

Pain assessment intensity and pain relief in patients post-operative orthopedic surgery

Avaliação da intensidade da dor e analgesia em pacientes no período pós-operatório de cirurgias ortopédicas

Evaluación de la intensidad del dolor y analgesia en pacientes sometidos a cirugía ortopédicas

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ABSTRACT

Objective: To evaluate the intensity of pain in patients after orthopedic surgeries; identify possible associations between physiological changes and postoperative pain; and describe the analgesia plan used. **Methods:** A prospective study was conducted between the immediate postoperative period and the 2nd postoperative period, in a public teaching hospital. The Statistical Package for Social Sciences (SPSS) was used for data analysis. **Results:** A total of 109 (81.3%) patients underwent surgical procedures in the lower limbs. Increased pain in the 2nd PO was reported by 18 (75%) patients, with a prevalence of mild pain. There was no significant association between pain and physiological changes. The most common physiological change was skin pallor (IPO: 57/42, 5%; 1st PO: 22/41, 5%; and 2nd PO: 11/45, 8%). There was a predominance of the joint administration of simple analgesics, non-steroidal anti-inflammatory drugs (NSAIDs) and opiates. **Conclusion:** Pain was present in most patients with a prevalence of mild pain. Additionally, there was no association between physiological changes and postoperative pain. The analgesia plan adopted was effective to control postoperative pain.

Keywords: Pain, Postoperative; Orthopedics; Pain measurement.

RESUMO

Este estudo teve como objetivo avaliar a intensidade da dor em pacientes no pós-operatório de cirurgias ortopédicas; verificar associação entre alterações fisiológicas e dor pós-operatória e descrever a analgesia utilizada. **Métodos:** Estudo prospectivo em um hospital público de ensino. Avaliou 134 pacientes do pós-operatório imediato ao 2^o pós-operatório. Utilizou-se o programa Statistical Package for the Social Sciences (SPSS) para análise. **Resultados:** Dos pacientes avaliados 109 (81,3%) realizaram procedimentos cirúrgicos em membros inferiores. O relato de dor aumentou no 2^o PO (18/75%), sendo a dor leve a prevalente. Não houve associação significativa entre dor e alterações fisiológicas. A alteração fisiológica mais frequente foi a palidez cutânea (POI: 57/42,5%, 1^o PO: 22/41,5% e 2^o PO: 11/45,8%). Houve prevalência da administração conjunta de analgésicos simples, anti-inflamatórios não esteroides e opioides. **Conclusão:** A dor esteve presente na maioria dos pacientes, com predomínio de dor leve, e não houve associação estatisticamente significativa entre alterações fisiológicas e dor pós-operatória. O esquema analgésico adotado mostrou-se eficaz no controle da dor pós-operatória.

Palavras-chave: Dor pós-operatória; Ortopedia; Medição da dor.

RESUMEN

Objetivo: Evaluar la intensidad del dolor de pacientes en cuadro posoperatorio en cirugías ortopédicas; identificar posibles asociaciones entre alteraciones fisiológicas y el dolor pos-operatorio; y descripción de analgésicos utilizados. **Métodos:** Estudio prospectivo, que evaluó 134 pacientes en posoperatorio inmediato al 2^o pos operatorio en un hospital público. Se utilizó Statistical Package for the Social Sciences (SPSS) para el análisis. **Resultados:** 109 (81,3%) realizaron procedimientos quirúrgicos en miembros inferiores. No hubo asociación significativa entre dolor y alteraciones fisiológicas. La alteración fisiológica más frecuente fue la palidez cutánea (POI: 57/42,5%, 1^o PO: 22/41,5% y 2^o PO: 11/45,8%). Hubo prevalencia de la administración conjunta de analgésicos simple, antiinflamatorios no esteroides y opioides. **Conclusión:** El dolor estuvo presente en la mayoría de los pacientes, con predominio del dolor de baja intensidad. No hubo relación significativa entre alteraciones fisiológicas y dolor posoperatorio. El esquema analgésico adoptado se mostró eficaz en el control del dolor posoperatorio.

Palabras-clave: Dolor Postoperatorio; Ortopedia; Dimensión del Dolor.

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INTRODUCTION

Pain can be defined as a sensitive and emotional experience, which can result from actual or potential tissue injury¹. When tissues suffer any type of injury, cells release prostaglandins, causing hypersensitivity and turning any stimulus, however small, into pain².

When not alleviated, pain can affect the pulmonary, cardiovascular, gastrointestinal, endocrine and immunological systems. Thus, it can be harmful to patients whose health has already been impaired by age, disease or injury. After surgical procedures, prolonged painful stimuli cause suffering, harm to the organism and postoperative complications, which consequently has a negative effect on patient recovery³.

Pain can cause several physiological changes and analgesia is essential for the well-being of patients⁴. It reduces early walking and movements and disrupts sleeping. Additionally, it can cause weariness, fatigue and lack of cooperation with treatment. Systematic assessments and the use of specific scales to measure pain can contribute to adequate care and the reduction in the pain pattern⁵.

Patients undergoing orthopedic surgeries usually have musculoskeletal dysfunctions, such as unstable fractures, deformities, joint disorders, infected or necrotic tissues, traumas or tumors. The most frequent surgical procedures include open reduction with internal fixation and closed reduction with internal fixation in fractures, arthroplasty, meniscectomy, joint replacement and amputation, among others. The goals of surgical procedures are as follows: to improve patients' body functions to recover their movement and stability, in addition to alleviating pain and incapacity⁶.

Lack of success in providing relief from pain in the postoperative period is mainly associated with health professionals' insufficient knowledge about pain assessment, effective analgesic doses, the action time of such drugs and their adverse effects⁷. Pain control in the postoperative period can include the prescription of analgesics at set times to prevent peaks of pain, use of sophisticated technology such as epidural catheters, and even cognitive-behavioral interventions such as relaxation, music and other educational activities. Adequate postoperative pain treatment is not only a physiopathological issue, but also an ethical and economic one. In this way, better pain management prevents suffering, enables greater satisfaction of patients under care and reduces costs associated with possible complications that lead to longer periods of hospitalization⁵.

Knowledge about the repercussions and magnitude of pain can certainly contribute to an increase in health professionals' awareness of the importance of pain assessment and adequacy of analgesic treatment to the needs of each individual, especially with regard to the fact that this event has a subjective origin.

In this context, the present study aimed to assess the intensity of pain in patients during the postoperative period of orthopedic surgeries; to verify whether there is an association between physiological changes and postoperative pain; and to describe the analgesia plan and drugs used.

METHODS

The present study is part of a major research project entitled "Assessment of Pain Intensity and Analgesia in Postoperative Patients of a Teaching Hospital in the State of Minas Gerais, Brazil", which was funded by the State of Minas Gerais Research Support Foundation (FAPEMIG) and approved by the *Universidade Federal do Triângulo Mineiro* (UFTM) Research Ethics Committee, under number 1367. A prospective study with a quantitative approach was conducted in a public teaching hospital that cares for high-complexity patients. This hospital is a referral center in the southern Triângulo Mineiro region, in the state of Minas Gerais. Data were collected in the Surgical and Orthopedic Clinics of this institution, the place of study of this research project.

The study population was comprised of 134 patients who had undergone orthopedic surgeries between April and December 2011 and who met the following inclusion criteria: to be aged 18 years or more; to be in the postoperative period of orthopedic surgeries; to be conscious; to be able to speak; to accept to participate in the study; and to sign an Informed Consent Form. Patients who had undergone head and neck surgeries or those performed in the nervous system and who had been under local anesthesia were excluded from this study.

Data were collected with an instrument that dealt with socio-demographic aspects, obtained through interviews with patients about the anesthetic-surgical procedure and including pain intensity assessment, physiological changes identified and prescribed analgesic plan.

Scores of the pre-anesthetic clinical assessment recorded in anesthesia files by anesthesiologists during the immediate preoperative period were obtained from the American Society of Anesthesiologists (ASA) and used in this study. These data were obtained from perioperative files and medical prescriptions found in patients' records, as were those on the anesthetic-surgical procedure and analgesic plan used. Analgesic drugs were thus classified: non-steroidal anti-inflammatory drugs (NSAIDs), simple analgesics, analgesics and opiates⁸.

Postoperative pain assessment was performed with interviews, when patients were asked about the presence of pain at the moment of such assessment. Aiming to quantify this symptom, the Verbal Numerical Scale was used. This scale varies from 0 to 10, where 0 means the absence of pain and 10, the most severe pain ever felt. Pain intensity was thus categorized: no pain (0), mild pain (1 to 4), moderate pain (5 to 7), and severe pain (8 to 10)⁵. Patients either showed or reported the location of pain, which was classified as follows: surgical incision, lower limbs, upper limbs, head, back and/or the entire body.

An interview and clinical assessment of patients were conducted to identify physiological changes (tachycardia, tachypnea, diaphoresis, skin pallor, nausea, vomiting and changes in body temperature), when the presence of such changes or not was verified.

The following parameters were considered to identify changes: tachycardia (> 100 bpm) and tachypnea (> 20 bpm)⁹,

changes in blood pressure (values lower than 100 x 60 mmHg and higher than 139 x 89 mmHg), considered to be borderline by the 6th Brazilian Directives on Arterial Hypertension (DBHA)¹⁰ and changes in body temperature (axillary temperature values < 36 °C and ≥ 37.1 °C)⁹.

The assessment of patients was performed once a day, during each of the following three periods analyzed in this study: immediate postoperative (IPO) period - until 24 hours after surgery; 1st postoperative period (1st PO) - from 24 to 48 hours after surgery; and 2nd postoperative (2nd PO) period - from 48 to 72 hours after surgery. In all, 211 assessments were performed (IPO: 134/100%, 1st PO: 53/39.5%, and 2nd PO: 24/17.9%).

Data were input into an electronic database with double data entry in the Microsoft® Excel XP® and exported to the Statistical Package for the Social Sciences (SPSS) software to be processed and analyzed. The chi-square test was used to verify whether there was an association between the physiological changes identified in the patients assessed and the presence of pain. Results were significant when $p < 0.05$, with a 95% confidence interval.

RESULTS

With regard to the socio-demographic variables analyzed, 44 (32.8%) patients were retired and 80 (59.7%) were males. Mean age was 48.25 years, varying from 18 to 93 years.

In terms of surgical procedures, 109 (81.3%) patients had lower limb surgeries; 13 (9.7%), hip surgeries; seven (5.2%), upper limb surgeries; and five (3.7%), back surgeries, which were categorized into elective and urgent. Regarding their complexity, the majority of patients, 79 (59%), underwent medium-complexity surgeries. There were records of intra-operative complications in nine (6.7%) patients, of which (3%) four were cardiovascular; three (2.2%), hemodynamic; one (0.7%), change in urine output; and one (0.7%), behavioral.

With regard to pain, 88 (65.7%) patients had this symptom in the IPO, 33 (62.2%) in the 1st PO and 18 (75%) in the 2nd PO. It should be emphasized that 81 (60.4%) patients in the 1st PO and 29 (54.7%) in the 2nd PO were not assessed for having been previously discharged during this period.

In terms of pain intensity, there was a predominance of mild pain in the IPO and 2nd PO (35/39.7% and 10/55.5%, respectively), whereas moderate pain prevailed in the 1st PO (12/36.3%) among patients interviewed. Regarding the location of pain, surgical incision was most frequently reported, totaling 83 (61.9%), 32 (60.3%) and 18 (75%) patients in the IPO, 1st PO and 2nd PO, respectively. The most frequent physiological change was skin pallor (57/42.5% in the IPO; 22/41.5% in the 1st PO; and 11/45.8% in the 2nd PO), as shown in Table 1.

There were no statistically significant associations ($p < 0.05$) between pain and the presence of physiological changes in patients who participated in this study.

Analgesia was exclusively restricted to the administration of analgesics. In the IPO, 1 PO and 2 PO, non-steroidal anti-inflammatory drugs (NSAIDs), simple analgesics and opiates were the

Table 1. Frequency of physiological changes in patients during the postoperative period of orthopedic surgeries, according to postoperative time. City of Uberaba, MG, Brazil, 2011-2012

Physiological changes	IPO	1 st PO	2 nd PO
Tachycardia	12 (8.9%)	9 (16.9%)	5 (20.8%)
Tachypnea	39 (29.1%)	12 (22.6%)	7 (29.1%)
Change in blood pressure	28 (20.8%)	8 (15%)	4 (16.6%)
Change in body temperature	18 (13.4%)	14 (26.4%)	6 (25%)
Diaphoresis	5 (3.7%)	3 (5.6%)	1 (4.1%)
Skin pallor	57 (42.5%)	22 (41.5%)	11 (45.8%)
Nausea	18 (13.4%)	8 (15%)	3 (12.5%)
Vomiting	9 (6.7%)	3 (5.6%)	1 (4.1%)

drugs most often prescribed simultaneously to 100 (74.6%), 38 (71.6%) and 20 (83.3%) patients respectively, according to the postoperative time assessed, as shown in Table 2.

Table 2. Analgesia used in the postoperative period of orthopedic surgeries, according to postoperative time. City of Uberaba, MG, Brazil, 2011

Analgesics	IPO	1 st PO	2 nd PO
NSAIDs + simple analgesics + opiates	100 (74.6%)	38 (71.6%)	20 (83.3%)
Simple analgesics + opiates	30 (22.40%)	10 (18.80%)	3 (12.50%)
Simple analgesics + NSAIDs	2 (1.50%)	-	-
Simple analgesics	1 (0.70%)	-	-
NSAIDs + opiates	1 (0.70%)	5 (9.40%)	1 (4.10%)

There was an increase in the simultaneous prescription of opiates, simple analgesics and NSAIDs in the 2nd PO (20/83.3%).

A total of 83(61.9%), 33(62.2%) and 15(62.5%) patients had a "set time" and "if required" analgesic plan in the IPO, 1st PO and 2nd PO respectively. Additionally, there was a reduction in the "set time" analgesic plan as the days passed during the postoperative period.

DISCUSSION

In view of the subjectivity and complexity of the experience of pain, the first challenge to control analgesia begins with its measurement. Asking questions to patients exclusively does not contribute to adequate pain assessment, as not all of them are able to report this in a clear and effective way²⁻¹¹.

The literature states that orthopedic surgeries are the main cause of severe pain in patients undergoing outpatient surgeries.

In addition to the pain reported by patients, many surgical procedures include a complex pain mechanism^{11,12}, clearly showing that perioperative pain control should be given greater attention and care when assessed by health professionals. However, what is happening is that much of the literature on the topic is international and in different contexts, thus hindering proper monitoring and management of patients¹².

The present study revealed that there were frequent reports of pain in all periods studied, with a higher incidence in the 2nd postoperative period, when 24 (75%) patients were identified.

The present results point out that 109 (81.3%) patients underwent surgical interventions in the lower limbs, with a predominance of mild pain reported by 35 (39.7%) and 10 (55.5%) patients in the immediate postoperative and 2nd postoperative periods, respectively. Additionally, moderate pain was only more prevalent in the 1st postoperative period, totaling 12 (36.3%) patients. These findings diverge from those of a study performed in the city of Uberlândia, MG, Southeastern Brazil, in 2003, which assessed 40 patients and evidenced that those who had undergone orthopedic surgeries, especially the ones performed in the lower limbs, had moderate to severe pain in the postoperative period¹³.

In a study conducted in the university hospital of the city of Londrina, PR, Southern Brazil, which identified the main nursing diagnoses in patients hospitalized in an orthopedic clinic, 39 (65.0%) of the 60 patients assessed were diagnosed with acute pain¹⁴. Another study that also identified nursing diagnoses and which was conducted with 50 patients undergoing orthopedic surgeries showed that all patients assessed had been diagnosed with pain¹⁵.

The results of this study evidenced reports of pain in the IPO in 88 (65.6%) patients. These results diverge from those obtained in a study in which researchers observed that the prevalence of postoperative pain in the first 24 hours was 85 (46%) patients³.

Of all 13 (9.7%) patients who underwent hip surgeries, three (30.7%) had moderate pain and one (7.6%) had severe pain, which is in disagreement with a study which showed that, after undergoing total hip and knee arthroplasty, patients usually reported moderate to severe pain, caused by bone trauma and impaired muscle tissue integrity¹⁶.

With regard to possible physiological changes resulting from pain, there was not a statistically significant association between pain and these changes. This diverges from another study, which assessed 30 patients in the postoperative period of cardiac surgeries and showed that pain and physiological changes were associated with statistical significance ($p < 0.001$) in the periods assessed⁴.

Analgesia only occurred through the administration of analgesic drugs. Postoperative pain control could be performed with the use of NSAIDs and opiates, through several ways and methods; and the use of physical means and interventions associated with cognitive behavior, such as educational techniques, relaxation and distraction⁵⁻¹⁷.

The present study revealed that, as the postoperative period passed, there was an increase in the simultaneous prescription of opiates, simple analgesics and NSAIDs and a reduction in the "set time" analgesic plan.

A study conducted by the Center of Orthopedics and Trauma Studies in 2010, in association with the Sport Trauma Committee and Brazilian Orthopedics and Trauma Society of São Paulo, evidenced that multi-modal perioperative pain management has been the most frequently recommended practice, consisting in the use of several drugs with different mechanisms of action to make the analgesic effect more potent and to reduce complications. A great benefit of NSAIDs in the postoperative period of orthopedic surgeries is that its concomitant use with other drugs requires lower doses of opiates for adequate pain control, which is extremely beneficial for patients undergoing an analgesia treatment plan that uses several drugs¹².

In this way, effective pain analgesia can result in faster recovery and greater cooperation with the treatment, enabling patients to have better post-surgical results⁵. However, the present study showed that, despite the analgesic drugs and techniques available, the prevalence of pain in the postoperative period was high (IPO: 88/65.7%; 1st PO: 33/62.2%; and 2nd PO: 18/75%) and present in all times observed, even with the joint use of simple analgesics, opiates and NSAIDs in the majority of patients assessed. Nurses can be aware of possible questions and resolve them, providing clients with the opportunity of dialogue to express their concerns and feelings towards the entire surgical process¹⁸.

Despite the difficulty in treating pain, such analgesic methods are essential to reduce the incidence of persistent postoperative pain, aiming to prevent and alleviate difficult treatment chronic pain cases in the future¹².

One of the limitations of the present study was the lack of comparison between groups of patients (older and younger ones), which is suggested for future research. Nonetheless, this limitation did not prevent the objectives proposed from being achieved. Additionally, the complexity involved with pain intensity assessment should be kept in mind, considering the multi-dimensionality of this symptom. Thus, the adoption of the instruments validated, such as the ones adopted in this study, must be taken into consideration when using this type of assessment.

CONCLUSION

The present study revealed that the majority of patients undergoing orthopedic surgeries were males, with a mean age of 48.25 years, of which 44 (32.8%) were retired. Most patients had lower limb surgeries (109/81.3%), with a predominance of medium-complexity surgeries. Pain was present in all times observed and mild pain was more frequent (IPO: 35/39.7%; and 2nd PO: 10/55.5%).

The majority of patients reported pain in all the periods assessed, with an increase in such complaints in the 2nd PO. Additionally, there were no statistically significant associations

between pain and physiological changes, although these were present in all periods analyzed. The most frequent change was skin pallor (IPO: 57/42.5%; 1st PO: 22/41.5%; and 2nd PO: 11/45.8%).

With regard to analgesia, there was a predominance of the joint administration of simple analgesics, NSAIDs and opiates in all periods assessed. Additionally, the "set time" and "if required" analgesic plan was more frequent.

The significant number of patients who reported the presence of pain shows that this must be the constant focus of attention of not only nurses, but the entire multi-professional team. Capacity-building and the development of directives are required to help to reduce postoperative pain. This should be a norm that can be institutionalized as routine, helping to identify and eliminate pain and, consequently, improving the quality of care provided.

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