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International Journal of Physical Medicine and Rehabilitation

Mini-Review

Our 15-Year Experience in Acute Pain Service: What is the Lesson so Far?

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ABSTRACT

Recent improvements in the medical and surgical fields increased the number of patients eligible for major oncological surgery, especially the elderly and frail ones. Adequate analgesia plays a key role in the perioperative pathway, and even the most advanced loco-regional techniques need to be embedded in a well-established structural organization to be really effective. Starting from our clinical experience and literature reports, we analyze the role of modern multidisciplinary Acute Pain Services, from their first appearance to the possible future applications.

Keywords: Acute pain service; Analgesia; Perioperative; ERAS

INTRODUCTION

Adequate and complete pain control in the post-operative period is essential to accelerate hospital discharge, avoid the development of relevant complications and ensure a rapid recovery of patients' pre-operative functional capacity. This is especially true for high-risk, frail and elderly surgical patients, whose number has constantly increased in the last decades: An effective analgesic strategy can prevent post-operative respiratory and cardiovascular complications in those patients, possibly reducing morbidity and mortality [1].

In recent years, the availability of newer and effective drugs and the application of advanced analgesic loco-regional techniques proved to be successful in post-operative analgesia in different surgical contexts. Scientific evidence also demonstrates the importance of embedding these pharmacological analgesic strategies in a well-organized structural organization of patient care, in order for them to be really effective.

LTERATURE REVIEW

Several scientific editorials supported the idea of creating such multidisciplinary organizational systems to face this need since the late Sixties [2]. However, the first publications describing Acute Pain Service (APS) experiences came out in 1985 in Germany and the United States [3,4]. Since then, many authors proposed different models of APS to the scientific community. Two were the main models described at the beginning: the "American" and the "Swedish" model [5,6].

Brian Ready proposed the first one, in which the main role is represented by hyperspecialized anesthesiologists, while Narinder Rawal described the latter, based on the professional figure of the Acute Pain Nurse, a nurse specifically trained for post-operative pain care. Beyond strengths and limitations of each model, it is necessary to focus on the importance of creating the best organizational system according to the available resources, with a context-sensitive approach.

To be really effective, an APS must respect some minimum criteria, such as the identification of selected personnel with a defined leader, the creation of detailed, specific and shared written analgesic protocols and the rapid availability during nights and days, seven days a week. Moreover, pain intensity measurement to evaluate the efficacy of the adopted analgesic protocols, and the identification and treatment of possible side effects related to the drugs and techniques chosen are some of the main objectives of an efficient APS.

ACUTE PAIN SERVICE

We published our ten-year experience of APS at San Raffaele hospital, Milan, Italy in 2019 [7]. We followed 17,913 adult patients expected to experience severe post-operative pain between 2006 and 2016.

Epidural analgesia (n=7,763, 43%) and Patient-Controlled Analgesia (PCA) of intravenous morphine (n=9,239, 52%) were the analgesic techniques adopted the most. Post-operative nausea and vomiting, paresthesia and hypotension were the most

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Received date: March 29, 2021; **Accepted date:** April 12, 2021; **Published date:** April 19, 2021

Citation: Marmiere M, Faustini C, Stefano T (2021) Our 15-Year Experience in Acute Pain Service: What is the Lesson so Far? Int J Phys Med Rehabil. 9:600.

described side effects. However, no serious complications, including severe respiratory depression and serious neurological damages (epidural abscess or epidural hematoma) were detected.

We treated more than 8,000 patients during the following five years, reaching a total of 26,440 patients up to February 2021. The average number of patients followed by our APS remained about 2,000 each year. We registered a significant reduction of monitored patients in 2020, due to the impact of COVID-19 pandemic on the elective surgical activity. The diffusion of SARS-CoV-2 infection and the subsequent obligation for the hospital to shift all its activity towards the treatment of patients with pneumonia and respiratory distress syndrome determined a complete interruption of benign surgery and an important reduction in non-urgent oncological operations, as it occurred in almost all countries worldwide (Figure 1).

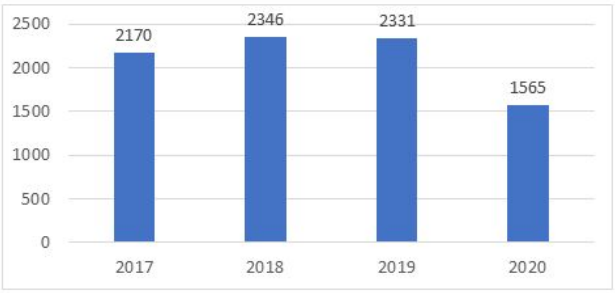

Figure 1: Number of patients followed by the Acute Pain Service at San Raffaele hospital, Milan, Italy in the last four years. We observed a 33% reduction of the activity in 2020 due to the COVID-19 pandemic, compared to the previous year.

Analyzing the data of the last five years, we did not observe severe side effects related to analgesic techniques such as severe respiratory depression, epidural hematoma or abscess. We registered an increase in the number of ultrasound-guided wall-blocks (mostly transversus abdominis plane and serratus plane blocks), intrathecal opioid administration and paravertebral analgesia. However, we observed a decrement in epidural catheter positioning. Latest Enhanced Recovery After Surgery (ERAS) society guidelines, indeed, recommend avoiding the use of epidural catheter in laparoscopic and minimally invasive surgery [8]. Multimodal therapy and opioid-sparing techniques have been demonstrated to be as effective as epidural analgesia in controlling pain after laparoscopic procedures. Moreover, the adoption of such techniques limits the possible risks related to neuraxial analgesia, such as bleeding and infective complications related to difficult positioning, as well as sympathetic block with subsequent hypotensive episodes. Maintaining an adequate level of mean arterial pressure in the post-operative period is essential, especially after abdominal surgery, in order to preserve an adequate perfusion of the visceral anastomosis.

The presence of an organized and well-structured APS also allowed the introduction of a new PCA device based on the administration of sublingual sufentanil. We adopted this technique in more than 300 patients undergoing major abdominal and gynecological surgery and we observed an excellent safety profile and optimal results in the management of post-operative pain [9]. The sublingual route of administration ensures an elevated drug bioavailability and a rapid onset of action, maintaining the high safety profile characterizing the PCA technique. Differently from what occurs with continuous infusion, the possibility of having the patient directly control their analgesic plan allows drug titration according to pain intensity during each phase of the post-operative period, and the avoidance of possible drug overdosing. As for intravenous morphine, we administered strong opiates in general wards only adopting the PCA modality.

The use of specific devices, the knowledge of their functioning and their continuous maintenance require the presence of a complex organizational system that only an APS can guarantee. Moreover, many analgesic techniques, even if really effective, can be associated to severe side effects, requiring continuous monitoring and surveillance for their utilization in a general ward.

To be completely effective, APS must be embedded in a multidisciplinary program able to manage all the problems that a patient can encounter after surgery. For more than 15 years, all surgical units of our hospital implemented ERAS protocols, with the aim of helping surgical patients obtaining a prompt recovery and a fast return to the pre-operative quality of life after hospital discharge, or at least as similar as possible to it. In order to reach this goal, this fast-track approach supports an evidence-based method consisting of the application of different items, among which post-operative pain control plays a fundamental role. The higher the number of items adopted and the adherence to them, the higher will be the impact of ERAS on patient's outcome. Pain control and APS can have a positive impact on patients' peri-operative journey only if well integrated in a complete fast-track program.

Furthermore, another essential element of an effective APS is its foundation on a multidisciplinary team. Post-operative pain management must be a prerogative of all the professional figures involved in the peri-operative period, including not only anesthesiologists, but also surgeons, nurses and physiotherapists.

The creation of shared written protocols, modifiable according to scientific evidence and direct observations, as well as a continuous work of education and diffusion of acquired knowledge are all essential characteristics of an APS.

Periodical multidisciplinary audits are useful and necessary meetings to promote a continuous discussion and to produce fundamental contributions in data analysis and decision-making strategies. As underlined in a recent review by Stamer et al., future developments of APS include an extension of its activity throughout the peri-operative period [10].

CHRONIC POST-SURGICAL PAIN

Recent observational studies and reviews underlined the diffusion and the increasing importance of Chronic Post-Surgical Pain (CPSP). Werner et al. defined CPSP as post-operative persisting pain for at least three months that was not present before surgery, that has different characteristics or increased in intensity, localized to the surgical site or to a referred area, when other possible causes of pain were excluded

(e.g., cancer recurrence, infection) [11]. The incidence of CPSP varies between five and eighty percent according to the type of surgery, with a higher incidence in limb amputations and thoracotomy. Both poorly controlled pre-operative pain and inadequate post-operative pain control are elements associated to an increased risk of developing CPSP.

CPSP can have a negative impact on several aspects of everyday life including quality of life, enjoyment of life, mood, and general activity, relations to other people, sleep and walking ability.

An important challenge of a modern APS should include the creation of an organizational system able to support patients during all the peri-operative period and not only immediately after surgery.

This concept suggests the importance of developing pre-operative programs to optimize patient's conditions before surgery, trying to solve untreated painful syndromes.

In the same way, a periodical monitoring and fixed follow-up evaluations after hospital discharge can help in detecting forms of inadequate post-operative pain control, to set tailored analgesic treatments as soon as possible, also enforcing doctor-patient relationship, with a direct improvement on patients' quality of life.

CONCLUSION

Furthermore, the COVID-19 pandemic significantly limited the possibility of direct access to hospitals, forcing the diffusion of several forms of telemedicine. These new technological applications and the higher patients' willingness to use them could offer further tools to follow patients and help them in controlling pain during all the peri-operative period.

Forty-five years after the description of the first attempts to systematically structure post-operative pain management, it is clear nowadays how important is the creation of a defined and well-organized APS. Effective APS should support the diffusion and the adoption of multidisciplinary and evidence-based analgesic protocols, able to follow and support patients throughout their peri-operative journey.

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