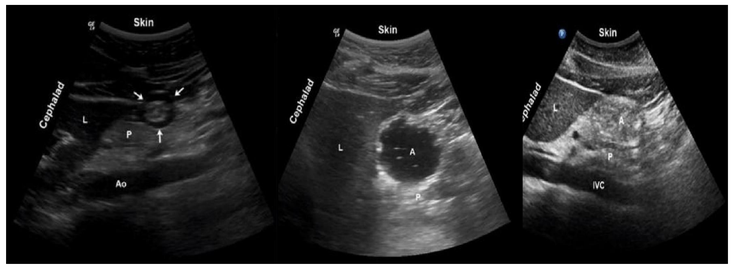
- Perlas Scale – Antral Grades 0, 1, and 2 (Perlas et al., 2011).
- Rapid – 3 minutes and 35 seconds per scan (Cieslak et al., 2020).
- Easily learnable – proficiency within 33 instructed scans (Arzola et al., 2013).
- Full stomach identified in 3.5-4.5% of all fasted patients presenting for elective surgery. (Perlas et al., 2011) & (Van de Putte et al., 2017).
- Full stomach identified in 5.7% of fasted obese patients presenting for elective surgery (Van de Putte and Perlas, 2014).
- Full stomach identified in 56% of emergency patients (Bouvet et al. (2017).
- Routine scanning not recommended. Scan when indicated (Van de Putte et al., 2017).
- Changing the paradigm – empty stomach discovered in 26.5% of pediatric patients presenting for pyloromyotomy. 61.8% following blind orogastric suctioning (Gagey et al., 2016).

PROJECT METHODS

A fifteen-minute educational PowerPoint presentation and a hands-on tutorial was developed and provided to the anesthesia providers.

The anesthesia department's ultrasound was used with the author as a live model to provide the anesthesia providers an opportunity to observe and practice gastric scanning.

A baseline survey was obtained prior to the educational intervention to assess the knowledge base and opinions regarding POCUS.



EVALUATION

Survery Results	*M*	*SD*
Pre Test	74.3%	3.5%
Post Test	95.7%	5.7%

All providers found the PowerPoint and hands-on tutorial informative.

Limitation – small practice with low turnout.

The providers look forward to incorporating gastric POCUS into their practice.

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IMPACT ON PRACTICE

- Gastric POCUS can guide airway management decision making.
- Practical – Rapid and cost-effective tool. Easily attainable skill.
- Patient Safety – Aspiration events may be reduced.
- Patient satisfaction may be improved.
- Paradigm Shifting – Rethinking traditional guidelines and management approaches.

CONCLUSIONS

- Gastric POCUS provides accurate and valuable information.
- Gastric POCUS should be embraced by all anesthesia departments.
- Only scan when indicated. Routine scanning not recommended.
- Exercise Prudent Judgement – courts may continue to defer to ASA preoperative fasting guidelines.

The Future is POCUS!

Perioperative Tube Feeding Guidelines for the Pediatric Burn Patient

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PROBLEM INTRODUCTION

- After the human body suffers a burn injury, the nutritional requirements it needs to repair itself are substantial (Cork et al., 2019)
- Unfortunately, for the pediatric burn patient, they not only require consistent nutritional support, but they also need numerous surgeries to fix their injuries (Cork et al., 2019)
- Each time the patient goes to surgery their tube feedings are interrupted for at least 8 hours, leading to impaired wound healing, caloric deficits, weight loss, and increased length of stay (Sunderman et al., 2019)
- This problem demands a consensus on how to properly manage nutritional feedings throughout the entire perioperative time-period

LITERATURE REVIEW

Burn Injury

- Burn Injuries are the fifth leading cause of death among pediatric patients (ABA, 2018)
- Type and severity needs to be established
- Stress response after a burn injury can increase metabolic demand by up to 200% (Elliot et al., 2020)
- Nutritional needs must match the patient's high metabolic demand to prevent unwanted side-effects

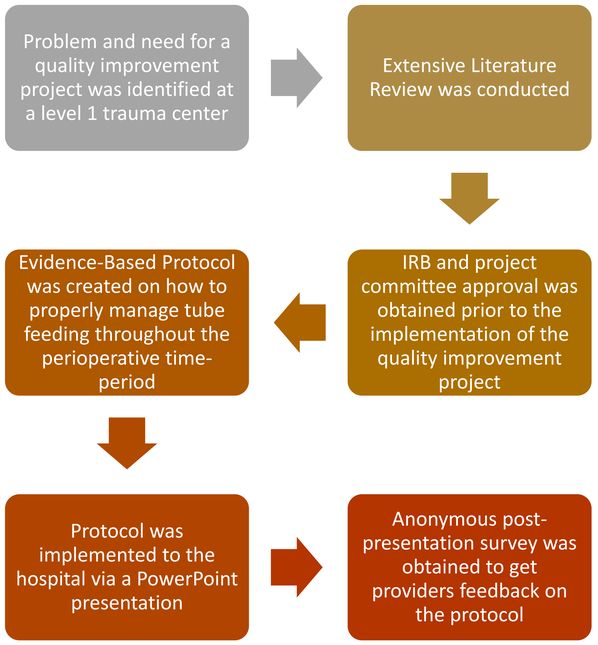
Nutritional Support

- Needs to go as uninterrupted as possible
- This can be achieved if the patient has a confirmed post-pyloric feeding tube
- The literature suggests that letting the tube feedings continuously run throughout the perioperative process places the patient at no greater risk of aspiration (Sunderman et al., 2019)

Perioperative Tube Feeding

- Patients that received continuous tube feedings met or exceeded daily nutritional goals in far greater rates when compared to the patient's who had their tube feeding interrupted (Friedrich et al., 2020)
- This led to better patient outcomes postoperatively

PROJECT METHODS



EVALUATION

- A post-presentation survey was presented to the five providers present for the presentation
- The survey consisted of approximately four Likert-style questions and two open-ended questions that helped determine the presentation's effectiveness
- All participants demonstrated that they would utilize the protocol if hospital policy allowed them to
- One primary barrier to its implementation was getting each department leader to agree with the protocol being used
- Collaboration and cooperation of all members of the care team is necessary for the protocol's success

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IMPACT ON PRACTICE

These patients can meet their nutritional goals even on operative days

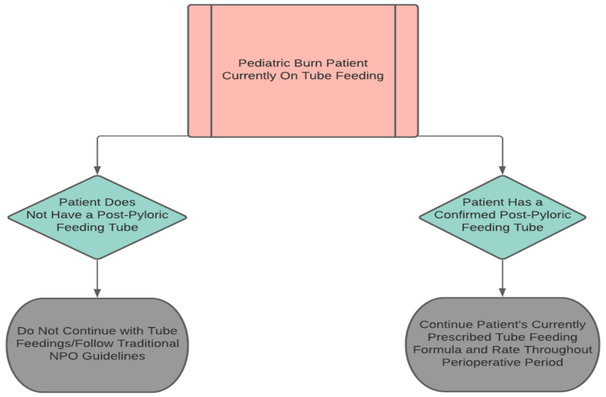
Will improve patient outcomes by consistently giving them the nutritional support they require to heal their wounds and decrease their length of stay

Protocol is cost-effective for the hospital and the patient

CONCLUSIONS

- Providers felt the protocol was easy to understand and follow
- Allows for a quick resource on how to optimally manage these patients' nutritional requirements perioperatively
- Utilization of the protocol will depend on the hospital's ability to adopt it as policy
- The evidence strongly suggests that patient outcomes are far superior when the feedings can continuously run throughout the perioperative time

Protocol for Perioperative Tube Feeding Management



ERAS protocols for General Abdominal and Orthopedic Surgery: Preoperative Hydration and Multimodal Management

Kristin Wolff, BSN, SRNA & Sadie Turner, BSN, SRNA
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PROBLEM INTRODUCTION

Introduction to ERAS:

-Evidence-based, patient-centered, interdisciplinary team-developed protocol (AANA, 2017)

-Utilized to decrease the patient's stress response to surgery, maintain preoperative physiologic function, and expedite recovery (AANA, 2017).

-Colorectal ERAS protocols were the first ERAS protocols developed (late 1990s), and today medical centers are currently developing and implementing more ERAS protocols for specific service lines such as general abdominal and orthopedic cases (Heathcote et al., 2019).

ERAS Evidence:

-Current evidence demonstrates that ERAS protocols lead to better patient outcomes, decrease postoperative complications, facilitate recovery, and allow for earlier discharge (AANA, 2017).

-Studies show that one must employ the preoperative, intraoperative, and postoperative components of the ERAS protocols to achieve maximum benefits (Heathcote et al., 2019).

Project Problem:

-A rural hospital in eastern Illinois, Paris Community Hospital (PCH), utilizes some components of the ERAS protocols, mainly the intraoperative portions, but lacks the full utilization.

-The purpose is to identify evidence-based ERAS protocols for general abdominal and orthopedic surgery, with emphasis on preoperative hydration, preoperative multimodal management, and postoperative multimodal pain management.

LITERATURE REVIEW

Preoperative Hydration

-Preoperative fasting guidelines are consistent for nearly all surgical procedures, allowing patients to drink clear liquids (including carbohydrate drinks) until 2 hours before anesthesia induction and eat a light meal until 6 hours before induction. (Thiele et al., 2016; Gustafsson et al., 2019)

-The ERAS protocols for orthopedic and abdominal general surgical cases include consuming a carbohydrate drink 2-3 hours prior to surgery. (Gustafsson et al., 2019)

-Maintaining a zero-fluid balance is the goal, as fluid excesses and deficits are associated with increased postoperative complications and prolonged hospital stay. (Gustafsson et al., 2019)

Multimodal Analgesia

-The American Society of Enhanced Recovery states that multimodal analgesic strategies should include a minimum of two nonopioid analgesics and an epidural or regional nerve block as appropriate. (Marcotte et al., 2020)

-Utilizing a multimodal approach, including NSAIDs, acetaminophen, gabapentinoids, corticosteroids, lidocaine, NMDA antagonists, and dexmedetomidine, can significantly reduce the opioid requirements of the patient. (Kaye et al., 2019)

-Utilizing multimodal medications optimizes pain control for the patient, reduces the reliance on opioids, and reduces the length of stay. (Frassanito et al., 2020; Feldheiser et al., 2015).

PROJECT METHODS

Aim

-Educate the healthcare providers in the knowledge deficit areas: perioperative goal-directed fluid management, preoperative and postoperative multimodal analgesic management, and the contraindications to the medications utilized in ERAS protocols.

Implementation

-Educational voiceover PowerPoint and protocol regarding the management of hydration status and multimodal analgesia for general abdominal and orthopedic surgeries.

-In-person presentation at the monthly surgical meeting, giving providers another opportunity to receive the material and ask questions.

UPDATED HYDRATION PROTOCOL

General Abdominal Surgery	Orthopedic Surgery
Preoperative: • Patients should be euvolemic, with electrolyte excesses or deficits corrected before inducing anesthesia • Clears up to 2 hours before surgery • Light meal until 6 hours before anesthesia induction • Include carbohydrate drink consumed 2-3 hours prior to induction (more studies needed on morbidly obese and GERD) • If diabetic, monitor sugar • Bowel preparation: avoid for colonic surgery, may use for rectal surgery	**Preoperative:** • Clears up to 2 hours before surgery • Light meal until 6 hours before anesthesia induction • Include carbohydrate drink consumed 2-3 hours prior to induction (can be added benefit, but further studies are needed)
Intraoperative: • Use goal-directed fluid therapy (GDFT) utilizing hemodynamic framework • Isotonic crystalloids are appropriate for the treatment of hypovolemia • Colorectal surgery: 1-4 ml/kg/hr to maintain fluid homeostasis, cardiac output, and tissue perfusion	**Intraoperative:** • Use goal-directed fluid therapy (GDFT) utilizing hemodynamic framework • Effective fluid management for orthopedic surgeries is focused on avoiding electrolyte imbalances and meeting insensible losses
Postoperative: • Consume oral fluids as soon as patient is awake and without nausea • Stop IV fluids after oral intake started	**Postoperative:** • Consume oral fluids as soon as patient is awake and without nausea • Stop IV fluids after oral intake started

MULTIMODAL ANALGESIA PROTOCOL

GENERAL ABDOMINAL SURGERY

	Preoperative	Intraoperative/Postoperative	Caution
Acetaminophen	-1G IV or PO q6hrs starting within 30min-2hrs preoperatively	-1g IV or PO q6hrs for 7-14 days postop	-Liver dysfunction -Overdose can cause hepatotoxicity, max dose is 4g per day
NSAIDs	-PO NSAID prior to surgery (Nonselective or COX-2 selective dependent on patient risk factors) -Time dosing to achieve optimal pharmacodynamic effect that coincides with surgery onset to maximize multimodal opioid-sparing effect	-Anastomotic leak risk: cautious use is advised in gastrointestinal, colorectal, and bariatric surgeries related to possible deleterious effects on anastomotic healing -Higher rate of anastomotic leakage associated with nonselective NSAIDs -Selective COX-2 inhibitors = same rate of anastomotic leakage as those not taking NSAIDs -More studies required before recommendation from ERAS	-NSAIDs can lead to disadvantages of platelet inhibition, increased bleeding, gastric ulceration, bronchospasm, and renal vasoconstriction
Gabapentinoids	-Pregabalin (Lyrica) dosed 75mg PO q12hrs -Gabapentin 300-600mg q12hrs	-Limited to a single preoperative dose unless indicated for postoperative neuropathic pain to limit the side effects	-Cause increased postoperative sedation, dizziness, visual disturbances, and peripheral edema. -Elderly should receive a lower preoperative dose due to increased sedation and respiratory depression -Renally excreted so caution with renal disease and decrease dose.
Corticosteroids	-Dexamethasone 4mg-10mg	-N/A	-Immunosuppression at higher doses -Increased blood glucose levels
Lidocaine/Local Anesthetics	-Spinal/epidural analgesia or TAP blocks	-Mixed results on efficacy but may consider: Lidocaine IV bolus 1-2 mg/kg with induction followed by lidocaine infusion 1-3 mg/kg/hr for 24 hours	-Local anesthetic systemic toxicity (LAST)
Ketamine	-0.1-0.5 mg/kg IV with induction	-0.1-0.3 mg/kg IV q30-60min or 0.1-0.2mg/kg/hr infusion -Can continue infusion for 24-72 hrs postop, but decrease dose to 10mg/hr or less after 24 hrs	-CAD, uncontrolled HTN -Shock/minimal catecholamine stores -Increased ICP, increased IOP, globe injuries -History of psychosis -Hepatic dysfunction, porphyria, recent liver transplant
Dexmedetomidine	-0.5-2mcg/kg IV bolus slow (over 10-20 min)	-0.2-0.7 mcg/kg/hr infusion (primarily only intraoperative)	-Hemodynamically unstable patients-dexmedetomidine may cause bradycardia, hypotension, or transient hypertension -Mixed results if increases or decreases nausea risk- dexmedetomidine may decrease nausea via opioid-sparing -Postoperative sedation

ORTHOPEDIC SURGERY

	Preoperative	Intraoperative/ Postoperative	Caution
Acetaminophen	-1G IV or PO q6hrs starting within 30min-2hrs preoperatively	-1g IV or PO q6hrs for 7-14 days postop (could continue longer)	-Liver dysfunction -Overdose can cause hepatotoxicity, max dose is 4g per day
NSAIDs	-COX-2 Inhibitor Celecoxib: 400mg an hour before surgery -If available parecoxib, parenteral COX-2 Inhibitor can be utilized	-200mg q12hrs for at least 5 days postoperatively, some studies show celecoxib up to 6 weeks postop is beneficial -Nonselective NSAIDs could be used	-NSAIDs can lead to disadvantages of platelet inhibition, increased bleeding, gastric ulceration, bronchospasm, and renal vasoconstriction
Gabapentinoids	-Pregabalin (Lyrica) dosed 75mg PO q12hrs -Gabapentin 300-600mg q12hrs	-Only take up to day 4	-Cause increased postoperative sedation, dizziness, visual disturbances, and peripheral edema. -Elderly should receive a lower preoperative dose due to increased sedation and respiratory depression -Renally excreted so caution with renal disease and decrease dose.
Corticosteroids	-Methylprednisone 125mg OR -Dexamethasone 4mg-10mg (preferably 4mg)	-N/A	-Immunosuppression at higher doses -Increased blood glucose levels
Lidocaine/Local Anesthetics	-Peripheral Nerve Blocks	-Lidocaine IV bolus 1-2 mg/kg with induction	-Local anesthetic systemic toxicity (LAST)
Ketamine	-0.1-0.5 mg/kg IV with induction	-0.1-0.3 mg/kg IV q30-60min or 0.1-0.2mg/kg/hr infusion -Can continue infusion for 24-72 hrs postop, but decrease dose to 10mg/hr or less after 24 hrs -Ortho adjunct example: 1-10mcg/kg/min started during procedure and stopped 48hr postop	-CAD, uncontrolled HTN -Shock/minimal catecholamine stores -Increased ICP, increased IOP, globe injuries -History of psychosis -Hepatic dysfunction, porphyria, recent liver transplant
Dexmedetomidine	-0.5-2mcg/kg IV bolus slow (over 10-20 min)	-0.2-0.7 mcg/kg/hr infusion (primarily only intraoperative)	-Hemodynamically unstable patients-dexmedetomidine may cause bradycardia, hypotension, or transient hypertension -Mixed results if increases or decreases nausea risk- dexmedetomidine may decrease nausea via opioid-sparing -Postoperative sedation

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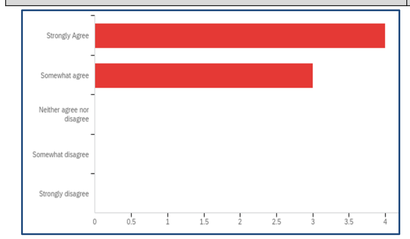
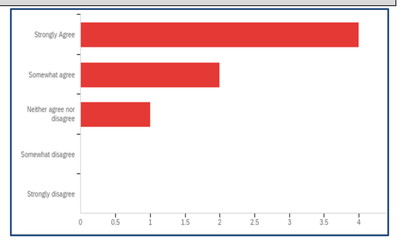
EVALUATION

Evaluation: post-presentation anonymous survey completed by three anesthesia providers, two surgeons, and two other surgical healthcare workers

All participants agreed that the presentation improved their knowledge regarding perioperative goal-directed fluid management, preoperative and postoperative multi-modal analgesic management, and the contraindications to the medications utilized in ERAS protocols.

Six out of seven participants stated the knowledge gained from the presentation would affect their practice.





IMPACT ON PRACTICE

The number of general abdominal and orthopedic procedures continues to grow. ERAS protocols improve patient satisfaction, decrease surgical complications and decrease costs and hospital length of stay.

Proper preoperative hydration improves patient satisfaction along with having metabolic and clinical benefits.

The project can be sustained by continued use of the protocols and the providers' ability to update the protocol as evidence continues to evolve.

Multimodal analgesia management decreases stress response to surgery and opioid use. With the current opioid epidemic and the multiple adverse effects of opioids, limiting their use has numerous benefits for the patient.

CONCLUSIONS

Continued Research

Utilizing the research methods of this project at facilities across the country would lead to increased utilization of ERAS protocols.

Facilities that do not utilize ERAS protocols must have complete education on what ERAS is and how to utilize ERAS protocols.

Facilities that partially utilize protocols, such as PCH, would benefit from assessing current practices, then education directed at the deficits.

Increasing the use of ERAS protocols can have a powerful impact on current practice.

Limitations

A limitation of this project was the small number of participants.

Another limitation of this project was using a convenience sample of participants.

References