

The Transition Process from Patient-Controlled Intravenous Analgesia to As-Needed Analgesia in Postoperative Situations – A Preliminary Look at the Issue

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Abstract

Purpose: Several studies have shown that patients often receive inadequate treatment for postoperative pain. However, there is little literature focusing on the transition process from patient-controlled intravenous analgesia (IV-PCA) and systematic (regular or as needed [PRN]) analgesia in the postoperative context. The purpose of this descriptive study is to describe the types of medication received by postoperative patients during the transition between IV-PCA and PRN analgesia, and to describe the pain assessments performed by nurses during this transition (n=36). **Method:** A retrospective analysis of participants' patient records by checking their medical history, analgesics prescribed and administered, and nurses' pain assessments. **Results:** When IV-PCA was discontinued, 52.8% of participants had no documented pain assessment and 75.0% received no PRN medication. Only 5 participants (24.8%) received analgesia. A double-entry table of the data indicates no significant relationship between the presence of a pain assessment and the presence of PRN analgesia when IV-PCA was stopped. **Conclusion:** This study confirms the need to review postoperative pain assessment and management procedures. Nurses must receive training in pain assessment and management.

INTRODUCTION

Postoperative pain is an important issue. Non-relieved pain is a major physiological stress (1) that may increase heart rate and blood pressure, slow gastric emptying, provoke endocrine imbalances and reduce breathing capacity, among other problems (2). Immobility due to pain in turn promotes deep vein thrombosis and pulmonary embolism (1,3-5). It also has psychological effects, such as increased anxiety, sleep disorders, fatigue, agitation, irritability, aggressiveness, and above all emotional suffering and distress (2,6,7). People with a high level of postoperative pain are also more likely to develop delirium (8). Ultimately, these complications will unnecessarily prolong the patient's hospital stay (7), increasing health care costs, and can even turn regular pain into chronic pain (3,7,9,10). Considering all the implications of poorly-relieved postoperative pain, it is essential to ensure that relief is provided successfully.

To this end, several therapeutic alternatives are available, such as nurse-controlled systematic (regular or as needed [PRN]) analgesia, ongoing (intravenous, epidural) analgesia,

and patient-controlled (intravenous or transdermal) analgesia (7,11). In recent decades, patient-controlled intravenous analgesia (IV-PCA) has emerged as the preferred therapeutic drug-administration method to efficiently manage postoperative pain (11). With IV-PCA, the patient self-injects a dose of analgesic, usually morphine or hydromorphone, administered parenterally via a pump that has been pre-programmed to the patient's clinical parameters by the anesthesia department (12,13).

Although IV-PCA remains the preferred therapeutic method of postoperative pain management, several studies have reported mixed results concerning its effectiveness, particularly as regards the reduction and alleviation of postoperative pain (12,14,15). Nonetheless, IV-PCA improves patient satisfaction (11,13-16), outcome (11,16,17), feelings of control (4,12,15,18) and engagement (4). It also helps reduce analgesic gaps (13), anxiety (18) and feelings of helplessness (4).

Nursing staff also acknowledge the benefits of IV-PCA for

patients (18), since it permits greater flexibility in the administration of analgesics (11) and decreases patients' use of nursing staff (12), which in turn decreases the nurses' workload (13,19). However, IV-PCA does not fit all patients (4,11), particularly those with cognitive disabilities, psychological disorders, a decreased level of consciousness (13) or a significant mobility impairment (11). It is therefore essential to carefully select patients eligible for IV-PCA (4,11-13,17,18).

Usually, IV-PCA is used in the first 24-48 hours after surgery. Subsequently, patients typically receive PRN analgesia. Some authors highlight possible major issues during this transition between IV-PCA and PRN analgesia. These can include an increase in the analgesic gap and a lack of systematic pain assessment by nurses (13,20). When changing analgesic administration methods, a systematic pain assessment should be performed using standardized tools, and regular, systematic analgesia should be administered, taking into account the analgesic's action peak and duration, to ensure that the patient's pain is efficiently alleviated (13,21,22).

Unfortunately, periods of transition between two methods of administration or two types of painkiller are not studied in clinical trials (23). Moreover, while several studies have investigated the effectiveness and effects of IV-PCA on postoperative patients, no study has looked at pain assessment and the medication received by patients in the transition between IV-PCA analgesia and regular systematic or PRN analgesia. What about in-transition pain management?

OBJECTIVES

The primary objective of this study is to describe the types of medication postoperative patients receive during their transition from IV-PCA to systematic PRN analgesia. The second objective is to describe the pain assessments performed by nurses during that transition.

METHODS

PARTICIPANTS

This tracking study is the result of a secondary analysis of research findings focused on postoperative pain assessments (24). Medication received and pain assessments were described using retrospective output specifications. Participants were recruited from the list of elective surgeries in a tertiary university hospital, using a convenience sampling. Participant recruitment was conducted from

January to June 2006. During this period, 1731 elective surgeries requiring hospitalization were conducted in the institution. The participants were all recruited in the preoperative clinic, and all were hospitalized in a general surgery unit for the duration of the study.

All participants had to be from 18 to 75 years of age, undergoing elective surgery, and able to regularly assess their pain for the first 3 days of hospitalization. People suffering from diseases that could affect the understanding and perception of pain, or having surgery due to cancer (except for a prostatectomy), were excluded from the study. Participants who had undergone prostatectomy were included because the intensity of their postoperative pain is similar to that of other patients (25,26).

It should be noted that at the time of the study, the institution had no policy or guideline on postoperative pain management and assessment. Nurses had received no specific training on pain management and assessment.

The research protocol, consent form and measuring instruments were approved by the Institutional Ethics Committee. Patients were informed that collected data would be used for research purposes and kept confidential. Patients were also assured that refusal to participate in the study would not affect the quality of care they received.

PROCEDURE

REVIEW OF MEDICAL RECORDS

A research assistant conducted a review of the patients' hospital records to document the administration of analgesics and co-analgesics. All data on pain relief were combined in an anonymized database and classified according to the type of medication participants received (IV-PCA, opioids, acetaminophen and non-steroidal anti-inflammatory drugs) and the time when they were administered.

During this review, all pain assessments performed on our participants by the nursing staff (both narrative assessments and assessments made using a measurement scale) were documented. This meant consulting several types of documents, including the nurse's observation notes, pain assessment sheets for patients on IV-PCA, and the computer files in which basic parameters (including pain assessments) were recorded. We considered all assessments documented as numbers on a scale from 0 to 10 and all descriptive or narrative assessments, such as "patient appears to be non-

suffering” or “patient is comfortable.” All were merged into a database and classified by assessment type (nurses' narrative assessments and nurses' numerical ratings).

STATISTICAL ANALYSIS

We conducted a descriptive analysis on the sociodemographics, pain numerical ratings and types of analgesics received. Discrete variables are presented using frequencies and percentages, while continuous variables are presented with means and standard deviations. To verify the presence of significant differences when comparing the presence of a pain assessment and the presence of analgesia, we conducted Fisher's exact test (when frequency was lower than 5) or a chi-square test. When differences were insignificant ($p \geq 0.05$), we conducted a sample size calculation to find the number of participants necessary to confirm the presence of a significant difference. To facilitate the statistical analysis and comparison of these numerical ratings, we calculated the average of all the nurses' numerical ratings per postoperative day performed on each patient. Then, statistical analyses were performed using SPSS 15.0. The significance threshold for all statistical tests was set at $p < 0.05$.

RESULTS

SOCIODEMOGRAPHICS OF STUDY PARTICIPANTS

The final sample consists of 36 participants (10 men and 26 women), representing 2.1% of all elective surgeries requiring hospitalization performed in the hospital during the study. The average age of participants was 53.4 (± 4.2) for men and 48.5 (± 2.2) for women. Their surgeries were, by order of importance: hysterectomy (52.8%), prostatectomy (19.5%), knee replacement (11.1%) and hip arthroplasty (8.3%). Three (8.3%) other participants underwent other types of elective surgery. The average number of days of hospitalization for our participants was 9.3 (± 3.3) days and they received IV-PCA for an average of 14.67 (± 2.1) hours.

PAIN ASSESSMENTS PERFORMED BY NURSING STAFF

The results in Table 2 indicate that for 52.8% of participants, there was no documented pain assessment when IV-PCA was discontinued. Three hours after discontinuing IV-PCA, the number of participants whose pain had still not been assessed was unchanged at 52.8%.

PRN ANALGESIA ADMINISTERED TO PARTICIPANTS

According to Table 3, when their IV-PCA was discontinued, 27 (75.0%) participants received no PRN medication, while only 5 (13.7%) received acetaminophen and 4 others (11.1%) received an opioid analgesic. It should also be noted that three hours after their IV-PCA was stopped, 15 (41.7%) participants had not yet received any PRN medication. Among those who did, only 8 (22.2%) received an opioid analgesic and 1 (2.8%) received a combination of opioid analgesic and acetaminophen.

PAIN ASSESSMENT AND ADMINISTRATION OF PRN ANALGESIA

Table 4 designed to reveal any relationship between the presence of a pain assessment and the presence of PRN analgesia. There is no such relationship of any significance ($p = 1.00$) at IV-PCA discontinuation. Therefore, the administration of PRN analgesia at IV-PCA termination does not influence the nurse-performed pain assessment process. We again see no significant relationship ($p = 0.83$) between the presence of pain assessment and the presence of PRN analgesia in the first three hours after IV-PCA discontinuation. The same conclusion can be reached, i.e. that the administration of PRN analgesia within three hours after stopping IV-PCA has no impact on the nurse-performed pain assessment process.

Figure 1

Table 1: Sociodemographics of study participants

	Sample (n=36)
Age (years) – mean (\pm SD)	
Men	53.4 (± 4.2)
Women	48.5 (± 2.2)
Gender – n (%)	
Male	10 (27.8%)
Female	26 (72.2%)
Surgery – n (%)	
Prostatectomy	7 (19.5%)
Hysterectomy	19 (52.8%)
Knee replacement	4 (11.1%)
Hip replacement	3 (8.3%)
Other	3 (8.3%)
Days of hospitalization – mean (\pm SD)	9.3 (± 3.3)
Number of hours on IV-PCA – mean (\pm SD)	14.67 (± 2.1)

Figure 2

Table 2: Performance of pain assessments by nursing staff upon discontinuation of IV-PCA and three hours after IV-PCA discontinuation

Pain assessment	Upon IV-PAC discontinuation	3 hours after IV-PCA discontinuation
Absent – n (%)	19 (52.8%)	19 (52.8%)
Present – n (%)	17 (47.2%)	17 (47.2%)

Figure 3

Table 3: PRN analgesia received by participants upon IV-PCA discontinuation and three hours after IV-PCA discontinuation

Types of PRN analgesics received – n (%)	Upon IV-PCA discontinuation (n=36)	3 hours after IV-PCA discontinuation (n=36)
None	27 (75.5%)	15 (41.7%)
Acetaminophen	5 (13.7%)	12 (33.3%)
Opioids	4 (11.1%)	8 (22.2%)
Opioids and acetaminophen	0 (0.0%)	1 (2.8%)

Figure 4

Table 4: Comparison between the presence of PRN analgesia and the performance of pain assessments by nurses upon IV-PCA discontinuation and three hours after IV-PCA discontinuation

		Presence of nurse-performed pain assessment		p
		Absence	Presence	
Presence of PRN analgesia – n (%)	upon PCA discontinuation	5 (26.3%)	4 (23.5%)	1.00
	3 hours after PCA discontinuation	10 (58.8%)	11 (57.9%)	0.83

DISCUSSION

It is important to point out that this study was conducted in part using field notes, in which nurses documented their assessments of patients' pain, and pain assessment sheets for patients on IV-PCA and epidural anesthesia. Therefore, the nurses' documentation of patients' pain may not be fully representative of their actual assessment of the participants' pain. Nevertheless, due to a social desirability bias, other data collection methods such as direct observation or questionnaires completed by nurses would probably have been less representative of the real situation than the method chosen for this study. The small size of the sample studied may preclude statistically significant results and limit their generalizability to other similar clinical settings. However, this is a first exploratory study on the subject and, following our sample size calculation, keeping the proportions identified in this study, we would need a sample of 3,815 participants upon IV-PCA discontinuation and a sample of

47,320 participants in the three hours following IV-PCA discontinuation in order to prove any significant difference. There is no doubt that a larger sample could change the ratios identified in this study, but considering the postoperative pain management gaps already reported in the literature, it is unlikely that the results of this study would change considerably with a larger number of participants.

The results of this study may partly explain the increase in analgesic gaps during the transition from IV-PCA to PRN analgesia in a postoperative pain management context, as reported in the literature (13,20). It is important to note that an analgesic gap can have multiple negative effects on hospitalized patients' functional mobility, emotional well-being, quality of life and overall healing process (27,28). Based on our results, the increase in analgesic gaps could be caused by the relative absence of PRN analgesia administered by nurses in the three hours following IV-PCA discontinuation. Another interesting finding is that administering PRN analgesia at or within three hours after IV-PCA discontinuation seems to have no influence on pain assessments performed by nursing staff.

Regarding the lack of systematic pain assessment reported in the literature (13,20), the results presented also tend to confirm this issue, both upon IV-PCA discontinuation and in the three hours following shutdown. Yet the guidelines recommend regular assessment of pain when switching analgesic administration methods, to properly manage the pain of hospitalized patients and thereby reduce the physiological effects of pain (13,21,22). The lack of systematic pain assessments during the transition between IV-PCA and PRN analgesia is probably explained by a lack of applicable guidelines in daily practice. Simple treatment algorithms based on the guidelines and taking into account the transition process between two methods of administration could facilitate better management of postoperative pain (29).

Obviously, the methodology chosen for this study does not allow us to state unequivocally that nurses perform few pain assessments during the transition from IV-PCA to PRN analgesia. Nevertheless, the results indicate that nurses do little documentation of their pain assessments during that transition. And several authors report similar concerns (30,31). In the absence of documentation on pain assessment and treatment, it is difficult for nurses and other health professionals to ensure proper and ongoing pain monitoring (30). It is also difficult to know precisely how effective a

health team's therapeutic approaches are, especially in the kind of transition process described in this study (30). To optimize postoperative pain management, we need adequate documentation, communication and collaboration between care team members. Having a coordinator or an Acute Pain Team of anesthetists and nurses with expertise in pain management could help optimize monitoring by the care team (23).

The failings reported in this study could probably be explained by shortcomings in the knowledge and attitudes of nurses regarding postoperative pain management (32-36). Pain assessment is among nurses' primary activities, especially when there are time constraints as is often the case in a surgical unit (37,38). Also, nurses continue to entertain false beliefs and fears about the addictive power and dangerousness of opiates (33), which might explain the low percentage of participants who received opioids during the transition from IV-PCA to PRN analgesia. Most of the problems mentioned above could be primarily due to poor academic training on pain assessment, false beliefs about the pharmacology of analgesics, and lack of knowledge about the benefits of pain relief (33,39).

CONCLUSION

Based on the results of this study and what has been reported in the literature, it is crucial that nurses receive better training in postoperative pain assessment and management. In addition, there should be a systematic procedure for pain assessment and sedation monitoring, in the form of an algorithm implemented in various care settings, so that nurses can develop a habit of regularly and systematically assessing and documenting their patients' pain, especially when the type and administration mode of analgesic is changed.

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