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The Personalized Pain Program: A New Transitional Perioperative Pain Care Delivery Model to Improve Surgical Recovery and Address the Opioid Crisis

Traci J. Speed, MD, PhD[1], **Marie N. Hanna, MD, MEHP**[2], **Anping Xie, PhD**[2,3]

[1]Department of Psychiatry and Behavioral Sciences, Johns Hopkins University School of Medicine, Baltimore, Maryland, USA

[2]Department of Anesthesiology and Critical Care Medicine, Johns Hopkins University School of Medicine, Baltimore, Maryland, USA

[3]Armstrong Institute for Patient Safety and Quality, Johns Hopkins University School of Medicine, Baltimore, Maryland, USA

THE OPIOID CRISIS

Opioids are addictive and prolonged opioid use has negative consequences for individual patients and public health more broadly.[1] In 2020, more than 80,000 deaths were attributed to an opioid-related overdose. Reducing the reliance on opioids for pain management remains a public health challenge. According to the National Center for Health Statistics, in 2020, over 142 million opioid prescriptions were dispensed in the United States (US). Surgery is a leading cause of opioid prescribing: over 100 million surgical procedures are performed annually in the US and 80% of surgeries result in a postoperative opioid prescription. While opioids effectively treat acute pain, poor communication across transitions from the pre-to-postoperative period and wide variability in opioid prescribing practices postoperatively increases the risk of prolonged and escalated opioid use and reduces quality of care.[2] Chronic pain and preexisting opioid use are robust predictors of prolonged opioid use after surgery, regardless of the type of procedure.[3,4] A well-coordinated and effectively integrated healthcare system can shepherd these patients on presurgical opioids for preexisting pain to the appropriate multidisciplinary specialists who can manage perioperative pain and optimize postoperative recovery.

PERSONALIZED PAIN PROGRAM AT THE JOHNS HOPKINS HOSPITAL

The Personalized Pain Program (PPP) at The Johns Hopkins Hospital was established as an institutional response to the opioid crisis.[5] Historically, the Acute Pain Service (APS) only provided pain management consultations in the inpatient setting during the acute postoperative period. This new program represents a comprehensive transitional model of care in which the same group of pain specialists work with patients across the care spectrum: from the preoperative ambulatory setting, through the acute inpatient setting, and into the long-term postoperative ambulatory setting. The program has the infrastructure to triage and enroll patients either before surgery or within 1 to 2 weeks of discharge after surgery. Patients are subsequently followed every 2 to 4 weeks over a 6-month postoperative period.

These follow-up visits focus on an individualized rehabilitative recovery approach tailored to each patient, and use multimodal approaches to manage pain and facilitate sustainable reductions in postoperative opioid use.

Multidisciplinary Pain Management Team

Optimizing the quality of recovery in the perioperative period requires the integration of care from multiple disciplines. The PPP team consists of both acute and chronic pain specialists and psychiatrists with access to integrative medicine, physical medicine and rehabilitation, and addiction medicine specialists. Each specialist optimizes a multimodal analgesic regimen using pharmacological and/or nonpharmacological approaches.

Acute pain specialists guide patients to taper opioids preoperatively and tailor regional anesthesia techniques perioperatively to help reduce daily inpatient opioid requirements. If possible, treatment regimens may include a combination of acetaminophen, non-steroidal anti-inflammatory agents, anticonvulsants, neuromodulators, ketamine, muscle relaxants, and local anesthetics via topical application, peripheral nerve injections or catheters. *Chronic pain specialists* help manage these patients using non-opioid and opioid analgesics; providing a continuum of care while also optimizing functional status. *Psychiatrists* enhance the comprehensive pain management plan by diagnosing the underlying psychiatric diseases that may be sustaining chronic pain, by providing a conceptual formulation of the causes and relationships that make it difficult for patients to engage in treatment and consider pain care without opioids, by prescribing psychotropics to treat diseases, and by providing psychotherapy to address the maladaptive behaviors, temperamental vulnerabilities, and life experiences that contribute to the complexity of pain management. Further, PPP providers prescribe buprenorphine to patients with opioid use disorder (approximately 10% of the patient population) and refer patients to more intensive substance use recovery programs when indicated.

Patient Engagement in Pain Management

In addition to the multidisciplinary nature of the PPP, we recognize the importance of engaging patients with chronic pain to set realistic goals and expectations about their pain during the perioperative period. The Institute of Medicine identifies patient-centeredness as a key attribute of quality healthcare, which stresses the merits of patient experience and their active participation in care, decision-making, and quality improvement.[6] Engaging surgical patients in perioperative pain management is essential to optimize recovery and patients are encouraged to work with their clinicians to identify treatment goals and successfully manage pain using current, safe, and effective treatments. We have shown that perceived engagement in pain management is significantly associated with reduction in prescription opioid use after surgery.[7]

To improve patient engagement in the PPP, we applied a human factors and systems engineering approach to develop a multi-faceted intervention including: (1) a patient navigation tool for patients to document their pain experience and prepare for their PPP visits, (2) a PPP website with instruction videos to introduce the PPP and multimodal analgesic regimen to patients, and (3) a PPP brochure to provide current PPP information

to both referring clinicians and potential patients. Both PPP patients and clinicians believed that the intervention was easy to use and has the potential to improve patient engagement by facilitating information sharing between patients and clinicians and empowering patients to work with their clinicians to set goals and develop plans for their treatment.

Outcomes of the PPP

We have previously demonstrated that PPP patients who were using opioids preoperatively achieve significant postoperative reductions (81mg to 29mg, $p < .001$) in daily opioid use.[8] Further, via self-reported outcome measures, patients report significant reductions in pain severity and pain interference, and improved physical functioning.[8] Approximately 60% of patients discontinue opioids by PPP discharge and those who successfully complete the program remain abstinent or on low doses (<30mg) of morphine equivalent doses up to 2 years after PPP discharge (unpublished data).

CHALLENGES TO PPP IMPLEMENTATION AND FUTURE CONSIDERATIONS FOR OTHER SITES

The PPP can serve as a template which other healthcare systems may adopt with local modifications. Table 1 presents challenges we have faced and future considerations in the implementation of this care model at other sites.

CONCLUSION

The multidisciplinary nature of collaboration at Johns Hopkins allowed us to develop a model of collaborative care that provides the framework for improving perioperative care coordination, preventing prolonged postoperative opioid use, and enhancing patient recovery after surgery. The dissemination and implementation of the PPP care model in other healthcare organizations has great potential to tackle the opioid crisis by both reducing opioid use in patients with opioid use disorders and by preventing the development of problematic opioid use after surgery. Moreover, the PPP can improve patient safety more broadly.

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Table 1.

Implementation of the PPP: Potential Challenges and Future Considerations

Tiers	Potential Challenges	Future Considerations
Patients	- Limited knowledge about pain and behavioral health resources after surgery - Limited education about opioid tapering - Limited opportunity to express care preferences	- Screen and triage patients before or immediately after surgery to increase patient reach - Materials to educate patients about the goals of the PPP - Examine factors that influence engagement
Providers	- Undertrained in identifying high-risk patients - Referral decision-making influenced by individual experience, biases, and stigmatization - Unfamiliar with how to order a PPP referral in the electronic health record	- Clinical decision support tools to flag and triage at-risk patients - Standardize the referral process to reduce biases - Build tools in electronic health records to facilitate referrals
Organization	- Limited resources, staff, and space - Fragmented access to patient-centered pain care - Time gaps from surgery to post-op surgery follow-up delay high-risk patient identification - Measuring program outcomes requires a research infrastructure	- Engage the support of health system leadership in the early phases of program development - Create training process to onboard new staff who can shepherd patients to appropriate specialists - APS patient referral during postop hospitalization - Simultaneously develop PPP-supporting clinical and research infrastructure before implementation
Society	- No evidence-based practices for multidisciplinary pain care and opioid tapering after surgery - Wide variation in insurance coverage may hinder access to specialists - Stigmatization of opioids and mental health - Social determinants of health may limit access	- Disseminate program successes - Educate and train providers at other institutions - Engage patient advocates and educate policy makers about program successes - Strategies to improve patient-provider communication to reduce stigma - Analyze and address data on disparate patient outcomes
Cultural	- Health system culture may be resistant to change - Patients' cultural, past experiences influence their receptiveness to and engagement in pain care	- Identify interdisciplinary teams to champion the program - Develop culturally sensitive materials to support engagement in treatment for historically marginalized or stigmatized populations