Executive Summary
Ultrasound-Guided Regional Anesthesia: Benefits for Practice
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Introduction
The use of ultrasound guidance (USG) for regional anesthetic block placement has increased in recent years. Proponents of USG claim direct visualization of anatomical structures improves block performance, increases speed of onset, and decreases the risk of adverse events related to block placement. Opponents point to a lack of evidence supporting USG improvement of patient outcomes and its potential for decreasing complications compared to the nerve stimulator (NS) technique. Another concern is the cost of the machinery and the additional training needed to perform the USG technique. Large hospitals performing many blocks daily may be able to justify this cost but smaller hospitals that perform a few blocks daily may not. The main barriers to USG are:

- Lack of training
- Perceived decreased efficiency
- Available equipment
- Practitioner reservations
- Cost of equipment

The long-term goal of this project is:

- To improve the quality and safety of care provided to patients receiving regional anesthesia by encouraging practitioners at two Iowa hospitals to make informed decisions based on current evidence.

The short term goals of this project are:

- To provide current evidence to healthcare practitioners about the utility of USG for regional anesthetic block placement
- Provide a cost analysis between the two techniques (USG vs. NS) to enable practitioners to conduct a personal practice cost/benefit analysis about utilizing USG within their practice.

Methodology

- Project was IRB exempt.
- Systematic review of current peer reviewed research (PubMed, CINAHL).
  - Key words: regional an(a)esthesia, ultrasound, nerve stimulator
  - Exclusion factors: non-English, multiple unrelated variable studies
  - Found: 17 RCTs, 8 systematic reviews, 19 case studies and expert opinions
  - Strength of evidence based on grading schema
- Summarize research and document findings. Common outcomes:
  - Rate of complications; local anesthetic dose requirements
  - Success rates; speed of block onset
  - Block performance; patient satisfaction
- Determine projected cost and resource utilization for purchase of an ultrasound device
- Determine potential cost savings and strategies to recoup expenses
- Disseminate the findings to stakeholders within two Iowa hospitals
- Evaluate

Literature Review
The literature strongly supports the benefits of USG in advancing the quality of care and the potential increase in safety of regional blocks due to multiple positive outcomes:

- Increased block success rate
• Increased speed of block onset
• Improved block performance
• Increased patient satisfaction
• Reduction of local anesthetic dose

The reduction of local anesthetic dosing has the potential to increase the safety associated with regional anesthesia and provide cost reduction benefits. In addition:

• There is a learning curve associated with the use of USG, however, this curve is said to be less steep and provides for a more reliable block than using traditional landmark technique with NS.³
• Insurance reimbursements provide an opportunity to recoup the initial associated expense and generate revenue over time.⁴

The act of critical and consistent review of current evidence in order to make recommendations that shape practice into one that is continuously working to improve quality and patient safety is supported by the Plan-Do-Study-Act (PDSA) Improvement Cycle. This theoretical model guides and monitors the success of local improvement efforts by not only the utility of current literature review, but also the collaboration of multiple experts and experiences.⁵

Evaluation Plan
After dissemination of project findings, the responses and consequential actions of anesthesia providers and other healthcare leaders will be sought. The decision to either continue with current practice or initiate change may be based on:

• Whether this project provides a new insight into the subject matter.
• How relatable the project is to their practice.
• Certain facility specific barriers or opportunities that impact their decision.

As an extension of this project, each facility that adopts the use of USG may do an internal assessment on whether the outcomes supported by the literature are evident in their practice.

Impact on Practice
As supported by research, the use of USG aims to impact practice by:

• Reducing local anesthetic dosing, and decreasing risk of related complications.
• Increase the success rates of blocks and diminish unwanted escalation of depth of anesthesia.
• Improve block performance, pain management, and increase patient satisfaction.
• Enhance practitioner knowledge and skill.

The long term goal of this project strives to meet some of the goals of the Institute of Medicine as discussed in Crossing the Quality Chasm⁶, which:

• Stresses the need for the use of evidence-based decision making.
• Mandates that patient’s should receive care based on best available scientific knowledge.
• Promotes a healthcare system that does not vary illogically from clinician to clinician.

Conclusion
• USG promotes multiple positive outcomes that improve the provision of regional anesthesia.
• While costing more than the NS technique, USG provides a higher level of reliability and a source of revenue that may allow for recoupment of cost.
• USG has a distinct learning curve, and without adequate teaching and skill, may promote complications and reduce benefits.
• This project aims at disseminating the benefits of USG within regional anesthesia as supported by research and allow for facility determination on whether USG is appropriate for their practice.

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References


