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Tackling pain after cardiac surgery: It takes a village!

Discussion Paper

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ABSTRACT

There is increasing concern regarding the risk to develop chronic pain after cardiac surgery with potential detrimental effects on recovery and quality of life. With shortened hospital stays after cardiac surgery, there needs to be more emphasis placed on self-management skills and the support provided to patients and their informal caregivers during the subacute phase. A paradigm shift needs to occur on multiple levels to prevent chronic pain and opioid misuse after surgery. Initiating this change means redefining the timing, recipients, and content and format of interventions. Several avenues can be examined and translated in practice to promote a successful transition after cardiac surgery.

KEYWORDS

Biopsychosocial model pain, Cardiac Surgery, Chronic Pain, Pain Intervention, Recovery

INTRODUCTION

Cardiac surgeries became frequent surgical procedures (Virani et al., 2021) with reduced length of stay in hospitals (Engelman et al., 2019; Son et al., 2021). However, postoperative persistent pain or chronic post-surgical pain (CPSP) after cardiac surgery, i.e. pain developing after surgery and lasting at least 3 months with other causes of pain excluded (Kehlet, 2014), has become more and more of a concern and can have a considerable impact on recovery and long term clinical outcomes (Guimaraes-Pereira et al., 2017). Of note, the relationship between chronic pain and cardiovascular disease (CVD) is currently being investigated. Several studies report a higher risk of reporting CVD if suffering from chronic pain (Bruehl et al., 2018; Fayaz et al., 2016; Oliveira et al., 2020; van Hecke et al., 2017), associations between chronic pain and mortality related to CVD, and a dose-response relationship with increasing pain severity being associated with more cardiovascular outcomes (Fayaz et al., 2016). Following discharge from the hospital, patients are exposed to a greater risk for CPSP and prolonged opioid use (Hirji et al., 2019), as they still experience high levels of pain and need to self-manage their pain (Bjornnes et al., 2016; Guimaraes-Pereira et al., 2017). Moreover, the risk of CPSP is usually not known by patients (Oliver et al., 2016), which likely lead them to consult once the pain has already become chronic (Clarke, 2016).

Can we prevent the chronification of pain after cardiac surgery? The answer is not that simple but with the help of a biopsychosocial model pain (Gatchel et al., 2007), the most comprehensive pain framework, experts from multidisciplinary fields of research are certainly examining solutions addressing the diversity of risk factors involved in this process. Among these, psychosocial protective and risk factors have gained increased attention as they are, to a certain extent, modifiable, and highly related to pain intensity and future functioning (Edwards et al., 2016). For instance, it has been

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shown that pain cognitions, such as pain-related catastrophic thoughts, negatively influence postoperative pain intensity and activity levels, thus contributing to the development of chronic postoperative pain, as opposed to self-efficacy and optimism which would enhance recovery (Weinrib et al., 2017). Additionally, targeting these factors concurs with an increased interest for non-pharmacological interventions (*HEAL initiative-Pain Management Effectiveness Research Network* 2019; *Interagency Pain Research Coordinating Committee-National Pain Strategy Overview*, 2016), potentially preventing opioid overuse or misuse. For decades, non-pharmacological approaches for postoperative pain have been focusing on the use of educational interventions in the acute care setting. However, although beneficial to anxiety levels, the lack of efficacy of these interventions on pain intensity (Ziehm et al., 2017), both preoperatively and postoperatively, has been consistently reported. These findings along with advances in the understanding of the development of CPSP calls for a paradigm shift. This shift may need to occur on multiple levels: timing of interventions, recipients of these interventions, and type of interventions.

TIMING OF INTERVENTIONS

One of the most important risk factors in the development of CPSP is postoperative acute pain intensity level (Katz & Seltzer, 2009; Schug & Bruce, 2017). With people having shorter hospital stays after cardiac surgery (Son et al., 2021), acute pain becomes a problem to address at home during recovery. Surprisingly, a lack of studies documenting pain after discharge from hospital has been observed (Park et al., 2020), thus reflecting a gap in postoperative pain management and the need to increase our efforts in understanding the experience of postoperative pain and the potential of efficacy of interventions in this phase of the postoperative continuum. Moreover, although non-pharmacological interventions for postoperative pain are integrated in clinical practice guidelines (Chou et al., 2016), recent studies still highlight multiple barriers in implementing such interventions in the acute care setting (Martorella & McDougall, 2021; Warren et al., 2020). Although efforts to implement these interventions in acute care settings must be pursued, it seems important to offer these in the community following discharge in order to prevent a serious setback in pain management during recovery when activity levels should be gradually increasing.

Furthermore, clinicians involved at different timepoints in the cardiac surgical care continuum tend to express the importance of developing self-management support for patients after discharge (Martorella et al., 2018). Indeed, according to nurses, patients can lack self-motivation, especially if living by themselves, and compliance with treatment seems challenging once discharged from hospital. In the context of discharge planning, the traditional approach to prepare cardiac surgical patients for their recovery at home has been to educate them during hospitalization or at the time of discharge. However, interventions occurring following discharge, once patients must apply what they learned, have previously shown to be more effective than self-management education during hospitalization (Akbari & Celik, 2015; Fredericks & Yau, 2013), as well as preferred by patients (Lapum et al., 2016; Martorella et al., 2014). Of note, this recommendation is in line with the increasing emphasis placed on patient-centered subacute care and the prevention of readmission after cardiac surgery (Mori et al., 2019).

RECIPIENTS OF INTERVENTIONS

With a fast-tracked acute care phase, the role of informal caregivers in the management of pain is becoming more and more significant. Additionally, pain being a subjective phenomenon learned through life experiences and influenced by biological, psychological, and social factors (Raja et al., 2020), it is logical to think that the personal pain-related experiences of family members or informal caregivers will impact the patient's pain. It comes as no surprise that psychosocial risk and protective factors for CPSP also include significant others in relation to social support and solicitous responding (Katz & Seltzer, 2009). Solicitous responding has been defined as "behaviors on the part of significant others that unwittingly positively and/or negatively reinforce the patient's pain behaviors thereby increasing their frequency of occurrence" (Katz & Seltzer, 2009, p. 726). Thus,

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most guidelines recommend the inclusion of family members in postoperative pain management interventions (Chou et al., 2016).

Nevertheless, very few studies have examined caregiver-facilitated pain management interventions in hospitalized adults (Yasmeen et al., 2020), as well as interventions focused on support for caregivers when transitioning at home (Bjornnes et al., 2019). Hence, in a systematic review of 42 studies including caregivers of cardiac surgery patients, solely 7 intervention studies were found (Bjornnes et al., 2019). The findings reflected caregivers feel insecure and lack information and support during the recovery at home (Bjornnes et al., 2019). Yet, interventions educating caregivers and involving them in pain management seem promising in contributing to the reduction of pain intensity as well as opioid consumption (Rahmani et al., 2020; Yasmeen et al., 2020) and could even promote the use of positive pain coping strategies (Grondin et al., 2014).

TYPE OF INTERVENTIONS

Given the increasing value of the subacute phase, the importance of patients' self-management skills cannot be overstressed. In view of the lack of efficacy of educational interventions on pain management, it is legitimate to wonder if interventions' targets should be revaluated as well as their active ingredients. Moreover, pain is generally not a big concern for cardiac surgical patients (Cogan et al., 2014; Martorella et al., 2014) who express more informational needs regarding other types of postoperative complications (Veronovici et al., 2014). This perception is related to core beliefs and attitudes that cause the normalization of pain and reluctance to take any actions. Advances on the importance of psychosocial risk and protective factors for pain have emphasized the relevance of cognitive and behavioral approaches, especially after discharge, when patients are trying to return to some normalcy. Cognitive behavioral therapy (CBT) and its variations, such as acceptance commitment therapy (ACT) and mindfulness-based cognitive therapy (MBCT), are suited to influence CPSP risk and protective factors as they target pain-related cognitions and behaviors, i.e. the foundation for individual self-management skills (Weinrib et al., 2017).

Hence, we may also want to investigate the impact of tailoring the content of interventions according to the individual profile of risk and protective factors. For instance, some patients may not present pain-related catastrophic thoughts and not require cognitive restructuring. This would mean that a standard CBT approach may not be relevant for everyone. A preliminary screening of these psychosocial risk and protective factors could help determine the content of the intervention. Content matching is an important tailoring ingredient that is frequently missing, even in interventions addressing chronic pain (Martorella et al., 2017). Of note, the evaluation of these factors may need to be done several times along the continuum, e.g. before and after surgery as their predictive power may change over time or depending on the type of surgery (Weinrib et al., 2017). As an example, while pain catastrophizing may not be present preoperatively in cardiac surgical patients who are more focused on survival, it may be present postoperatively due to the pain related to their sternotomy.

FORMAT OF INTERVENTIONS

However, implementing these CBT-based interventions following discharge may present several challenges in the context of a surgical population, such as the cardiac surgical population, and may require modifying their format. Indeed, for instance, they usually require weekly group meetings for 8-12 weeks, which is rather taxing during recovery after a major surgery and not always necessary if pain is not yet chronic and disability has not surfaced. These interventions may require adaptations to better fit the recovery period following hospital discharge and the prevention of CPSP. Several studies have successfully tested brief versions of these approaches with surgical populations (McClintock et al., 2019; Weinrib et al., 2017).

Lastly, another adaptation to explore is a web-based or online format of interventions, which has previously shown benefits in the perioperative continuum of care (van der Meij et al., 2016). As an example, a mobile health or social media-based

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application accessible from smartphones and tablets seems to be a promising and convenient tool to incorporate into cardiac rehabilitation, particularly for underserved populations (Dorje et al., 2019; Liu et al., 2020). This format allows instant guidance and feedback this is patient-centered, i.e., tailored to individual needs in terms of content, timing, and dosage. Furthermore, integrating messages from a clinician creates a sense of connectedness and personalized consultation that could enhance motivation and engagement (Dorje et al., 2019; Martorella et al., 2018). Additionally, according to patient preferences, the intervention could be hybrid with the combination of a mobile application and brief check-ins with a coach by telephone. Moreover, although embryonic, the use of technologies is also emerging as a tool to facilitate accessibility to interventions including informal caregivers (Shaffer et al., 2020) and the social-media based application seems like a convenient tool to integrate caregivers.

CONCLUSION

Although providing support beyond discharge as well as involving caregivers have previously been suggested in studies and guidelines, these recommendations have not been reflected in research and practice. Today, with shortened hospital stays after cardiac surgery and the known risk of CPSP and opioid misuse, we have a responsibility to initiate change by increasing awareness regarding CPSP and providing support in the community. Managing pain after surgery does take a village!

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