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## Postoperative pain: frequency and management characterization

### Dolor postoperatorio: frecuencia y caracterización del manejo

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**Palabras clave:** Dolor Posoperatorio, Periodo Posoperatorio, Dolor Agudo, Analgesia, Analgésicos

#### Abstract

**Introduction:** Acute postoperative pain is a usual symptom and a surgical challenge.

**Objective:** To determine the frequency of pain in the postoperative period of patients undergoing elective surgery and to characterize pain management at a second-level public hospital.

**Material and methods:** A cross-section study of 175 postop patients was conducted, analyzing variables such as level of pain 24 hours after surgery according to the visual analog scale, type of surgery, use of analgesics, and anesthetic technique.

**Results:** The findings indicate that the frequency of moderate, severe, and excruciating pain is 66.3%. In all cases, the analgesia treatment was prescribed by the treating service, and 2 to 3 nonsteroidal anti-inflammatory drugs were used in 86.4% of the cases, with a minimal use of opioids in 13% of the patients. The

anesthetic techniques used included balanced general anesthesia, neuro-axial block, and a mixed technique; the latter improved pain control.

**Conclusion:** The frequency of postoperative pain is similar to the level reported in other trials (30%–70%), pointing to the need to review our current management, with more extensive participation and training of the staff involved in pain control.

#### Resumen

**Introducción:** El dolor agudo postoperatorio es un síntoma frecuente, el cual representa un reto en el ámbito quirúrgico.

**Objetivo:** determinar la frecuencia de dolor en el paciente postoperado de cirugía electiva y caracterizar el manejo del mismo en un hospital público de segundo nivel de atención.

**Material y métodos:** se realizó un estudio transversal en 175 pacientes postoperados, analizando las variables de grado de

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dolor a las 24 horas del postoperatorio con la escala visual análoga, tipo de cirugía, uso de analgésicos, técnica anestésica.

**Resultados:** Se encontró que la frecuencia de dolor moderado, severo o insoportable es del 66.3%. El tratamiento analgésico en todos los casos fue prescrito por el servicio tratante y en el 86.4% de los casos se emplearon AINE'S, en número de uno a tres. Con un uso mínimo de opioides en el 13% de los pacientes. Las técnicas anestésicas usadas fueron AGB, BNA y técnica mixta; con mejoría en el grado de dolor con la técnica mixta.

**Conclusión:** Existe una frecuencia de dolor postoperatorio similar a lo reportado en otros estudios (30–70%), reflejando la necesidad de revisión del manejo actual, mayor participación y capacitación del personal involucrado en su manejo.

## Background

Acute pain presents suddenly, probably for a limited time, and is usually time and/or cause-related with an injury or a disease; a case in point is postoperative pain.<sup>1,2</sup> Like any clinical symptom or sign, it needs to be thoroughly evaluated and measured with different scales, including the most popular, which is the visual analog scale (VAS).<sup>3,4</sup>

It is acceptable to rate acute postoperative pain between 0 and 3 according to VAS, with mild pain from 3 to 1, and 0 representing no pain. This helps in determining the effectiveness of treatment, both resting and being active.<sup>1</sup>

Notwithstanding the importance of pain and its impact on patient's perception, it is nonetheless undertreated. It is estimated that between 30% and 70% of patients undergoing surgery experience moderate (4–6) to severe (7–10) pain at some point in time. This level of pain is associated with increased morbidity, higher costs, and impaired well-being.<sup>5</sup>

There is a need to improve the treatment of acute postoperative pain by administering effective methods of analgesic control, through organized and systematized care, consistent with the possibilities in each hospital.<sup>6</sup> This approach will have a positive impact on the patient's well-being and his/her perception of quality of care, limiting the anesthetic-surgical aggression, lowering morbidity, and facilitating the patient's recovery as a result of rapid mobility and rehabilitation that shortens the hospital stay.<sup>7,8</sup>

The probability of successful analgesia will increase when considering the type of surgery, the surgical approach, the clinical practice pattern in each unit, and the risk factors for developing pain associated with the patient.<sup>9</sup>

Knowing the context of postoperative pain in every elective surgery unit provides an objective diagnosis to take the steps towards improved management of postoperative analgesia, based on the above-mentioned criteria. Hence, the purpose of this trial was to establish the frequency of pain in the patient after elective surgery, and to describe the management approach.

**Table 1. General characteristics of the patients studied**

	n (%)	95% CI	P
<b>Sex</b>			
Males	46 (26)	(13 a 39)	0.0001
Females	129 (74)	(66 a 82)	
<b>Level of education</b>			
Professional	154 (88)	(83 a 93)	
None	14 (8)	(6 a 22)	0.003
Service	7 (4)	(11 a 18)	
Gynecology	63 (36)	(24 a 48)	
General surgery	49 (28)	(15 a 41)	0.0001
Orthopedics	43 (25)	(12 a 38)	
Oncology	20 (11)	(–3 a 24)	
<b>Type of surgery</b>			
Major surgery*	162 (93)	(89 a 96)	0.0001
Minor surgery†	13 (7)	(9 a 21)	
<b>ASA</b>			
I	51 (29)	(16 a 42)	0.0001
II	96 (55)	(45 a 65)	
III	28 (16)	(2 a 30)	

ASA=American Society of Anesthesiology; CI=confidence interval; F=frequency; P=calculated value using Pearson's chi-square test.

\* Included: upper abdominal surgery, hip, spine, knee, hysterectomy and exploratory laparotomy, nephrectomy, and thyroidectomy.

† Included: laparoscopic surgery, inguinal plasty, umbilical, hemorrhoidectomy, orchidopexy, varicocele, fistulectomy.

Source: Authors.

## Materials and methods

A cross-sectional study was conducted at a Regional Medical Center in México in 2015. In all, 175 adult patients were recruited from the Departments of Surgery, Trauma-Orthopedics, and Obstetrics-Gynecology. The patients were programmed for elective surgery, and their risk classification according to the American Society of Anesthesiology (ASA) was I to III. The patients received general balanced anesthesia or regional anesthesia, with an estimated postoperative stay  $\geq 24$  hours. Patients in a critical condition or unable to be autonomous were excluded, as were patients with psychiatric disease.

The adapted questionnaire from the American Pain Society<sup>10</sup> and VAS were administered to measure minimal

**Table 2. Time, type of anesthesia, pain intensity, and use of analgesics among the population studied**

	n (%)	95% CI	P
Type of anesthesia administered			
GBA	65 (37)	(25 to 49)	
NAB	99 (56)	(27 to 47)	0.0001
Combined	11 (7)	(8 to 22)	
Pain intensity based on type of surgery			
Severe pain	103 (59)	(50 to 68)	
Moderate pain	70 (40)	(29 to 51)	0.0001
Mild pain	2 (1)	(-12.8 to 15)	
Maximum pain experienced in 24h			
Severe pain	74 (43)	(32 to 54)	
Moderate pain	42 (24)	(42 to 24)	0.0001
Mild pain	59 (33)	(21 to 45)	
Type of postsurgical analgesia			
NSAIDs	152 (86.4)	(82 to 93)	
NSAIDs-opioid*	22 (13)	(-1 to 27)	0.0001
None	1 (0.6)	(-15 to 16)	
Number of NSAIDs used			
One	42 (24)	(12 to 37)	
Two	103 (59)	(51 to 67)	0.0001
Three	30 (17)	(4 to 30)	

BGA=balanced general anesthesia; CI=95% confidence interval; F=frequency; NAB=neuro-axial block; NSAIDs=nonsteroidal anti-inflammatory drugs.

Severe pain: VAS 7 to 10; moderate: 4 to 6; mild 1 to 3. P value calculated using the Pearson's chi-square test.

\*Opioid: buprenorphine 150µg every 12 hours.

Source: Authors.

and maximum pain in the last 24 hours, and also pain experienced at the time of the interview. Acute postoperative pain was considered to be under control when the VAS score ranged from 3 to 0 (mild to no pain), both at rest and in motion. Patients were also asked about their level of pain before surgery, and were instructed to report any pain to assess the need of administering additional pain mediation. The analgesic approach used during the postoperative period was described, based on the type of surgery performed, and a record was kept of all the nonsteroidal anti-inflammatory drugs (NSAIDs) pre-

scribed, the use of opioids, if any, and the pain intensity according to the type of surgery, anesthesia, and analgesia used.

The data collected was analyzed using the SPSS version 20 software, with a statistical analysis that included central trend and dispersion measurements for the quantitative variables, and proportions for the qualitative variables. The bivariate analysis was conducted with the chi-square test and a significant P value of  $\leq 0.05$ .

The study was approved by the Hospital's Local Research and Ethics Committee under Registry Number R-2013-2601-36.

## Results

The mean age of the 175 postsurgical patients from the different surgical specialties was  $49 \pm 16.2$  years. Table 1 shows the data corresponding to sex, level of education, surgical specialties included, ASA classification, and type of surgery, showing statistically significant differences among the categories of the variables analyzed.

The time elapsed after surgery was  $13 \pm 7$  hours, and the in-hospital survey to assess pain was administered within that time frame. The anesthetic techniques used, the level of pain expected based on the type of surgery, and the actual pain experienced are described in Table 2. The most frequently used anesthetic technique was BNA, with severe pain expected in 103 (59%); 74 (43%) experienced maximum pain during the first 24 hours after surgery. The analgesics used to control postoperative pain in the hospitalization floor were mostly NSAIDs, administered to 152 (86.4%) patients, and only 22 (13%) of them received combined analgesia; that is, NSAIDs and 1 opioid, which, in this case, was buprenorphine. The NSAIDs were administered according to a fixed schedule, and buprenorphine was administered as needed, and only in 1 case with a fixed schedule. Only 1 patient did not receive any analgesia. The pain intensity described based on this regime was VAS 5 in patients receiving NSAIDs only, and VAS 6 in patients with combined analgesia. There were no significant differences identified among these patients.

The relationship between the level of pain and the anesthetic technique used was in average 5.6 in VAS for general anesthesia and 5.3 for regional anesthesia. Therefore, there is no significant difference between the level of pain and any of the 2 anesthetic techniques used, in contrast with the patients in whom a combined technique was used that reported an average of 2.5 in VAS, versus the other techniques, with a significant P value 0.03.

Additionally, data were collected from patients in whom an epidural infusion pump was used or simply a catheter for further dosing; but although regional anesthesia was the most frequently used technique, this approach for postoperative analgesia was only used in 21 of the 175 patients (12%).

**Table 3. Pain intensity according to the type of surgery**

Type of surgery	Pain intensity			Total, n (%) n = 175 (100%)
	Severe pain n (%) n = 11 (63.4%)	Moderate pain n (%) n = 57 (32.6%)	Mild pain n (%) n = 7 (4.1%)	
Upper GI	31 (17.7)	19 (10.9)	1 (0.6)	51 (29.1)
Lower GI	25 (14.3)	7 (4)	4 (2.3)	36 (20.6)
Trauma and orthopedics	16 (9.1)	9 (5.1)	0	25 (14.3)
Cabeza y cuello	1 (0.6)	7 (4)	0	8 (4.6)
Obstetrics-gynecological	35 (20)	14 (8)	1 (0.6)	50 (28.6)
Breast	3 (1.7)	1 (0.6)	1 (0.6)	5 (2.9)

n: absolute number; GI: gastrointestinal, %: percentage.  
Source: Authors.

The most common postsurgical analgesia was the combination of NSAIDs, followed by NSAIDs and opioids. The number of NSAIDs prescribed ranged from 1 to 3 (simultaneously), but 2 was the most widely used combination (103 [59%]) (Table 2). Trauma and orthopedics was the specialty that mostly prescribed the maximum combination of NSAIDs.

With regards to the presence of pain, patients were grouped into those with no pain—VAS 0; mild pain—VAS 1 to 3; moderate pain—VAS 4 to 6; and severe pain—VAS 7 to 9, whereas excruciating pain was VAS 10. In all, 27 patients experienced mild pain, 42 moderate pain, 39 severe pain, and 35 excruciating pain. The efficacy of analgesia to control immediate postoperative pain was rated as effective in patients with no pain or with moderate pain (VAS 1–3), and this was the case in 59 patients (33.7%); in the rest of the patients (116 [66.3%]), analgesia was considered ineffective. Among the patients, 32 (24%) were pain-free after 24 hours postop, versus 141 (76%) who experienced some type of pain.

The relationship between type of surgery and the pain intensity was also analyzed, with a prevalence of severe pain in obstetric-gynecological surgery, followed by upper gastrointestinal where moderate pain prevailed (Table 3).

## Discussion

The frequency of moderate, severe, and excruciating pain over the first 24 hours postop in our hospital was 66.3%. We feel that this represents ineffective analgesia and is consistent with the results of similar evaluations around the world,<sup>1,11,12</sup> with a frequency of 60%, as reported by Esteve-Pérez et al.<sup>13</sup>

The high percentage of patients with uncontrolled pain is evidenced when analyzing the postoperative analgesia used. NSAIDs are the most widely used agents (86.4%),

even in procedures in which severe pain is expected. As previously mentioned, NSAIDs are the initial strategy or the first step in pain management; in case of acute postoperative pain, NSAIDs should be used in combination with other analgesic techniques, and this is called multimodal therapy.<sup>7,14,15</sup> The limited use of opioids for treating acute postoperative pain is striking (13%), and is the result of a lack of knowledge and fear of using opioids, which leads to the combined use of 2 or 3 NSAIDs, despite the risk of increased adverse effects with no added analgesic efficacy.<sup>16</sup>

One of the limitations in this trial was the failure to measure pain at different time points during the postoperative period. Measuring pain in the recovery room would have been helpful to directly evaluate the anesthesiology service. However, the results indicate the limited involvement of the anesthesiology service in the management of postoperative pain, because in the hospitalization floors, the services evaluated are responsible for monitoring pain. This situation was further emphasized by the small number of patients connected to an epidural infusion pump for postoperative pain management, as is also supported by the literature.<sup>16</sup>

A large number of programmed surgeries predict the potential for expected moderate to severe pain as shown by the 173 (99%) patients who experienced such pain in this trial; however, no preventive measures were adopted to avoid the occurrence of pain. This fact should be an invitation to implement programs leading to enhanced pain control in accordance with the type of surgery, monitoring vital signs, and using alternate drugs based on availability in the particular unit.<sup>7,17,18</sup>

Numerous trials worldwide have initially evaluated the management of postoperative pain in their population and have then implemented treatment guidelines with excellent results. The fact that we have identified such



heterogeneous approaches for managing pain further emphasizes the importance of adopting effective and easy to use postsurgical pain management guidelines, consistent with the international guidelines to reach a consensus on the management of acute postoperative pain.

### Ethical disclosures

**Protection of human and animal subjects.** The authors declare that no experiments were performed on humans or animals for this study.

**Confidentiality of data.** The authors declare that they have followed the protocols of their work center on the publication of patient data.

**Right to privacy and informed consent.** The authors have obtained the informed consent of the patients and/or subjects referred to in the article. This document work in the power of the correspondence author.

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### Conflicts of interest

The authors declare having no conflict of interest to disclose.

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