Chapter 18

REVIEW OF MULTIDISCIPLINARY STRATEGIES IN THE TREATMENT OF CHRONIC POSTOPERATIVE PAIN

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ABSTRACT

Chronic Postoperative Pain (CPOP) has a multifactorial etiology and affects the biopsychosocial sphere of the patient suffering from it. Pharmacological treatment alone has been shown to be insufficient for optimal management. Given that fact, the emergence of multidisciplinary teams where doctors specializing in pain management work together with nurses, physiotherapists, mental health professionals, occupational therapists and social workers, among others, to formulate and implement an individualized therapeutic plan, has shown itself to be an effective option in which all areas of the patient that are involved in the origin and consequences of the pain are specifically addressed.

In this chapter we will review the current literature on multimodal chronic pain management and specifically that pertaining to CPOP. In addition, we will investigate whether these multidisciplinary approaches would have a place in the prevention of CPOP in patients who are due to undergo surgery.

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INTRODUCTION

Chronic postoperative pain (CPOP) or chronic postsurgical pain (CPSP) has an overall incidence of 30%, and is considered severe in 5 to 10% of patients [1].

Its characteristics include its diagnostic complexity and the impact on the biopsychosocial sphere of the individual, affecting their quality of life [2], and making it a difficult type of pain to treat.

Although researchers have endeavored to select patients at risk for CPOP, its management remains inadequate [3]. Its origin is multifactorial and its consequences encompass the physical, psychological and social spheres, with the ability to affect sleep habits, enjoyment of life, mood, vital energy and productivity, among other things [4]. Given this complexity, when pharmacological treatments are used in isolation they are insufficient and instead an individualized and multimodal plan is recommended for effective management [5].

In this chapter we will analyze the need for comprehensive treatment for the management of chronic pain in general, how the multidisciplinary teams which will be in charge of putting said treatment into practice should be formed, as well as the studies that have implemented these treatment plans in patients with chronic pain. Finally, we will analyze the use of these multimodal therapeutic programs to see how effective they are in improving outcomes of patients with CPOP as well as in preventing its appearance in those patients who are due to undergo surgery.

MULTIDISCIPLINARY TREATMENT OF CHRONIC PAIN

Justification versus Monomodal Treatments

Waters' biopsychosocial model defines pain as a complex phenomenon characterized by the confluence in the patient suffering from it, of biological, psychological (emotional and cognitive components), social (family support, access to the health system, sociocultural background, etc.) and spiritual factors [6].

These factors become more complex during the pain chronification process, producing neuroplastic changes in the nervous system, in addition to learning processes with modifications in the psychological and social sphere that are sometimes associated with dysfunctional psychological processing of pain. [7]. It is this involvement of the biopsychosocial sphere of the patient that supports the need for multidisciplinary management for an effective result in the management of chronic pain.

Monomodal therapies can be effective in managing acute pain, but when pharmacological treatment represents the only therapy for chronic pain, this leads the patient suffering from it to prolong the search for a medical solution to their problem [8]. Other notable consequences of the use of medication as the sole therapy for chronic pain are the delay in effective diagnosis and therapy, as well as the epidemic of opioid use that we are seeing today [9].

Given the above perspective, multidisciplinary teams for the multimodal treatment of chronic pain have emerged as a possible solution.

Multidisciplinary Teams

The anesthesiologist John J. Bonica (1917-1994), who dedicated his professional life to the study of pain, was a pioneer in the comprehensive management of chronic pain and founded the first Multidisciplinary Unit at Tacoma General Hospital (USA). [8].

The International Association for the Study of Pain (IASP), founded by Bonica in 1973 and made up of all types of professionals who participate in the treatment of patients with pain, recommends that the Multidisciplinary Pain Centers (MPC) are staffed with specialist professionals who must communicate regularly about patients and manage all of the biomedical and psychological aspects of pain. The central objective of this multidisciplinary treatment should be, in addition to the improvement of pain, the achievement of the physical, psychological and socio-occupational functioning of the patient, which can be objectified by measuring the intensity of their pain, their psychological anguish and their quality of life [10].

The professionals who should make up these MPCs are: doctors with advanced training in pain management, nurses, mental health professionals (clinical psychologists, psychiatrists), physical therapists, social workers, and occupational therapists.

In the first evaluation, a clinical history of pain and a complete physical examination is carried out, requesting the necessary diagnostic studies. In the case of chronic pain that is not related to surgery, we must be alert to the existence of warning signs that could lead us to a serious pathology. For example, in the case of chronic back pain, factors that may make us suspect malignant neoplasms or fractures as the cause of pain [11].

With all of the above, a multimodal therapeutic plan is drawn up in which the professionals and techniques that should be involved in the treatment are established, the objectives agreed upon with the patient are set and the expected results are explained. The multimodal approach refers to an interdependence of professionals at a personal, spatial and patient-related level, not only the combination of different therapeutic methods [7].

In the course of treatment, joint evaluations are carried out in regular sessions with the entire team. Another key aspect is coordination with the patient's Primary Care physician during the therapeutic process and at the point of discharge [12].

Studies with Multidisciplinary Therapies in Patients with Chronic Pain

Many studies have been carried out in patients with *disabling chronic pain* in which multidisciplinary therapies have been used, demonstrating therapeutic benefits. This is because multidisciplinary treatment implements the biopsychosocial factors of pain chronification.

In a prospective study carried out in a Spanish hospital in which 104 patients on sick leave with muscular-skeletal pain refractory to previous treatment were included, the patients were subject to a multimodal therapeutic program. The plan consisted of individual and group sessions, which lasted 5 hours per day over a course of 4 weeks, and involved the following: medical techniques (oral or locoregional pharmacology, peripheral neural blocks, etc.); cognitive behavioral therapy; physical therapy (physiotherapy, cryotherapy, TENS, etc.) and occupational therapy. After the end of the program significant reductions in pain were observed in relation to the pre-treatment evaluations (Visual Analogue Scale: 7.4 ± 1.6 vs 3.4 ± 2; $p < 0.0001$); depressive symptoms (Beck's Depression Inventory (BDI): 17 ± 9 vs 10±8 points; $p< 0,0001$); anxiety (Hamilton Anxiety Rating Scale (HARS): 19 ± 8 vs 14 ± 7 points; $p < 0.0001$); and the level of difficulty in performing daily activities (measured by the Health Assessment Questionnaire (HAQ): 1.7 ± 0.4 vs 0.6 ± 0.5 points; $p < 0.0001$) [13].

In line with the previous results, we found a 2015 Cochrane systematic review and meta-analysis in which 41 randomized controlled trials were analyzed with a total of 6858 patients suffering from chronic low back pain who underwent multidisciplinary rehabilitation (with at least one physical, one psychological, and one social or work component) and it was compared with a non-multidisciplinary intervention, which was classified as usual care (patients received care at the discretion of their general practitioner or medical specialist) or as physical treatment exclusively.

The authors concluded that these multidisciplinary programs were more effective in reducing pain and disability, compared to the usual care (moderate-quality evidence) and to the physical treatments (low-quality

evidence). In addition, in the multimodal management group, greater efficacy was observed in terms of the probability of returning to work, compared to that observed with the physical treatments [14].

We also found studies that demonstrate the long-term effectiveness of these treatments in patients with CP. Pieber et al., [15], in a longitudinal study where they carried out a multidisciplinary rehabilitation program involving 96 patients with recurrent chronic low back pain, demonstrated significant improvements in the range of motion and strength of the lumbar muscles, pain measured by the Visual Analogue Scale (VAS), functional status and health-related quality of life. This improvement was observed at the end of the treatment and was maintained 18 months after it. Another retrospective cohort study, carried out in a Swiss Pain Center, found improvement in patients undergoing this type of program, measured from pretreatment to 3-year follow-up in terms of well-being, physical well-being and pain intensity. This study was however limited in its interpretation due to a low rate of patients responding to post-treatment surveys (27%) [16].

Regarding the selection criteria for patients with chronic pain for the indication of multimodal therapy, we can highlight, among others, those with biopsychosocial risk factors of greater chronification and those in a period of incapacity for work [7].

Another issue that has been analyzed is the time that multidisciplinary therapy should last. In another systematic review of randomized controlled trials that used biopsychosocial rehabilitation programs to treat chronic low back pain and compared them with a control group in which patients had not received this type of multimodal therapy, the authors concluded that both the multidisciplinarity and the intensity of the treatment with programs lasting more than 100 hours were determining factors in reducing the intensity of pain and in obtaining an increase in the functionality of the patients [17]. However, in a more recent systematic review, the objective of which was to estimate the influence of dose on the effectiveness of multidisciplinary rehabilitation, the authors could not conclude that the intensity of the intervention produced a greater clinical

effect. Therefore, the optimal dose of multidisciplinary therapy is not currently known [18].

As far as which are the most effective therapies that a multidisciplinary treatment should compile for a patient with chronic pain, there are several studies that have investigated this important question. As was the case with the previous question, due to the heterogeneity of the multimodal therapies used in the different published studies as well as the variety of profiles analyzed of patients with chronic pain, we have not yet not found evidence-based recommendations that answer this question [18, 19].

Multidisciplinary programs have proven to be the most effective and cost-effective treatment for chronic pain of non-cancer origin. [20]. The considerable positive economic effects of this type of treatment have been studied [21].

Despite all of the above, monomodal options, especially pharmacological treatments and invasive therapies, are overused, while multimodal therapies continue to be underused [7].

MULTIDISCIPLINARY TREATMENT OF CHRONIC POSTOPERATIVE PAIN

CPOP is a type of chronic pain defined as that which lasts for three or more months after a surgical procedure, when other causes of pain such as cancer or chronic infection have been excluded. The factors that affect its chronicity can be biological, psychological or social in nature. It interferes with the individual's resumption of daily activities, thus affecting both their ability and their productivity. All of the foregoing therefore influences the biopsychosocial sphere of the patient, as we discussed at the beginning of the chapter [2, 22, 23].

We have found reviews in the literature that have analyzed multidisciplinary therapeutic interventions in patients with chronic pain and that have already been discussed previously. However, studies of this type in the specific context of CPOP are scarce. We found reviews that investigate the management of CPOP after specific surgeries, such as

phantom limb pain after amputation [24] or knee replacement [25], although the authors did not discover any studies performed using multimodal treatments in this field.

As we have seen with the management of chronic pain, monomodal therapies have been shown to be insufficient in CPOP. Thus, in a 2017 systematic review by Wylde et al., [26], conducted to evaluate the effectiveness of different interventions used independently in the management of patients with this type of pain, 66 randomized clinical trials were analyzed. The interventions analyzed were: pharmacology, acupuncture, exercise, spinal cord stimulation, additional surgery, laser therapy, mindfulness, etc. None of the interventions showed sufficient evidence to draw conclusions about their effectiveness in reducing the intensity of the CPOP. The authors concluded that to date the trials have focused on pharmacological interventions, and therefore, clinical trials of multimodal interventions tailored to the pain characteristics of patients with CPOP are necessary.

CPOP is a specific subtype of chronic pain that is complex and multifactorial in nature. Given that there have been multimodal therapies carried out for patients with non-oncological chronic pain that have been shown to be effective, but that we did not find similar studies carried out in patients with a specific diagnosis of CPOP, we feel justified in recommending the need for multidisciplinary rehabilitation trials in these patients in order to evaluate them.

MULTIDISCIPLINARY INTERVENTION FOR THE PREVENTION OF CHRONIC POSTOPERATIVE PAIN

The prevention of CPOP in patients who are due to undergo surgery and who have risk factors for developing this type of pain could help reduce its prevalence [27]. Among these predisposing factors it is worth highlighting the following: surgical procedures estimated to last longer than 3 hours [28], patients undergoing thoracic, breast or hernia surgery (due to a higher risk of developing neuropathic pain) [29], perioperative

pain and perioperative use of opioids [30], anxiety or depression [31], among other factors.

The implementation of a growing number of Enhanced Recovery after Surgery (ERAS) protocols in relation to different surgical interventions has, as one of its objectives, the control of acute postoperative pain and the reduction of perioperative use of opioids [32, 33]. These protocols are carried out by multidisciplinary teams and emphasize patient education and management of patient expectations, as well as the use of multimodal analgesia and regional anesthesia. If acute postoperative pain is a predictor of chronic postoperative pain, the incorporation of ERAS could have subsequent beneficial effects in preventing CPOP [34], although this has not yet been demonstrated.

Some monomodal therapies have been found to be effective in the prevention of CPOP, such as the use of adequate perioperative analgesia and the use of techniques that prevent nerve damage, provided they can be carried out [3].

Multimodal interventions are currently being used, not only in the treatment of patients with CPOP, but also in the prevention of the transition from acute pain to the introduction of CPOP. As an example of this, a prospective study with comprehensive treatment carried out by a multidisciplinary Transitional Pain Service (TPS) has been underway at the Toronto General Hospital since 2014. This therapeutic plan began in the surgical patient's preoperative phase and ended in the outpatient setting 6 months after surgery. Patients at high risk of suffering from CPOP were identified and a comprehensive and multimodal approach was carried out by pain physicians, specialist nurses, psychologists and physiotherapists. The objectives of this program were to minimize the incidence and severity of CPOP, disability and emotional distress, and to improve the quality of life of these patients [27]. Six months after the operation, opioid-naive and opioid-experienced patients reduced the amount of opioid use by 69% and 44%, respectively [35]. In the psychological approach of this therapeutic plan, the use of a type of cognitive-behavioral therapy called Acceptance and Commitment Therapy (ACT) stands out as incorporating mindfulness and acceptance in behavioral choices based on personal values. This part

of the treatment (accompanied by medical techniques, physical therapy, occupational therapy, etc.) is consistent with the biopsychosocial approach that has been attributed to chronic pain and specifically to CPOP, as it concerns us.

The use of a multidisciplinary TPS has been shown to be effective in other studies such as a retrospective cohort study carried out in a US Clinic. In this study, the results of veteran patients (who have a high risk of CPOP [36]) undergoing major surgery on their joints and controlled by a TPS were compared with those who underwent the same type of intervention prior to the implementation of this service in that hospital. The group of patients controlled by TPS had a 69% lower probability of chronic opioid use compared to the pre-intervention group. Furthermore, this happened both in opioid-naive patients and in those with chronic opioid use prior to surgery [37].

At present, randomized controlled trials are being carried to investigate the effectiveness of the prevention of this type of pain through multidisciplinary management versus standard management in patients at risk of developing CPOP. This is the case of the TRUSt trial, which is being carried out in the Netherlands and the clinical results of which will be measured by the quality of the patient's recovery, the incidence of CPOP and the postoperative use of opioids [38]. Because the pain chronification process is extremely complex and dynamic, further studies like this one with multidisciplinary treatments are needed to effectively prevent chronic pain after surgery [39].

CONCLUSION

Chronic pain, and specifically CPOP, is a complex entity with an impact on the biopsychosocial sphere of the individual.

Monomodal management is used in excess, despite its effectiveness not having been demonstrated. Multidisciplinary interventions have been shown to be effective in the treatment of patients with chronic pain,

however, we did not find studies that have specifically focused on patients with CPOP.

The prevention of CPOP with a multidisciplinary approach in patients who are due to undergo surgery and who present risk factors for its development has shown promising results, although more studies are currently being carried out in this regard and will provide more information on the effectiveness of such an approach.

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