

What is the Impact of the Implementation of an Evidence Based Procedural Sedation Protocol in the Emergency Department?

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Abstract

Background: Procedural sedation and analgesia (PSA) enables emergency physicians to provide pain and anxiety relief for many procedures. However, PSA introduces an independent risk factor and requires continuous monitoring. Recently, we applied the principles of knowledge translation (KT) to develop and implement a PSA protocol in our ED.

Objectives: To evaluate the impact of a PSA protocol developed and implemented using KT principles on changes in ED physician practices with respect to length of monitoring time in resuscitation area, complication rate, medication types and doses.

Methods:

Design: Pre- Post retrospective chart review.

Setting: Adult tertiary-care academic centre.

Participants: Patients who underwent PSA in the ED as per physician billing code from September 2008 to August 2010. The Pre protocol implementation was from Sept 2008 to Aug 2009 and the Post was from Sept 2009 to Aug 2010. One of the authors (NM) reviewed all charts and recorded patient information such as sociodemographics, past medical history, allergies, monitoring time, complications, medication and doses. Pre and post periods information was compared using two-sample T-test and Chi-square test as appropriate.

Results: There were 318 billing codes for PSA from September 2008 to August 2010 of which the 150 occurred during the Pre protocol period and 134 during the Post protocol implementation period. Excluded were 34 patients due to lack of documentation. There were no statistical differences in Pre vs. Post for baseline characteristics (mean age+standard deviation (52+20 vs. 53+22 years), male gender (54% vs. 53%), with a past medical history (36% vs. 47%) and allergies (16% vs. 15.7%)). As well no differences in outcomes with respect to complication rate (7.4% vs. 9.9%) and medication types (70% vs. 65% Ketafol, 23% vs. 23% propofol) and doses used. However, monitoring time in minutes recorded from time of first medication given until patient was moved out of resuscitation area was significantly reduced during the Post period (Pre period: mean 49 (95% CI: 42-56) versus Post period: mean 19 (95% CI: 17-21).

Conclusion: The implementation of the PSA protocol using KT principles resulted in a significant and important decrease in monitoring time required for PSA thus liberating important resources in busy EDs.

Keywords: Procedure sedation; Emergency; Monitoring; Knowledge translation

Introduction

For more than a decade procedural sedation and analgesia (PSA) has enabled emergency physicians to perform pain-free and anxiety-free emergent procedures. Although PSA has greatly improved patient care and comfort, and has been incorporated into emergency medicine (EM) training programs, there are still concerns about the safety of

performing such procedures outside the operating theatre [1]. PSA introduces an independent risk factor for morbidity and mortality in addition to the procedure itself. Continually evaluating and monitoring respiratory and circulatory requirements prior to, during, and following the procedure is essential & might be quite challenging in a busy emergency department (ED) [2].

In March 1996, a National Emergency Medicine Working Committee, representing adult and pediatric Emergency physicians, was established to come up with Canadian Consensus Guidelines. These guidelines discuss the goals, definitions, and principles of ED sedation, and make recommendations for pre-sedation preparation, patient fasting, physician skills, equipment and monitoring requirements, and post-sedation care [3].

Recently, at our tertiary care hospital, a PSA Protocol was developed and implemented in our ED in order to increase documentation and decrease complications associated with PSA. The protocol includes indications and contraindications for PSA, monitoring equipment required roles and responsibilities of staff, medication descriptions, and discharge instructions. Included as well is a procedural sedation documentation sheet for the physician, nurse, and respiratory technician, a preprinted prescription sheet, and a discharge instructions sheet.

The Canadian Institutes of Health Research has referred to knowledge translation (KT) as "a dynamic and iterative process that includes synthesis, dissemination, exchange and ethically sound application of knowledge to improve the health of Canadians, provide more effective health services and products and strengthen the health care system" [4]. The aim of our study is to look at whether or not the knowledge provided by the implementation of our PSA protocol was translated into a change in clinical practice. Our objectives were to evaluate the impact of our PSA protocol that was developed and implemented using KT principles on changes in ED physician practices with respect to length of monitoring time in resuscitation area, complication rate, medication types and doses.

Methods

Study design

A retrospective chart review of patients who underwent PSA from September 2008 to August 2010 at the Jewish General Hospital (JGH) ED. We compared the year prior to PSA protocol implementation (Sept 2008-Aug 2009) with the year following implementation (Sept 2009-Aug 2010).

Study population and setting

The JGH is a tertiary care hospital and a level two-trauma center. We have a large elderly patient population with 30% over 65 years of age. We perform an average of approximately 12 PSA procedures per month.

A computerized search using the ED administrative database was performed to target all patients who underwent PSA in the ED based on the PSA physician billing code. All adult patients who underwent PSA were included in the study.

Study protocol

All the patient medical charts resulting from the search were reviewed twice on two separate occasions through the hospital's electronic medical charts database by one of the authors (NM). Information recorded included: patient demographics, past medical history, allergies, the procedure performed, the medications and doses used, monitoring time required, and any complications documented. There were four categories of medications used both pre and post protocol which included fentanyl and versed, propofol, ketamine, and ketafol. The definition of monitoring time was the time recorded in minutes from the first medication given until the patient was moved out of the resuscitation area. The possible complications were defined as vomiting, hypoxemia (SpO₂<90%), hypotension (SBP <90 mmHg),

apnea, arrhythmia, allergic reaction, laryngospasm, emergence reaction, hyper salivation, or other. Both physician and nursing notes were searched in order to obtain all pertinent information pre protocol documentation sheets. All information was entered on a database spread sheet at the JGH ED research unit.

Ethical issues

The Director of Professional Services - and the JGH Research Ethics Committee reviewed our protocol. As this was a retrospective chart review, an expedited - approval was granted.

Outcome measures

We determined whether the implementation of an ED PSA protocol translated into a positive change in clinical practice through measuring changes in the following outcomes: Length of monitoring time required (Primary end point), complication rate and medication types and doses used (Secondary end points).

Data analysis

Descriptive statistics such as means (+standard deviations) and proportions were used to describe baseline patient characteristics. Univariate analysis (T-test and Chi-square test) was used to compare these patient factors pre *vs.* post implementation. Factors that showed statistically significant difference with P<0.10 were entered into multiple linear regression analysis where length of monitoring time were compared pre vs. post after controlling for potential confounding factors.

Results

There were 318 billing codes for PSA from September 2008 to August 2010 of which 150 occurred during the Pre protocol period and 134 during the Post protocol implementation period. We excluded 34 patients due to a lack of documentation.

We compared the baseline characteristics between the two groups (pre *vs.* post protocol), and found no statistical difference between them (mean age+standard deviation (52+20 vs. 53+22 years), male gender (54% vs. 53%), with a past medical history (36% vs. 47%) and allergies (16% vs. 15.7%) (Table 1).

Baseline Character	Pre	Post
Ν	150	134
Male	81 (54%)	71 (53%)
Age (yr) Mean (SD)	52 (20)	53 (22)
Past Medical History	36%	47%
Allergies	16%	15.7%

Table 1: Baseline characteristics.

Both the medication types (ketafol 70% *vs.* 65%, propofol 23% *vs.* 23%) and doses were not significantly different pre and post protocol implementation.

As well, the complication rates (7.4% vs. 9.9%) were not significantly different.

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	Pre	Post
Ν	150	134
Frequency (Percent)	11 (7.43)	13 (9.85)

Table 2: Complication rate.

The most frequent complication was hypoxia (Pre protocol=5.4% and Post protocol=4.6%), while hypotension was the second most frequent (Pre protocol=1.4% and Post protocol=2.3%) (Table 2).

The monitoring time in minutes recorded from time of first medication given until the patient was moved out of the resuscitation area was significantly reduced during the post protocol implementation period (Pre period: mean 49 (95% CI: 42-56) versus Post period: mean 19 (95% CI: 17-21)) (Table 3).

	Pre	Post
Ν	150	134
Mean (SD)	49 (41)	19 (13)
95%CI	(42-56)	(17-21)

Table 3: Monitoring time (min).

Discussion

Knowledge translation (KT) is the method used to translate the evidence documented in the literature into a positive change in clinical practice. There have been many techniques developed in order to accomplish this task. We designed a PSA protocol in our department based on KT principles in order to provide information to the treating ED physician regarding patient evaluation for PSA (ie., Risks of difficult airway or other complications) as well as clear guidelines regarding patient monitoring, medication choices and doses. We also wanted to improve documentation during PSA. We proved that our KT method lead to a significant reduction in monitoring time required for patients undergoing PSA which is very valuable for our ED as it is extremely busy and has limited monitored beds.

We looked at possible biases to our study which could have explained this significant change in monitoring time, such as a change in staff members or a change in the emergency department design or functioning, but the only change that we found was the implementation of our protocol. We also did a subgroup analysis to see if the type of procedures done played a role in this time reduction, but again there was no statistical difference in procedure type pre and post protocol.

Thus, the conclusion that we draw from our results is that clear guidelines regarding when the patient is stable for transfer out of our resuscitation allowed both the physicians and nurses to monitor the patient for a shorter time interval, thus freeing up our resuscitation beds sooner.

Limitations

These results are from a single center, and thus further studies should be performed in order to assess if the results can be replicated. Other limitations include limitations of retrospective chart reviews ie., missing data.

Conclusion

The implementation of the PSA protocol using KT principles resulted in a significant and important decrease in monitoring time required for PSA thus liberating important resources in busy ED.

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