Opinion

Obstetrical Patient Engagement and Data Collection: The Value of Technology in Enhanced Recovery Programs

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Abstract

Enhanced recovery at cesarean section refers to a multimodal and multidisciplinary pathway aimed at accelerating patient recovery. The program's success requires patient engagement throughout the perioperative period, as well as post-discharge, which is made possible with the help of technology. Our institution's state of the art patient engagement smartphone application provides on-demand patient education and allows for remote monitoring both pre and postoperatively. Further, the application surveys patients regarding preoperative surgical fear, program compliance, opioid risk, amongst other data points, that are collected to an analytics dashboard, which can be viewed pre- and postoperatively. This application is particularly helpful post-discharge when it is more difficult to have continued patient engagement and program assessment. Thus, we argue that technology is essential to the success of an enhanced recovery program and in future research aimed at studying the comprehensive benefit of these programs on maternal recovery and outcomes.

Keywords: Technology; Obstetrics; Patient Engagement; Enhanced Recovery; Cesarean Section

Abbreviations: ERAS: Enhanced Recovery After Surgery; RCSS: Recovery from Caesarean Section Scale; Obsqor: Obstetrics Quality Of Recovery

Introduction

Enhanced Recovery and Patient Engagement

The concept of an enhanced recovery program was developed more than 20 years ago, specifically for colorectal surgery, but has gained increasing interest and success in the field of obstetrics at cesarean delivery [1,2]. ERAS refers to a multimodal care pathway designed to accelerate patient recovery by reducing the surgical stress response and supporting the patient's physiologic function. The program is an integrated continuum, as the patient moves from home through the preoperative, intraoperative, and postoperative phases of surgery and home again [3]. A key component of enhanced recovery is patient and family engagement, which helps patients better prepare for surgery and discharge. Women who are better informed perioperatively and who take an active role in their care appear to recover more quickly [4].

Why Should We Engage Patients?

Empowering patients to take a significant role and ownership over decisions regarding their care, in contrast with the passive "sick" role patients play in traditional care pathways, is essential. It is about designing and delivering healthcare in a way that is inclusive and enables women to take control of their healthcare needs. Accurate and consistent written and verbal information is key as it reduces the fear of the unknown and challenges

preconceived ideas about the operation, pain, recovery and length of stay. Further, shared decision-making between physicians and patients increases the probability of improved outcomes.

At our institution an Enhanced Recovery patient is continually engaged and: 1) Understands her health condition and its effect on her body 2) Feels able to participate in decision-making with her healthcare professionals 3) Feels able to make informed choices about her treatment 4) Understands the need to make necessary changes to her lifestyle for managing her condition 5) Is able to challenge and ask questions of the healthcare professionals providing her care and 6) Takes responsibility for her health.

How Do We Engage Patients?

The combination of our evidence based multidisciplinary enhanced recovery pathway and our state of the art patient engagement application puts our patients in the heart of their healthcare services. Prior to enrollment in the enhanced recovery program at our institution, patients are surveyed about the proposed perioperative changes and their attitudes to surgery and earlier postoperative discharge. All patients then receive a detailed explanation about the program from their obstetrician and further details of the care plan are included in the smartphone application, which is downloaded during a prenatal visit.

Our patient education materials use appropriate language and are delivered by interactive multimedia which improves patient willingness to participate in care. Instead of overwhelming the patient with all the information at one time via verbal or paper instructions we instead provide bite-sized information at different intervals via the multimedia platform. Studies have shown that the patients only remember 20% of verbally provided information and 50% of that information is remembered incorrectly [5].

Why is Technology Essential in Patient Engagement?

Patients of childbearing age are part of the millennial generation and are thus familiar with actively researching, evaluating, and making use of online information. Over 95% of Generation Y owns a smartphone or smart device and these devices have become a staple of everyday life: an on-the-go tool to read emails or tap into social media networks. This specific generation is more dependent on technology than any other generation. This connection presents a unique opportunity to engage, inform, and connect to our pregnant patients.

Our team at Saint Peter's University partnered with a leading provider of a clinical intelligence platform to develop the first smartphone application to engage and empower our obstetrical patient population. We were looking for a solution with a wide range of capabilities, including a cross-platform application which accommodates patient education and the ability to perform remote monitoring. Other integrated options such as email or text reminders, ability to create custom educational modules, and to measure performance through an analytics dashboard were important aspects as well.

Maintaining continuous contact with every patient is a task that exceeds the capability of even the largest healthcare organizations if one uses only manual processes. Most physicians do not have enough time to track all patients via telephone calls or office visits and most patients are not willing to schedule extra time or appointments. With the help of our mobile clinical intelligence platform we expanded the reach and influence of our physicians on patients participating in the program. Some examples include: 1) Automated delivery of patient education and engagement messages 2) Automated appointment reminders 3) Daily health checks 4) Patient inquiries directed to the appropriate person and 5) Automated data collection.

Much of the prior ERAS research investigates inpatient data while lacking post-discharge information. Understanding how ERAS protocols comprehensively impact maternal recovery, including the months postpartum, should be further investigated and is made possible with the help of technology [6].

What New Data and Information Can Be Collected with the Help of Technology?

It is evident that information collected directly from patients is increasingly important. Remote monitoring systems have become more robust and less expensive and the ability to transmit data has grown exponentially. During the current COVID-19 national pandemic the need for remote monitoring has become even more essential, as both patients and healthcare providers look to telemedicine to overcome the burden on the healthcare system and disease transmission.

Our smartphone application helps our care teams to extend their reach and engage patients at home both preoperatively and post-discharge. Patient-generated health data are created and recorded by patients, family members or other caregivers to help address a health concern. The use of our platform supplements existing clinical data, fills in gaps in information regarding ERAS, and provides a more comprehensive picture of ongoing patient health. Collection of data for initiating, maintaining, and improving enhanced recovery programs is thus emphasized here.

At our institution we instituted ERAS at time of cesarean delivery with the goal of improving each domain of "DREAMS" (drinking, eating, analgesia, mobilizing, sleeping) [7]. Moonesinghe et al. [8] provides a framework for measuring the quality of care as it pertains to ERAS, which includes evaluating both outcome and compliance. Increasing compliance of specific DREAMS elements may be associated with better outcomes and may explain the success of certain ERAS programs and institutions over

others. Further, measuring compliance remotely may allow for identification of a lagging element(s) requiring attention and thus an opportunity for program improvement. A study by Gustafsson et al. [9] showed compliance with nearly all ERAS interventions influenced postoperative outcomes beneficially..

Our application contains a postoperative assessment of ERAS compliance: "Did you have education and counseling with your doctor/surgeon regarding expectations and goals regarding enhanced recovery for your c-section?", "Did you drink the Ensure pre-surgical drink..?", "Did you have a meal the day of surgery?", and "Did you get out of bed the day of surgery?" We are thus able to determine whether postoperative outcomes are truly associated with ERAS protocol and which areas need improvement. Further, we continue to have engagement postoperatively, which may not have been possible without the patient smartphone application.

A frequently overlooked element to surgical recovery is preoperative anxiety and fear, as fear of surgery has been associated with increased postoperative pain, increased use of analgesia, and poor recovery. Our smartphone application utilizes the Surgical Fear Questionnaire, a valid and reliable tool for assessing fear of short and long-term consequences of surgery, and surveys patient fear of the operation, anesthesia, post-operative pain, nausea and side effects, and duration of rehabilitation [10]. Identification of patients with surgical fear preoperatively may allow for targeted intervention and support and thus improvement in perioperative care and surgical outcomes. Further, studying the positive relationship between reduced anxiety preoperatively and improved maternal recovery and satisfaction postoperatively reinforces the value of providing on-demand thorough information perioperatively [11].

In response to the country's current opioid epidemic, we also seek to identify those patients most at risk of postoperative opioid abuse early. Our smartphone application includes the Opioid Risk Tool, a remotely self-administered and validated assessment of opioid abuse risk in patients prescribed opioids for pain [12]. The following questions are answered preoperatively: "Do you have a personal history of substance abuse [alcohol, illegal drugs, prescription drugs]?", "Do you have a family history of substance abuse?", "Do you have history of preadolescent sexual abuse?", and "Do you have a history of psychological disease [depression, schizophrenia, bipolar, PTSD, ADD, OCD]?"

Patients screened as low risk for opioid abuse may still also contribute to the growing danger of opioids as unused prescribed opioids may unintentionally get introduced into the community. Much of the success of ERAS programs lies in the fact that women experience improved analgesia and thus decreased opioid use postoperatively. Though hospitals with ERAS programs achieve

a significant reduction in inpatient opioid use postoperatively, this reduction has yet to be translated to the amount of opioids prescribed to the patient on the day of discharge. Since the amount of prescribed opioids often exceeds the actual amount used by the patient upon discharge, strategies are needed to better align opioid prescribing with patient needs. We have incorporated a modified shared decision-making tool into our smartphone application, which has been shown to both optimize pain management after cesarean delivery and decrease the amount of opioids prescribed by approximately half of the institution standard [13]. We are able to monitor the amount of opioids given to the patient while inpatient and then in-turn use this information in a shared decision-making process to decide how many pills the patient will be prescribed at discharge. Our remote monitoring platform helps to determine how many pills the patient took at home in the postoperative period and thus helps to decide if the patient requires a refill versus determine the number of pills that went unused. Knowing this information can better guide the opioid-prescribing practices at our institution.

Interest also remains in the quality of the scoring tool we use to evaluate overall postoperative recovery. We desired a tool specific to cesarean section and one that encompasses the multidimensionality of recovery: includes the physical, psychological, and social components of recovery. A validated remote tool is needed to assess whether the enhanced recovery perioperative interventions have an effect on patient experience and can also be used to guide how we define future protocols. Sharawi et al. [14] studied the available patient-reported outcome measures scoring tools that evaluate functional postoperative recovery and we deemed the RCSS [11] the most suitable outcome measure in our setting. The RCSS was found to be a structurally valid, reliable, and internally consistent tool also with moderately positive ratings for hypothesis testing and responsiveness. The RCSS asks the patients' perceptions using a 7-point Likert scale regarding speed of recovery, mobility, aspects of caring for the baby, caring for own hygiene, post-surgical pain, activity, and fatigue.

Though the ObsQoR-11[14] has been considered the best tool for functional recovery post cesarean section, it has only been utilized up to 25 hours postpartum and is thus not recommended for use beyond this time. Since the goal of our enhanced recovery program is continued patient engagement and data collection past the immediate postpartum period we were unable to use this tool. We consider continued post-discharge monitoring essential as we seek to prevent postoperative complications and improve self-management; thus avoiding ER visits, hospital readmissions, and failed provider-patient relationships. Reports that can be generated on the analytics dashboard post-discharge include the opioid risk tool, ERAS compliance, surgical fear questionnaire, and the RCSS. Patient survey health checks can also be generated and may include

critical alerts pertaining to dehydration, digestive observations, infection observations, breastfeeding, allergic reaction, blood clot observations, and postpartum depression.

Conclusion

In this opinion article, we provide the rationale for inclusion of technology in enhanced recovery programs. A standardized smart device application would benefit institutions utilizing ERAS protocol at time of cesarean delivery by improving patient education, continual patient engagement, remote monitoring, and postoperative follow up. Improvements in the aforementioned areas are likely to improve maternal postoperative outcomes. Further, the smart device application and associated analytic dashboard allow for the collection of new data in the field of obstetrics and ERAS, including how preoperative fear, opioid risk, and postoperative review of program compliance affect surgical and maternal outcomes.

Conflicts of Interest

The authors did not report any potential conflicts of interest.

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