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Is perioperative home the future of surgical patient care?

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Perioperative home (PH) or perioperative surgical home (PSH) is a patient centered medical service or primary care provider aimed at share decision-making and seamless continuity of care for the surgical patient. The goal is to improve operational efficiency, decrease resource utilization, reduce length of hospital/intensive care unit (ICU) stay and readmission, and to decrease complication and mortality rates. PH is an innovative model of delivering health care during the entire patient surgical/procedural experience. This model is centered around patient from the time of the decision for surgery till the patients have recovered and returned to the care of themselves.

It is estimated that the US health care expenses would account for 19.3% of the United States gross domestic product (GDP) by 2019^[1], perioperative expense accounts for an estimated 52% of hospital admission charges in the United States^[2]. Most often the perioperative care is fragmented. So the central elements of current and likely any future health care reform will be value-based purchasing of health care and link medical quality and the payment via "pay for-performance" and "value-based purchasing" models^[3]. It is necessary to transform the current patient care system to a comparative effectiveness and cost effective health care delivery system.

In a report using Medicare beneficiary data from 2005 to 2006, Ghaferi and colleagues found that the incidence of complications undergoing 6 major

operations in patients were similar at the worst and the best hospitals in US (36.4% vs. 32.7%), but the worst hospitals had the mortality rates 2.5-fold higher than the best hospitals^[4]. The authors concluded that mortality among patients with complications is not only different in postsurgical complications, but also different in effective responses in a timely fashion. Another study also indicated that adverse events in general ward (non-ICU) patients lacked of recognition and appropriate management/treatment^[5]. In order to improve the perioperative outcomes and minimize the operational mistakes and accidents caused by the fragmented care, the American Society of Anesthesiologists (ASA) and other organizations recommended the PSH project as an innovative, patient-centered, surgical continuity of care model that fully incorporated shared decision-making and seamless continuity of care for the surgical patient. The proposed strategic principles and team of PH/PSH include: 1. patient-centered care by engaging in decision-making, 2. physician-led and team-based care to provide high quality services, 3. evidence-based care to reduce unexplained variability and complications and, 4. coordinated care to avoid interrupted clinical services. In order to provide such a high quality care, a team building is vitally important. This care team should include: anesthesiologists, surgeons, internists, physical therapists, nurses, laboratory technologists, radiologists, pharmacists, central supply

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persons, information technologists, case managers and social workers.

PH models do not need to be exactly the same and can be varied from one institution to the other depending on institutional infrastructures, conditions, compositions of staff and professions^[6-8]. It is strongly recommended that standardization, coordination and value-based care models be established. In order to eliminate the barrier among different patient care specialties, PH requires a physician team leader who is able to keep the PH model working effectively by collaboration. Every participant must practice based on the PH model where knowledge can be created within a certain patient population and where members actively interact by sharing experiences and take on asymmetric roles. PH model could provide seamless continuity in patient care while actively involving the patient, family, and other health care stakeholders and providers, including primary care physicians. The surgeons have traditionally served as the perioperative team leader. But, the team leader needs to coordinate many aspects of patient care in the PH model. Surgeons, however, need to focus on surgeries and surgical technical. Internal medicine physicians could potentially be the leader. However, since internal medicine physicians usually don't have surgical experiences, anesthesiologists are uniquely positioned to serve as perioperativists because of their understanding and ability to assess, evaluate, and prepare patients with a multitude of complex comorbidities for their procedure and their ability to manage these complex comorbidities intraoperatively and postoperatively^[8]. One study looked at the surgical ICU patients who were managed by the same anesthesiologists for intraoperative and postoperative care vs. those whose care was managed by different anesthesiologists, the length of ICU stay were (2.72 vs. 4.85 days with $P < 0.001$) and length of hospital stay (LOS, 6.87 vs. 10.1 days, $P = 0.004$) were significantly reduced in the PSH model. ICU readmission rates were significantly less among patients in the PSH group (1.65 vs. 15%, $P < 0.001$). The mortality among patients managed in the PSH group was also significantly reduced (3.79 vs. 8.33%, $P = 0.005$)^[9]. Since the initiation of the PSH model of care there were several studies published. A cost analysis study for patients undergoing primary unilateral elective total hip arthroplasty (THA) or total knee arthroplasty (TKA) under a total joint-PSH model suggested that the direct hospital costs were driven down substantially below USA benchmark levels using the total joint-PSH pathway. Total per diem cost was $\$10\,042 \pm 1\,305$ (13%) for TKA and $\$9\,952 \pm 1\,294$ (13%) for THA vs. literature-reported bench mark

per diem cost of \$17 588 for TKA and \$16 267 for THA, respectively^[10]. In another study presented recently at the ASA 2014 annual meeting, the authors included 546 patients who had knee replacement surgery within one year prior to the implementation of the PSH protocol and 518 who had the procedure within one year after the PSH protocol was in place. The average LOS after the initiation of the PSH protocol was 1.9 days vs. 3.2 days before the PSH protocol was instituted. In the PSH group, 94 percent of patients went home and 6 percent went to a skilled nursing facility. In the pre-PSH group, 80 percent of patients went home and 20 percent went to a skilled nursing facility. The 30-day readmission rate was low in both groups: 1.2% in the pre-PSH group and 0.9 % in the PSH group. When the authors surveyed 130 patients in the PSH group: 71 percent rated their experience as excellent and 25 percent said that it was satisfactory^[11].

The goals in the PH/PSH model will be met through shared decision-making and seamless continuity of care for the surgical patient, from the decision for surgery through recovery, discharge, and beyond by establishing a multidisciplinary system of coordinated perioperative patient care throughout the entire surgical continuum. The preoperative phase should include early preadmission evaluation by a centralized preoperative area/clinic, including current and past medical/surgical histories, laboratory and physical examination and other clinical information. Patients with multiple comorbidities need further comprehensive evaluation and optimization to minimize patient specific, attendant risks. Patient education, engagement, and empowerment can also be completed in this preoperative phase. Intraoperative phase: decrease case delays and cancellations can be achieved by medically optimizing the patient and achieving strong consensus within the group; provide precise fluid management in a goal-directed fashion; integrate pain management; perform highly efficient and quality surgeries. Postoperative phase: continue personalized pain management, early postoperative mobilization through physical therapy and rehabilitation and increase patient and caretaker education concerning post-discharge care. This new system should also drive performance improvement through feedback and outcome research to provide the best surgical care for all patients^[6,12].

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