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The second project of Pain Out Mexico: deciphering functional interference and postoperative neuropathic pain towards the design of a transitional pain service

Segundo proyecto Pain Out *México: descifrando la interferencia funcional y el dolor neuropático postoperatorio, hacia el diseño de una clínica transicional de dolor*

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Pain Out México, functional interference, neuropathic pain, transitional pain service, postoperative pain management.

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ABSTRACT. The second Pain Out México project aims to understand functional interference and early-onset neuropathic pain in patients during the immediate, intermediate, and long-term postoperative periods. This multidisciplinary collaboration between several hospital centers offers new perspectives on managing postoperative pain in our country. It also aims to eventually establish transitional pain clinics, which could translate into a significant improvement in the quality of life for patients and strengthen clinical practices related to pain management.

Abbreviations:

PITS = Pain Interference Total Score
BPI = Brief Pain Inventory
PECS = Pectoralis Block
BPI-WAW = Brief Pain Inventory - Worst, Average, and Worst Activity (physical interference)
BPI-REM = Brief Pain Inventory - Relief, Enjoyment, and Mood (affective interference)

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INTRODUCTION

Since 2016, the Pain Out research project has been developed in Mexico to optimize postoperative pain management. This project has been conducted in collaboration with Dr. Ruth Zaslansky, Dr. Wifried Meissner, and the University of Jena, Germany team to improve postoperative pain treatment. During the project's initial phase, which spanned from 2016 to 2018, a diagnostic assessment was carried out to evaluate pain management practices in Mexico. Based on the results of this assessment, the second phase implemented improvement protocols encompassing educational aspects, pharmacological and non-pharmacological interventions, as well as regional techniques, intending to enhance the quality of care and alleviate pain in postoperative patients[1-3]. In 2022, a second project titled «Longitudinal Assessment of Pain-Related Patient-Reported Outcomes in the Sub-Acute Phase After Surgery: A Registry Study from PAIN OUT in Mexico» was initiated, registered in Clinical Trials as: «Longitudinal Assessment of Pain-Related Patient-Reported Outcomes in the Sub-Acute Phase After Surgery: A Registry Study from PAIN OUT in Mexico»[4]. This study involved the participation of 14 hospitals. It aimed to include postoperative patients from various specialties, who were administered several validated and culturally adapted questionnaires in Mexico at different times.

The international questionnaire was administered to patients within 24 hours following surgery. Subsequently, a follow-up was conducted via telephone at seven days, 28 days, and, in some hospitals, at three months post-surgery, using two questionnaires: the Brief Pain Inventory (BPI) and another to assess the total pain interference score (PITS)[5]. The BPI evaluates both the severity of pain and its impact on daily activities. Four items are used to measure pain intensity: the worst pain experienced, the minimum pain level, the average pain over the past 24 hours, and the current pain level. Additionally, seven items assess pain interference in various areas: sleep, general activities, mood, work, interpersonal relationships, walking ability, and enjoyment of life. These questions are rated on a scale from 0 to 10, where 0 indicates «no interference» and 10 indicates «complete interference»[5]. The scores of the functional interference items from the BPI are summed to calculate the BPI-PITS scores. The total sum is then divided by the number of items to obtain an average score. Once the average pain interference total score (PITS) is obtained, patients can be categorized into the following groups: PITS $\leq$ 0: No interference, 0.5 < PITS $\leq$ 2: Mild interference, 2 < PITS $\leq$ 5: Moderate interference, and PITS > 5: Severe interference. This classification system allows for a more precise assessment of the impact of pain on patients and facilitates clinical decision-making[6].

Neuropathic pain was assessed using the DN4 questionnaire. Still, it only included the first two questions (DN2) that explore various pain characteristics such as burning, cold pain, electric shocks, and associated symptoms like tingling, pins and needles sensation, numbness, and itching. Neuropathic pain in postoperative pain has already been assessed with DN2 in other publications[5-8]. These tools have proven helpful in characterizing pain in patients during the acute and subacute phases across the entire Mexican network. The results are currently being analyzed in collaboration with the University of Jena, and we anticipate a new publication soon.

Designing a Transitional Pain Service: Is it Feasible in Mexico?

Transitional pain clinics worldwide are adopting a comprehensive approach that addresses both the prevention of chronic postoperative pain and the detection and management of patients at risk for opioid addiction in response to the opioid crisis faced by countries such as the United States. These clinics strive to identify risk factors for the development of chronic pain after surgery and offer early preventive interventions to mitigate this risk. Additionally, they are equipped to assess and manage patients with opioid addiction issues, providing alternative treatments and harm reduction programs for those requiring support in managing their addiction[9]. Unlike the United States, where opioid abuse within the medical community has contributed to the opioid crisis, the primary challenge in Mexico lies in overcoming opioid phobia and ensuring that patients receive appropriate pain treatment without unfounded fears.

Therefore, transitional pain clinics in Mexico would face different challenges, including securing the economic and human resources needed to implement them, among other difficulties. While they would be useful for the detection and management of patients at risk of addictions and substance abuse, their primary focus would be the prevention and early recognition of persistent postoperative pain. The question remains whether this would be possible with the limited resources available in our country. How could we begin to address this issue?

At the Instituto Nacional de Ciencias Médicas y Nutrición Salvador Zubirán (INCMNSZ), as part of this project and as an improvement for the management of postoperative pain based on the results obtained in 2016 at our hospital, the Postoperative Pain Service was founded in 2017 under the direction of Dr. Víctor Manuel Acosta Nava, Head of the Anesthesiology Department, and coordinated by Dr. Ana Lilia Garduño López. This service implemented protocols and interventional techniques for pain management, achieving positive results and good acceptance from the hospital's medical personnel.

In 2022, coinciding with the start of the second project of the Pain Out initiative, a Transitional Pain Service was established to provide in-person care for patients identified via telephone with persistent pain, functional interference, or neuropathic pain. These patients were scheduled to be evaluated in the institute's outpatient department on Mondays from 8 to 10 a.m.

In 2022 and 2023, all patients at INCMNSZ who agreed to participate in this project provided their consent and mobile phone numbers to be contacted via telephone. Of the 968 patients included, 63% were women, with a mean age of 55.54 ± 16.17 years. All patients completed the international questionnaire within the first 24 hours to characterize postoperative pain. Follow-up was successfully completed in only 743 patients at 7 days, 28 days, and 3 months.

At three months, 227 patients reported persistent pain. Of these, 62% reported mild discomfort, which in most cases did not require analgesic management, 31% experienced moderate pain, and 7% reported severe pain. Functional interference in our population was 18%, with 1.8% considered severe (PITS > 5), which is consistent with the literature. In a logistic regression analysis, factors such as a prior history of chronic pain, female gender, and maximum pain intensity during the first 24 hours (> 6 points) emerged as significant predictors of overall functional interference associated with pain in surgical patients at three months. Of the 227 patients, 82 were seen at the INCMNSZ Transitional Pain Service for presenting with moderate to severe pain and/or neuropathic pain characteristics (DN4 > 3). Despite being offered this care, the remaining patients did not consider it necessary.

The group most frequently experiencing persistent pain with neuropathic characteristics was breast surgery patients, totaling 32 women. In selected cases, these patients were offered analgesics, neuromodulators, and ultrasound-guided regional blocks (PECS block, serratus block, or erector spinae block). Pain resolution was achieved in 17 women with a single early intervention, while 11 women required a second or third block for pain resolution. It is important to note that pain is often resolved with initial interventions; however, residual painful areas may require additional blocks. Ultimately, only four women continued to experience pain and were referred to the chronic pain service. The next group with the highest frequency was thoracic surgery patients, totaling 16 individuals. These patients also underwent ultrasound-guided interventional procedures, where early intervention with a block helped alleviate pain in 50% of the patients. In seven patients, the ultrasound-guided regional block was repeated due to partial analgesia; however, complete pain relief was achieved in only five patients. The remaining two patients were referred to the INCMNSZ chronic pain service. Another significant group with persistent pain consisted of knee joint replacement surgery patients, most of whom improved with medication and physical therapy by the three-month mark. However, physical functional interference was one of the main sequelae observed in these patients, as many of them have chronic rheumatologic diseases. Nephrectomy and hysterectomy were surgeries that reported persistent pain in 10% of cases, which was resolved with analgesic management and abdominal wall blocks for those patients who experienced it.

The assessment tools used in this study, such as the BPI and DN4, proved to be useful in the follow-up consultations as a fundamental part of the approach, allowing us to characterize pain and establish a treatment plan tailored to the affected areas. The BPI generates three subscale scores: the pain interference total score (BPI-PITS), which is the average of the seven interference items; physical interference (BPI-WAW), calculated by averaging the items related to work, general activity, and walking ability; and affective interference (BPI-REM), obtained by averaging the items associated with interpersonal relationships, enjoyment of life, and mood. This classification allows us to identify which areas of the patient are most affected when completing the questionnaire. It helps determine a treatment plan based on the subscale scores. Whether the focus is on pain affecting the physical state, emotional aspect, insomnia, or a comprehensive approach if all aspects are affected *(Figure 1)*. As mentioned above, neuropathic pain was assessed using the DN4 questionnaire. The first two questions explore pain characteristics such as burning, cold pain, electric shocks, and associated symptoms like tingling, pins and needles sensation, numbness, and itching. The complete DN4 questionnaire was administered during the in-person consultation, as the last two questions require a physical examination.

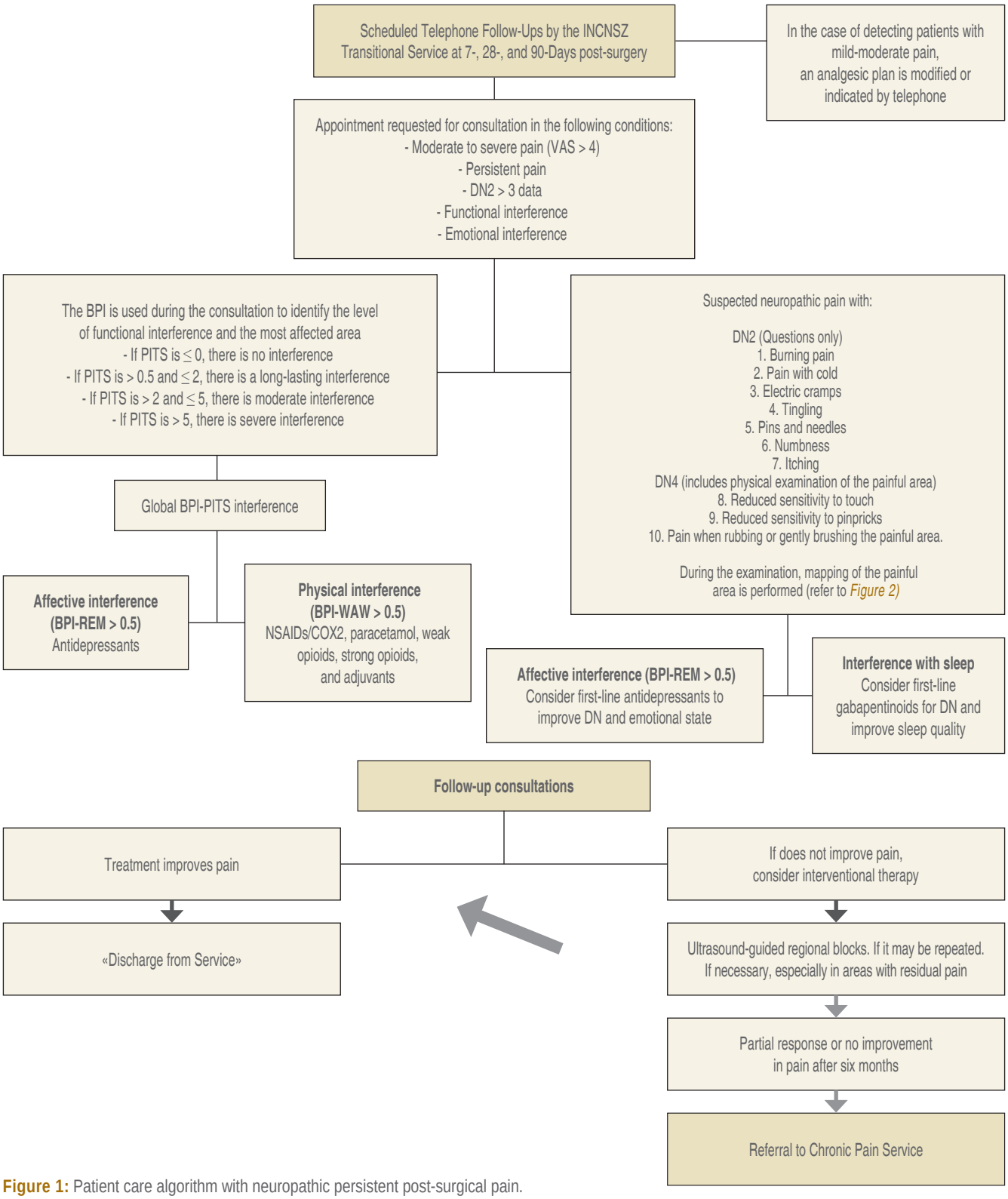

Figure 1: Patient care algorithm with neuropathic persistent post-surgical pain.
BPI = Brief Pain Inventory. PITS = Interference Score Total. DN = Neuropathic Pain. VAS = Verbal Analog Scale. BPI-REM = Brief Pain Inventory, interference with Relationships, Enjoyment of life and Mood. BPI-WAW = Brief Pain Inventory, interference with Work, general Activity, and Walking ability.

Figure 2:

Instruments for clinical evaluation and mapping in patients with post-mini-thoracotomy neuropathic Pain. The red dotted line encircles areas with allodynia. The solid blue line indicates an area with hypoesthesia.

It is crucial to pay detailed attention to the somatosensory system, evaluating responses to touch, pain, cold, and heat to identify areas of mechanical and/or thermal hypoesthesia, hyperalgesia, or allodynia. The clinical evaluation can be conducted at each consultation using simple instruments such as cotton swabs, reflex hammers, Wartenberg wheels, tuning forks, Weber compasses, needle esthesiometers, and von Frey filaments, among others. During the physical examination, mapping the painful area with a dotted line represents allodynia or hyperalgesia, while a solid line represents areas of hypoesthesia *(Figure 2)*. Repeating mapping areas with sensory alterations during follow-up consultations can reveal somatosensory changes. However, these are not always directly related to the intensity and severity of neuropathic pain. It is advisable to map these areas on schematic diagrams of the patient's anterior and posterior body to compare possible responses to neuromodulator treatment at each consultation.

In the preliminary results of this research project, we identified that specific symptoms detected with the DN2, such as cold pain, tingling, pins and needles sensation, electric shock, and numbness, are significantly associated with functional interference. These findings highlight the importance of a comprehensive and early evaluation of postoperative pain, particularly neuropathic pain, which requires a specific approach to mitigate its functional interference and improve long-term quality of life during patient recovery. Throughout this research project and establishing acute and transitional pain pain services at INCMNSZ, we have concluded that rigorous follow-up from the immediate postoperative period, including telephone contact with patients at seven days, 28 days, and three months, along with early analgesic interventions, offers clear advantages. Utilizing the BPI to assess functional interference, the DN4, and the possibility of consultations for physical examination and the establishment of early treatment proves to be superior compared to unrecognized chronic postoperative pain, which can significantly compromise patients' long-term quality of life. We have observed that early treatment can have a preventive effect.

To implement these measures, it is essential to have a specialized team, such as our acute pain clinic, which consists of two permanent anesthesiologists and rotating resident physicians who meet the patients in the postoperative period and can contact them by phone. Additionally, establishing a weekly consultation of a couple of hours, attended by the same team, has proven a feasible and low-cost model. We recognize that a transitional pain clinic will only be necessary in certain hospitals like ours, where caring for a specific group of patients at high risk of developing chronic pain justifies its implementation.

CONCLUSIONS

The tools proposed by the Pain Out management system have proven valuable for establishing immediate, intermediate, and long-term follow-up after surgery. This follow-up is crucial for the timely detection of persistent surgical pain, neuropathic pain, and consequent functional interference, allowing for the early establishment of treatments that prevent the development of chronic postoperative pain in high-risk patients. The relationship between neuropathic pain and functional interference suggests that a multidisciplinary approach and early and preventive care are essential to mitigate functional interference and improve the postoperative quality of life for these patients. Transitional pain service could offer a viable solution to this problem. However, further studies are needed to validate these results. The Pain Out Mexican Network is committed to ongoing research in this field.

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