Intraoperative Anesthesia Care of Patients with Cardiovascular Implantable Electronic Devices

by

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Abstract

Problem and Purpose

Cardiovascular Implantable Electronic Devices (CIED), commonly referred to as pacemakers or implantable cardioverter defibrillators (ICD), are lifesaving devices placed subcutaneously in patients with recurrent life-threatening bradyarrhythmias and tachyarrhythmias (Crossley et al., 2011). In the United States, more than 3 million patients have pacemakers and more than 300,000 patients have ICDs (Ellis et al., 2017). Electromagnetic interference during the intraoperative period is the most significant problem encountered with these patients during surgeries (Crossley et al., 2011). Therefore, anesthesia providers need to understand how to manage these devices perioperatively (Neubauer et al., 2018). The purpose of this scholarly project is to develop a clinical practice guideline (CPG) for consistent intraoperative anesthesia care of the patients with CIEDs at a hospital in Baltimore, Maryland.

Methods

Institutional Review Board approvals at the school and the hospital facility were obtained prior to DNP project implementation. An expert panel was assembled: two CRNAs, an Anesthesiologist and a Cardiac Electrophysiologist. The expert panel utilized the Appraisal of Guidelines for Research & Evaluation II (AGREE II) tool to evaluate the CPG developed by the student. Revisions were made to the CPG based on feedback from the AGREE II tool. A PowerPoint presentation on the CPG was delivered to the anesthesia staff during ground rounds by the student. Following the presentation, the anesthesia staff completed the Practitioner Feedback Questionnaire (PFQ), an anonymous survey that assessed for clarity of the presentation and ease of CPG adaptability to clinical practice.

Results

Domain scores from the AGREE II tool results ranged from the lowest score of 70.8% to the highest score of 97.9%. Of the PFQ distributed, 80% were returned and analyzed. Results indicated that 94% of the providers recommended adoption of the CPG, and 90% indicated they would adapt the CPG recommendations to their practice once approved. Qualitative data on the anesthesia providers' years of experience and provider type were collected from the PFQ responses, and results indicated that 50% of the providers had less than five years of experience and 47% were CRNAs. A finalized CPG was approved by the chief anesthesiologist, and the CPG became an official policy at this anesthesia department.

Conclusion

The cumulative results revealed anesthesia providers' future intention to use the CPG policy during their care of patients with CIEDs. Adoption of this CPG in daily clinical practice will mean a reduction in electromagnetic interference, and the use of evidence-based care by anesthesia providers during the intraoperative care for this patient population.

Introduction

Background and Significance of the Problem

Cardiovascular Implantable Electronic Devices (CIED), commonly referred to as pacemakers or implanted cardiovascular defibrillators (ICDs), are lifesaving devices placed subcutaneously in patients with recurrent life-threatening bradyarrhythmias and tachyarrhythmias (Crossley et al., 2011). In the United States, approximately 3 million Americans have a pacemaker and over 300,000 have ICDs (Ellis et al., 2017). An additional 1 million new patients get a CIED implantation annually and many of these patients with CIEDs require cardiac and non-cardiac surgeries (Neelankavil, Thompson & Mahajan, 2013).

Electromagnetic interference (EMI) with the patient's CIED often caused by surgical equipment used during surgery, is the most significant problem encountered during the intraoperative anesthesia care of these patients. EMI result in complications such as damage to the CIED, depletion of the CIED battery generator, and arrhythmias during surgery (Crossley et al., 2011). Because of the risk of complications associated with CIEDs, anesthesia providers need to understand how to manage these devices perioperatively especially during the intraoperative period (Neubauer et al., 2018).

The purpose of this scholarly project was to develop a clinical practice guideline (CPG) for consistent intraoperative anesthesia care of patients with a CIEDs at a hospital in Baltimore, Maryland. The lack of a clinical practice guideline to facilitate the perioperative anesthesia care of patients with cardiovascular implantable electronic devices at this facility necessitated this project.

Literature Review

Evidence Review

Ellis et al. (2017) conducted a cohort study to evaluate the efficacy and safety before and after the implementation of a new perioperative CIED service of specially trained anesthesiologists that care for patients with CIEDs. A convenience sample of 15,100 patients were included who underwent surgery between 2008 and 2010 for the pre-intervention period and from 2012 to 2014 for the postintervention period. This study evaluated whether having an anesthesiologist-run perioperative care of patients with CIEDs improved operating room efficiency, reduced institutional cost and improved patient safety. The outcomes measured were improved operative room efficiency, reduced institutional cost and patient safety when a specially trained anesthesia providers cared for patients with CIEDs. The outcomes were measured in time periods: Pre-intervention (2008-2010), before the specially trained anesthesiologists provided care to patients with CIEDs; and Post-intervention (2012-2014), after the anesthesiologists began caring for the patients with CIEDs. Results indicated that the difference in mean first-case start delay between the post-intervention and pre-intervention periods was -16.7 minutes (95% Confidence interval [CI], -26.1 to -7.2 respectively). The mean delay time between the post- and pre-intervention was -4.7 minutes (95% CI, -5.4 to -3.9 respectively). Based on reduction in first case start delay, the intervention was associated with cost savings (~$14,102 annual institutional savings or $94.06 per patient). This study concluded that specially trained anesthesia providers can provide safe and cost-effective perioperative care of patients with CIEDs.

Gifford, Larimer, Thomas, May, Stanhope, & Gami (2014) conducted a randomized controlled trial to evaluate how to manage patients with implantable cardiac defibrillators in the perioperative period. A convenience sample of 80 patients with pectoral ICDs undergoing surgery with monopolar (unipolar) electrocautery were included. 40 patients were randomized to

"off" group (the patients' ICD was reprogrammed to off prior to surgery and these patients required postoperative ICD reprograming) and 40 patients were randomized to the "magnet" group (a magnet was placed over the patients' ICD to suspend its function during surgery). The outcomes measured by the authors between these two groups were ICD off time (length of time the patient's ICD was off), caregiver handoff (length of time needed to give report on a patient when their ICD was pre-operatively turned off versus the patient when a magnet was used), and the incidence of EMI. The results indicated that the mean ICD off time was higher in the "off" group than the "magnet" group (115 vs. 28 minutes, $P<0.001$). The mean caregiver handoff was also higher in the off group (6.6 vs. 5.5, $P<0.001$) and no EMI was noted in the surgeries located greater than 6-inches from the ICD site for either group. Therefore, the authors concluded that it is safer to utilize a magnet during surgery than to preoperatively turn off a patient's ICD, which also prevents inadvertently discharging patients to home with ICDs turned off.

Gifford, Larimer, Thomas, & May (2017) conducted a multifacility cohort study to standardize the perioperative management of patients with CIEDs undergoing surgery requiring electrocautery. The authors aim was to evaluate EMI incidence and postoperative device reset based on surgical location. A convenience sample of 331 patients with pectoral CIEDs were included in this study and were assigned to three different groups regardless of surgery site. The three groups included: a sample of 52 patients requiring preoperative reprograming of their CIED, a sample of 51 patients receiving intraoperative magnet application over their CIED and a sample of 228 patients whose CIEDs were not manipulated. The results indicated that there was no EMI with surgeries below the iliac crest but there was EMI in surgeries above the iliac crest. Intraoperative EMI occurred in >45% for thoracic cases, 35% for Head and Neck procedures, 15% for upper extremity surgeries and 3% for abdominal cases. These authors concluded that

>69% of patients required no magnet application intraoperatively or device reprograming preoperatively when the surgery location was greater than 6-inches from the CIED.

Neubauer et al. (2018) conducted an observational prospective study to understand how to manage ICD patients intraoperatively based on the location of the surgery and the type of electrocautery being utilized. A sample of 101 patients with ICDs were divided into three groups. The three groups included a sample of 42 patients whose ICD was reprogrammed preoperatively, 42 patients who had magnet placed over their ICD during surgery, and 14 patients whose ICDs were not manipulated. Outcomes measured how the location of the surgery (below or above the umbilicus) and the type of electrocautery used (bipolar or unipolar) affected the intraoperative anesthesia management of the patient with an ICD. The authors concluded that intraoperative EMI was neither detected during surgeries below the umbilicus when unipolar electrocautery was used, nor during surgeries above the umbilicus when bipolar electrocautery was used.

Izrailtyan, Schiller, Katz, & Almasry (2013) reported a case study of an 89-year-old male patient with an ICD for tachyarrhythmias who developed intraoperative pacemaker-mediated tachycardia with magnet application over the ICD while undergoing hip surgery. The case study reported the patient's response to magnet application during a surgery greater than 6-inches from the ICD location. The study concluded that even for surgeries below the iliac crest or greater than 6-inches from the ICD location, the application of a magnet may induce life threatening tachycardias in patients with ICD devices undergoing surgeries.

Ip, Liu, Chen, & Lerman (2017) reported a case study to describe the effects of placing a magnet on an 80-year-old female pacemaker-dependent patient undergoing a mastectomy. The outcome measured was the patient's intraoperative response to magnet application. This study indicated that the patient developed asystole with magnet application after anesthesia induction

during the mastectomy operation. The authors attributed this poor outcome to the magnet application over the CIED of the pacemaker-dependent patient.

Evidence Synthesis

One randomized control trial, two cohort studies, two case studies and one observational study were reviewed for this project (Table 1). The consensus among majority of the studies are as follows for all three levels of perioperative care. During the preoperative period, an interrogation of the CIED device within a year of surgery is necessary to assess current functioning and to obtain an understanding of the CIED capabilities (Gifford et al., 2014). The device can further be analyzed by a cardiology-led CIED team who make patient-specific adjustments to the device such as switch device off, especially when surgeries are within 6-inches of the device or during emergencies (Crossley et al., 2011). During the intraoperative period, reprogramming of the CIED can be achieved temporarily and during emergencies by the application of a magnet over the CIED which switches the device to an asynchronous mode for surgeries above the umbilicus and iliac crest (Gifford et al., 2014). During the postoperative period, a re-interrogation of the CIED device is necessary to restore the CIED to default patient settings prior to patient discharge if the CIED was manipulated preoperatively (Gifford et al., 2017).

A cohort study by Ellis et al. (2017) concluded that properly trained anesthesia providers can provide a safe and cost-effective care for patients with CIEDs at all three levels of perioperative care. Although this cohort study had a large sample size of n=15,100 patients, the study did not assess the number of CIED patients who experienced EMI during surgery. The two case studies reviewed lack generalizability due to the risk for bias since only one patient's

experience each were reported. A collection of anesthesia practice recommendations from the literature review and synthesis were compiled into the CPG draft approved by the expert panel.

Theoretical framework

Kurt Lewin's Change Theory was the model of organizational change utilized in the development of this CPG. The purpose of Lewin's change theory is to provide a systematic process for change in three phases that includes removing the current often outdated practice method, introducing a new practice, and solidifying the new practice as the standard. The three major concepts of the Change theory are termed: Unfreezing, Moving and Refreezing (Lewin, 1947).

The first concept of Lewin's theory, Unfreezing, is defined as the pivotal stage of communicating why a change process is necessary (Lewin, 1947). The anesthesia department at this hospital had no standard of care for perioperative care of CIEDs, thus, the first step involved the creation of a CPG and educating the staff on its importance for patient safety. The second step in Lewin's theory, Moving, defined as the change itself, often involves a transition period and is usually the most challenging process to change (Lewin, 1947). For this project, this step involved the adoption of the developed CPG as policy and the re-education of anesthesia staff as needed to facilitate proper documentation on the preexisting electronic health record. The final step in Lewin's change theory, Refreezing, defined as the solidification of the change process ensures permanence of the change as part of the organization's culture (Lewin, 1947). At this hospital, the refreezing step will be accomplished once the established CPG policy is adapted by the anesthesia providers in daily clinical practice. During this stage, unit champions would be imperative to re-educate, conduct chart reviews and clarify the CPG policy as needed to the anesthesia staff.

Methods

Setting and Population

A hospital in Baltimore, Maryland was the setting where approximately, five patients with CIEDs present for surgeries on a weekly basis. The target population are all anesthesia providers who care for the patients with CIEDs undergoing surgery, which includes Student Registered Nurse Anesthetists (SRNAs), Certified Registered Nurse Anesthetists (CRNAs) and Anesthesiologists. Excluded were other perioperative staff who also care for this patient population such as operating room nurses, surgeons, pre- and post- anesthesia care unit nursing staff.

Phase I of CPG Development

IRB approvals were obtained from the University of Maryland Baltimore and the Administrative Review Board of the hospital site. An expert panel assembled by the DNP student included two CRNAs, a staff anesthesiologist, and a cardiac electrophysiologist. A meeting was held with the expert panel in the form of a PowerPoint presentation where the DNP student introduced the panels roles and responsibilities, the literature synthesis, and presented a draft of the CPG. The expert panel was asked for feedback on the draft CPG as it fits the needs of the hospital organization. A second meeting was held with the expert panel to review the modifications made to the CPG and obtain approval of the CPG draft. The expert panel completed the AGREE II Tool (Appendix A) during this meeting. A third meeting was held with the expert panel to discuss the AGREE II tool results (Table 2).

Phase II of CPG Development

A 30-minute PowerPoint presentation of the CPG was provided to the anesthesia providers during ground rounds. The learning objectives and outline were emailed to the

anesthesia unit secretary 1-week prior to the presentation for inclusion in the ground rounds agenda of the day. The presentation included clinical relevance and background information, evidence review and synthesis, final CPG draft, and expectations for daily anesthesia practice. Hardcopies of the PFQ (Appendix B) were distributed to the anesthesia providers during the presentation for feedback on the CPG presentation and applicability of the guideline to practice.

Phase III of CPG Development

Approximately 80% of the PFQ surveys distributed to the anesthesia providers were collected, a total of 30 out of 37 surveys. A meeting was held with the expert panel and the chief anesthesiologist to obtain approval of the further revised CPG. The CPG was then submitted to the chief anesthesiologist for adoption and got approved as an official policy for clinical practice at this anesthesia department.

Data Collection

The AGREE II tool (Appendix A) and the PFQ (Appendix B), were used for data collection. The AGREE II tool includes six domains that assesses quality of guidelines. The PFQ is an anonymous survey that assesses clarity of the CPG and ease of CPG use in clinical practice.

Data Analysis

The expert panel completed the AGREE II tool after the second meeting and the raw scores, scaled scores and comments were compiled. Qualitative data to include provider years of experience and anesthesia provider type were analyze based on the PFQ feedback. Further analysis of PFQ compared the rate of response to two specific questions in the PFQ.

Results

Table 2 details the AGREE II tool results within the six domains. The domain scores ranged from 70.8 to 97.9%. The highest rated domain at 97.9 % was *Editorial Independence*,

while the two lowest domain scores, *Rigour of Development* and *Clarity of Presentation* were 70.8% and 70.8% respectively. Of the PFQ surveys collected, 47% of the responses were from CRNAs, 27% were Anesthesiologists and 26% were SRNAs as shown in Figure 2. PFQ responses were analyzed based on years of experience. As shown in Figure 3, 50% of the providers had 0-5 years, 23.3% had 5-10 years, 6.7% had 10-15 years, 0% had 15-20 years, 6.7% had 20-25 years, and 13.3% had >25years of experience. From the PFQ results in Figure 1, 94% of the anesthesia providers agreed to approval of the CPG as policy (PFQ Question 21) and 90% indicated they would adapt the approved CPG recommendations to their clinical practice (PFQ Question 23). There was no statistical difference noted in the PFQ response rate to question number 21 and number 23 based on years on experience.

Discussion

The strength of this project is that the CPG developed was approved as a policy for daily anesthesia clinical practice. Renewal of the CPG every two to three years will be necessary to ensure up to date references. There is no cost implication to implementation of the CPG policy as the anesthesia department already has a documentation section for patients with CIEDs on its preexisting electronic health record. This organization prioritizes quality improvement and future QI projects need to investigate the feasibility of a Cardiology-led CIED team as this will further enhance safety for this patient population. A limitation encountered during the CPG development include the limited amount of level 1 studies available on this patient population.

Areas of improvement include education of other operating room staff such as the nurses and surgeons, regarding the importance of using the bipolar electrocautery and having defibrillation equipment present at all times in the operating room during surgical procedures on patients with CIEDs. Hospital education across the disciplines of perioperative staff including

the pre- and post- anesthesia care unit staff who also care for patients with CIEDs on a daily basis will be critical for sustainability. The use of a unit champion will be required to complete quarterly chart reviews to verify anesthesia staffs' compliance to the CPG policy based on the documentation on the preexisting electronic health record.

Conclusion

The cumulative results from the PFQ responses revealed promising use of the CPG policy in the future by anesthesia providers for this patient population. The CPG development process also educated the majority of anesthesia providers at this hospital with very limited years of experience on the patient safety measures required during the intraoperative anesthesia care of patients with CIEDs. Adoption of this CPG into daily anesthesia practice is feasible as this hospital already has a section for documenting the anesthesia care provided to this patient population on its preexisting electronic health record. In the end, this DNP project successfully created a CPG policy for this hospital's anesthesia department.

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Table 1: Evidence Table

Author, year	Study objective/intervention or exposures compared	Design	Sample (N)	Outcomes studied (how measured)	Results	*Level and Quality Rating
Ellis, Treggiari,Robertson, Rozner, Graven, Aziz, & Schulman, 2017.	To evaluate the efficacy and safety of anesthesia care provided to CIED patients before and after the implementation of newly trained anesthesiologist run perioperative CIED service.	Cohort study	N=15,100 convenience sample of patients who underwent surgery between 2008-2010 (pre-intervention n=7293) and 2012-2014 (post-intervention n=7807).	Improved operative room efficiency, reduced institutional cost and adequate patient safety with specially trained anesthesiologists caring for CIED patients.	The difference in mean first case start delay between the post and preintervention periods was -16.7minutes (95% Confidence interval [CI], -26.1 to -7.2 respectively). The mean delay time between the post and preintervention was -4.7minutes (95% CI, -5.4 to -3.9 respectively). Based on reduction in first case start delay, the intervention was associated with cost savings (~$14,102 annual institutional savings or $94.06 per CIED patient). Specially trained anesthesia providers can provide safe and cost-effective perioperative care for patients with CIEDs.	4B
Gifford, Larimer, Thomas, May, Stanhope, & Gami, 2014.	To evaluate how to manage patients with implantable cardiac defibrillators (ICD) in the perioperative period.	Randomized Controlled Trial	Convenience sample n = 80 patients who had pectoral ICDs and undergoing surgery with unipolar electrocautery.	Subjects were randomized to 'off' group and 'magnet' group. Outcomes measured were time with ICD off, caregiver handoff, and incidence of electromagnetic interference (EMI).	Mean ICD off time was higher in the off group than the Magnet group (115minutes vs 28 minutes, P<0.001). Mean caregiver handoff was also higher in the Off group (6.6 vs 5.5, P<0.001). No EMI was noted in the surgeries located >6inches from the ICD.	2B
Izrailtyan, Schiller,	To report an intraoperative	Case study	N=1	Case report to assess patient's	Even for surgeries under the iliac, application of a magnet may induce	6B

Katz, & Almasry, 2013.	pacemaker-mediated tachycardia associated with magnet application over an Implanted Cardioverter Defibrillator (ICD) in a patient undergoing Hip surgery.		An 89-year-old man with a history of atrial fibrillation status post ICD placement 20 months prior for tachyarrhythmias; congestive heart failure, coronary artery disease, coronary artery bypass graft surgery 20 years prior, ischemic cardiomyopathy and left ventricular ejection fraction of 30% who presented for open reduction and fixation of the right hip.	response to intraoperative magnet application during a surgery >6inches from the ICD location.	life threatening tachycardias in patients with ICD devices undergoing surgeries.	
Ip, Liu, Chen, & Lerman, 2017.	To assess the impact of pacemaker magnet application for a pacemaker dependent patient undergoing mastectomy surgery.	Case study	N=1 An 80-year-old woman with history of Hypertension, breast cancer status post previous lumpectomy and dual-chamber pacemaker implanted for complete heart block.	Outcomes measured was patient's intraoperative response to magnet application over pacemaker during a surgery <6inches from the pacemaker location.	This pacemaker-dependent patient developed asystole with magnet application after anesthesia induction during a mastectomy operation.	6B
Gifford, Larimer, Thomas, & May, 2017.	To standardize the perioperative management of patients with Cardiovascular Implantable Electronic Devices undergoing surgery requiring electrocautery.	Multifacility cohort study	N=331 patients with pectoral CIEDs	Outcomes were measured to assess the difference in patients assigned to 3 groups regardless of surgery site: 1) Required reprogram 2) Magnet application 3) No change	Results found that there was no EMI occurred with electrocautery use during surgeries below the iliac crest, whereas, there was EMI during surgeries above the iliac crest in patients at the following rates (>45% for thoracic cases; 35% for Head and Neck procedures; 15% for upper extremity surgeries; 3% for abdominal cases). In conclusion, > 69% of patients	4B

					required no magnet application intraoperatively or device reprograming preoperatively.	
Neubauer, Wellan, Herzog-Niescery, Wutzler, Weber, Mugge, & Volsang, 2018.	To understand how to manage ICD patients intraoperatively based on the location of the surgery and the type of electrocautery being utilized.	Observational prospective study	N=101 patients with ICDs, not pacemaker dependent was included in the study. The ICD was reprogrammed preoperatively N=42 patients, a magnet was used in N=45 patients, and ICD was not deactivated in N=14 patients.	Outcomes measured how the location of the surgery and the type of electrocautery used affects the intraoperative anesthesia management of ICD patients.	Results found that no intraoperative electromagnetic interference was detected for surgeries below the umbilicus when unipolar electrocautery was used, and in surgeries above the umbilicus when bipolar electrocautery was used.	4B

Table 2: AGREE II Tool Results

Quality Score for Each AGREE II Domain

	Obtained Score	Domain Score %
Domain 1: Scope of Practice	78	91.7
Domain 2: Stakeholder Involvement	73	84.7
Domain 3: Rigour Of Development	168	70.8
Domain 4: Clarity of Presentation	63	70.8
Domain 5: Applicability	104	91.7
Domain 6: Editorial Independence	55	97.9

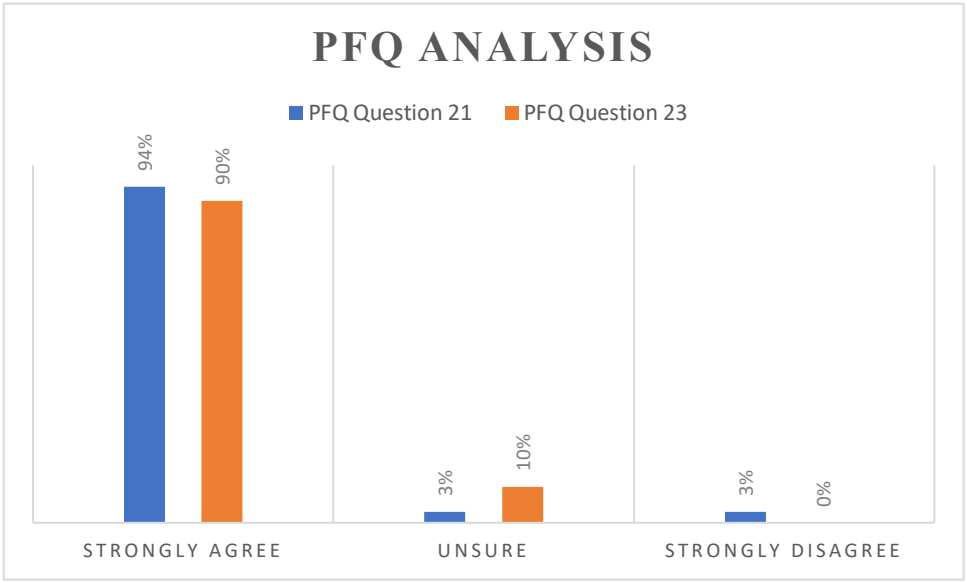

Figure 1: Specific Questions - PFQ Analysis

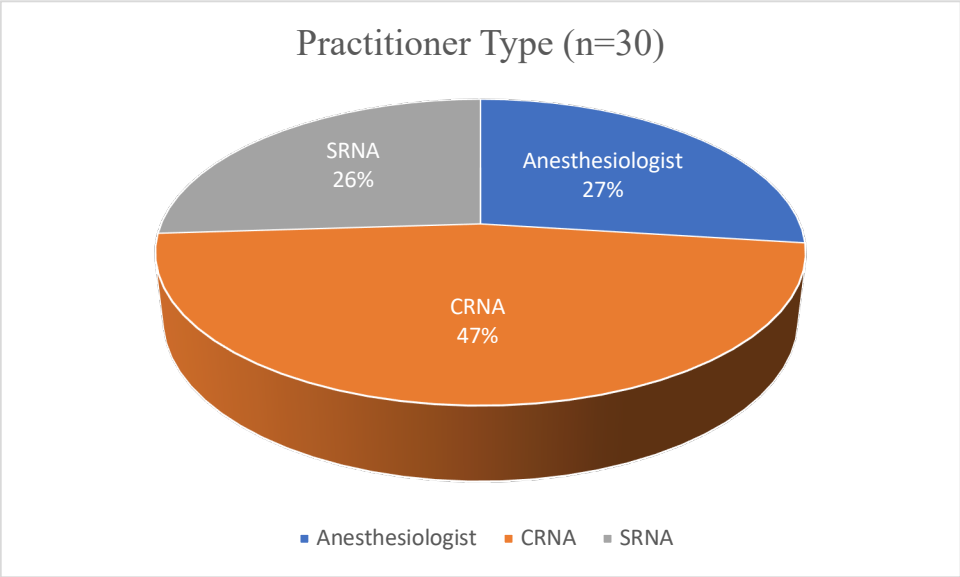

Figure 2: PFQ Result - Practitioner Type

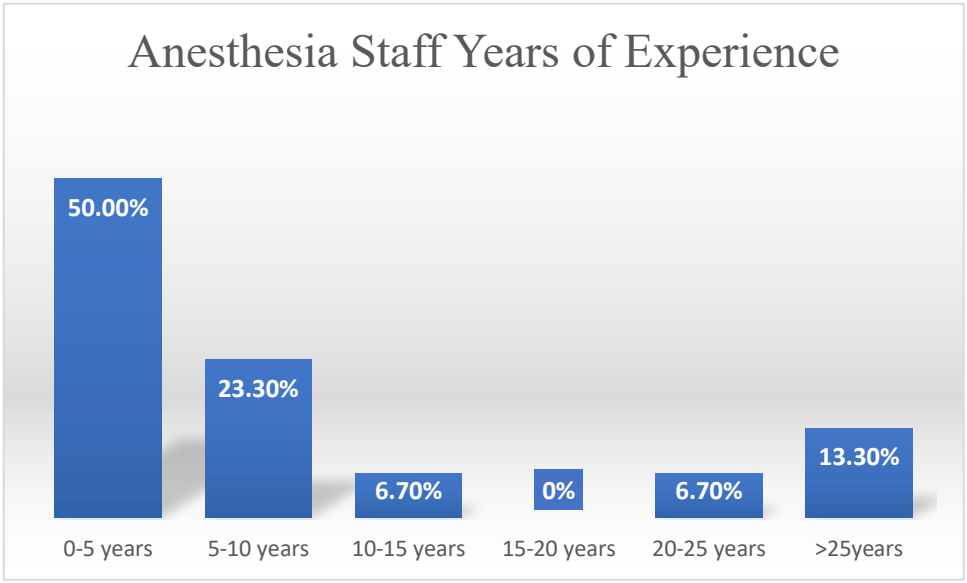

Figure 3: PFQ Result – Years of Experience

Appendix A: AGREE II Tool

Domain	Item	AGREE II Rating						
		1 *Strongly Disagree*						**7** *Strongly Agree*
Scope and purpose	1. The overall objective(s) of the guideline is (are) specifically described.							
	2. The health question(s) covered by the guideline is (are) specifically described.							
	3. The population (patients, public, etc.) to whom the guideline is meant to apply is specifically described.							
Stakeholder involvement	4. The guideline development group includes individuals from all the relevant professional groups.							
	5. The views and preferences of the target population (patients, public, etc.) have been sought.							
	6. The target users of the guideline are clearly defined.							
Rigor of development	7. Systematic methods were used to search for evidence.							
	8. The criteria for selecting the evidence are clearly described.							
	9. The strengths and limitations of the body of evidence are clearly described.							
	10. The methods for formulating the recommendations are clearly described.							
	11. The health benefits, side effects and risks have been considered in formulating the recommendations.							
	12. There is an explicit link between the recommendations and the supporting evidence.							
	13. The guideline has been externally reviewed by experts prior to its publication.							
	14. A procedure for updating the guideline is provided.							
Clarity of presentation	15. The recommendations are specific and unambiguous.							
	16. The different options for management of the condition or health issue are clearly presented.							
	17. Key recommendations are easily identifiable.							
Applicability	18. The guideline describes facilitators and barriers to its application.							
	19. The guideline provides advice and/or tools on how the recommendations can be put into practice.							
	20. The potential resource implications of applying the recommendations have been considered.							
	21. The guideline presents monitoring and/ or auditing criteria.							

Domain	Item	AGREE II Rating						
		1 *Strongly Disagree*						**7** *Strongly Agree*
Editorial independence	22. The views of the funding body have not influenced the content of the guideline.							
	23. Competing interests of guideline development group members have been recorded and addressed.							
Overall Guideline Assessment	1. Rate the overall quality of this guideline.	**1** *Lowest possible quality*						**7** *Highest possible quality*
Overall Guideline Assessment	2. I would recommend this guideline for use.	*Yes*		*Yes, with modifications*				*No*

Appendix B: Practitioner Feedback Questionnaire

1. Are you responsible for the care of patients for whom this draft guideline report is relevant? This may include the referral, diagnosis, treatment, or follow-up of patients.	Yes ☐	No ☐	Unsure ☐
If you answered "*No*" or "*Unsure*", there is no need to answer or return this questionnaire. If you answered "*Yes*", please answer the questions below and return to **[enter expected destination of surveys]**.			
	Strongly agree	Neither agree or disagree	Strongly disagree
2. The rationale for developing a guideline is clear.	☐	☐	☐
3. There is a need for a guideline on this topic.	☐	☐	☐
4. The literature search is relevant and complete (e.g., no key evidence was missed nor any included that should not have been) in this draft guideline.	☐	☐	☐
5. I agree with the methodology used to summarize the evidence included in this draft guideline.	☐	☐	☐
6. The results of the evidence described in this draft guideline are interpreted according to my understanding of the evidence.	☐	☐	☐
7. The draft recommendations in this report are clear.	☐	☐	☐
8. I agree with the draft recommendations as stated.	☐	☐	☐
9. The draft recommendations are suitable for the patients for whom they are intended.	☐	☐	☐
10. The draft recommendations are too rigid to apply to individual patients.	☐	☐	☐
11. When applied, the draft recommendations will produce more benefits for patients than harms.	☐	☐	☐
12. The draft guideline presents options that will be acceptable to patients.	☐	☐	☐
13. To apply the draft recommendations will require reorganization of services/care in my practice setting.	☐	☐	☐
14. To apply the draft guideline recommendations will be technically challenging.	☐	☐	☐
15. The draft guideline recommendations are too expensive to apply.	☐	☐	☐
16. The draft guideline recommendations are likely to be supported by a majority of my colleagues.	☐	☐	☐
17. If I follow the draft guideline recommendations, the expected effects on patient outcomes will be obvious.	☐	☐	☐
18. The draft guideline recommendations reflect a more effective approach for improving patient outcomes than is current usual practice. (If they are the same as current practice, please tick NA). *NA* ☐	☐	☐	☐
19. When applied, the draft guideline recommendations will result in better use of resources than current usual practice. (If they are the same as current practice, please tick NA). *NA* ☐	☐	☐	☐

20. I would feel comfortable if my patients received the care recommended in the draft guideline.	☐	☐	☐
21. This draft guideline should be approved as a practice guideline.	☐	☐	☐
22. If this draft guideline were to be approved as a practice guideline, I would use it in my own practice.	☐	☐	☐
23. If this draft guideline were to be approved as a practice guideline, I would apply the recommendations to my patients.	☐	☐	☐

Brouwers, M.C., Graham, I.D., Hanna, S.E., Cameron, D.A., & Browman, G.P. (2004). Clinicians' assessments of practice guidelines in oncology: The CAPGO survey**.** *International Journal of Technology Assessment in Health Care, 20*(4), 421-6.