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Original Article

A Quality Improvement Method on Improving the Safe Procedural & Analgesia Service in the Emergency Medicine Setting

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Abstract

Introduction: Procedural sedation and analgesia are common procedures in the emergency department, performed almost daily on a large cohort of patients. Despite their frequency, safety profiles have been a concern due to sentinel cases of complications leading to adverse outcomes. Consequently, the term "safe procedural sedation and analgesia" has been adopted to emphasize safety as a crucial component of the procedure. **Methods:** To ensure a robust safety profile, we implemented the mnemonic BACSACS, providing a guided protocol for procedural sedation and analgesia. This mnemonic was designed to enhance safety and standardize the procedure. **Results:** Data from the implementation of the BACSACS protocol were analyzed to assess its effectiveness and impact on patient outcomes. **Conclusion:** The use of the BACSACS mnemonic in procedural sedation and analgesia helped instil a safety-focused approach. Data analysis confirmed its effectiveness, demonstrating improved safety profiles and positive patient outcomes.

Keywords: *Emergency Medicine; Quality Improvement; Safe Procedural Sedation and Analgesia*

Introduction

Procedural sedation and analgesia (PSA) are a "common emergency department (ED) clinical practice that alleviates pain, anxiety, and suffering for patients' medical procedures" (Homma *et al.*, 2020). These procedures are usually short and include reduction of joint dislocation, cardioversion, and imaging studies (Shimizu *et al.*, 2021). Doing PSA in the safest way can avoid grave consequences (van Schaik *et al.*, 2021). The PSA procedure is done on a variety of patients including the traumatic, infective, inflammatory, metabolic, neoplastic and psychiatric patient s in the ED for various reasons. The SPSA is conducted in all zones in the ED room the red zone, yellow zones and the observation wards. Therefore, there needs to be a property guide on performing the procedure which is beneficial but with not uncommon risk of complications including death.

Methodology

Over a period of 6 months, comprehensive data has been meticulously gathered from patients undergoing procedural sedation and analgesia (PSA) in the emergency department (ED) using an online Google Sheets form (Sahyoun *et al.*, 2021). Central to this data collection effort is the implementation of the BACSACS mnemonic system, a structured approach encompassing background, ASA classification, choice of drugs, starve status, airway assessment, consent, and safety checklist (Li *et al.*, 2021). This mnemonic system serves as a crucial tool in ensuring that every PSA procedure is conducted in an environment optimized for safety, beginning with thorough PRE-SPSA assessments for each patient.

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The collected data underscores the significant impact of the BACSACS mnemonic on enhancing the quality of PSA in the ED (Sahyoun *et al*., 2021), particularly among patients with various comorbid conditions. By systematically addressing each component of the mnemonic, healthcare providers can tailor sedation and analgesia strategies to individual patient needs while mitigating potential risks associated with the procedure. This structured approach not only improves procedural outcomes but also enhances patient safety and satisfaction.

Key elements such as ASA scoring (American Society of Anesthesiologists classification) and sedation scales play pivotal roles in the development of guidelines aimed at ensuring the safety of PSA procedures (Lew *et al*., 2023). These tools enable healthcare teams to assess patient risk levels accurately, select appropriate medications, monitor sedation depth effectively, and intervene promptly if complications arise. The integration of standardized assessment tools and protocols derived from the BACSACS mnemonic facilitates consistency and reliability in the delivery of sedation and analgesia services across diverse patient populations.

In conclusion, the utilization of the BACSACS mnemonic system in the ED represents a significant advancement in procedural sedation and analgesia practices. By promoting a structured and systematic approach to patient assessment and management, healthcare providers can optimize procedural outcomes while prioritizing patient safety, thereby setting a benchmark for quality improvement in emergency medicine settings.

Results and Discussion

In the course of 6 months, a total of 43 patients had received PSA. With the use of a mnemonic BACSACS with a safety checklist, only 2 minor complications were reported, and no major complications were reported (Figure 1), as shown in the below table.

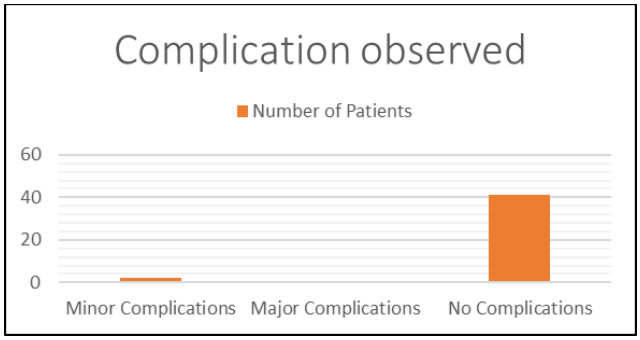

Figure 1: Number of Cases with Range of Complications Observed

Table 1: Safety Profile of Patients with Comorbids

Comorbids	No. of Patients	Minor Complications	Major Complications
Yes	8	0%	0%
No	35	0.06%	0%

The underlying disease of patients determines the outcome of PSA. In Table 1, out of 43 patients, 8 had comorbidities. Our data found that, out of the patients that had comorbidities, there were 0% complications. This shows that using the pneumonic BACSACS can be used for patients with comorbid conditions to do PSA safely (Raffay *et al*., 2020).

The most common indications that required PSA were CMR procedures (34%), toilet and suturing in the ED (6.9%), the least common being chest tube insertion (4.7%), imaging studies (4.7%), and cardioversion (4.7%). This is discussed in Table 2.

Table 2: Types of Cases Which Required SPSA

Type of Cases		No. of Patients	Percentage
Trauma	CMR	34	79%
	Toilet and Suturing	3	6.9%
	Chest Tube Insertion	2	4.7%
Synchronised Cardioversion		2	4.7%
Imaging Studies – Sedation (e.g. CT Brain)		2	4.7%

Almost all the patients who received PSA are for trauma; that shows the cohort of PSA use in the ED, an easy cohort of patients only done in the ED. Other than that, according to the ASA scoring, most of the patients were in class 1–2. It shows the safe ASA scores prior to doing PSA in the ED. Only 2% of difficult airway cases were identified through the ASA airway assessment, which was successfully done with supervision (Figure 2). There was no major complication reported.

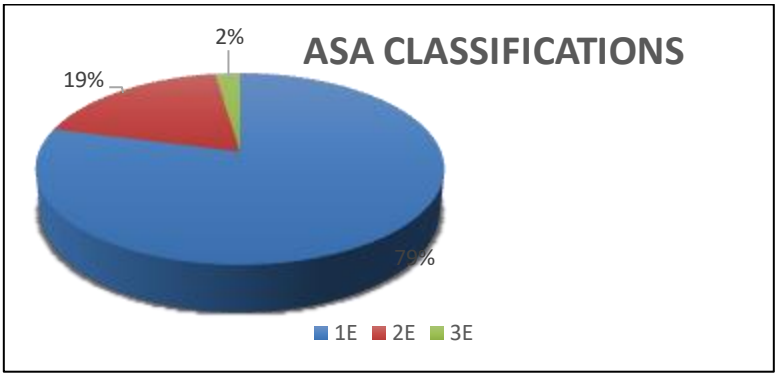

Figure 2: The Range of ASA Classification in All Patients Receiving SPSA in the Emergency Department

The below Figure 3 shows that the most commonly used drugs were propofol and Ketamine combinations known as Ketofol, accounting for 37%, which is easily available in the ED (Hara *et al.*, 2023).

All the drugs used were at a safe dose. The dosage for propofol is 1 to 2.5 mg/kg (adults), 0.5 to 1 mg/kg (children), and for Ketamine, both adults and children, IV is 1 to 3 mg/kg and IM is 5 to 10 mg/kg.

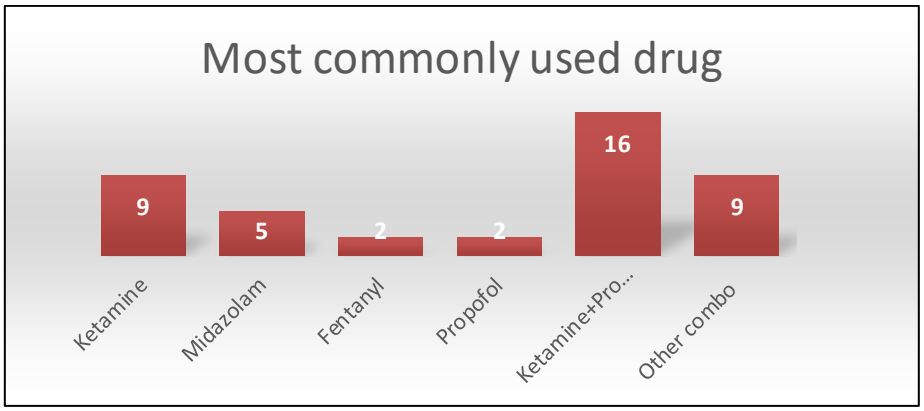

Figure 3: Most Common Drugs Used in Providing SPSA

In the emergency department, the selection of drugs used for procedural sedation and analgesia (PSA) is critical to ensuring patient safety and effective sedation. Commonly used medications include Midazolam for their anxiolytic and sedative properties, Fentanyl for pain relief, and dissociative agents like Ketamine for their profound analgesic and amnestic effects. Propofol, a rapid-acting sedative-hypnotic agent, is also frequently used due to its quick onset and short duration of action. The choice of drugs is tailored to each patient's needs, medical history, and the specific procedure being performed (Table 3).

Table 3: Type of Drugs Used in SPSA in the Emergency Department

Type of Drugs	No. of Patients	Percentage
Ketamine	9	21%
Midazolam	5	11%
Fentanyl	2	5%
Propofol	2	5%
Ketamine + Propofol	16	37%
Other combination	9	21%

Conclusion

Ensuring a robust safety profile is paramount when conducting procedural sedation and analgesia (PSA) in emergency settings. The implementation of the BACSACS mnemonic system has demonstrated a marked improvement in the quality and safety of PSA procedures in the emergency department, leading to better patient outcomes. Achieving these safety standards is essential and must align with the overall goals of sedation and analgesia.

Conflict of Interest

The authors declare that they have no competing interests.

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