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REVIEW

Total knee arthroplasty: improving outcomes with a multidisciplinary approach

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Abstract: Total knee arthroplasty (TKA) is the most commonly performed inpatient surgical procedure within the USA and is estimated to reach 3.48 million procedures annually by 2030. As value-based care initiatives continue to focus on hospital readmission rates and patient satisfaction, it has become essential for health care providers to develop and implement a multidisciplinary approach to enhance TKA outcomes while minimizing unnecessary expenditures. Through this necessity, clinical care pathways have been developed to standardize, organize, and improve the quality and efficiency of patient care while simultaneously encouraging the collaboration among various medical care providers. Here, we review several systems based programs and specialty care practices that can be adopted into the standard orthopedic practice.

Keywords: perioperative optimization, clinical care pathways, adult reconstruction total joint replacement, perioperative orthopaedic surgical home, POSH

Introduction

Osteoarthritis (OA) of the knee is one of the leading causes of disability among adults older than 65 years.[1] Patients with OA experience significantly greater pain and functional deficits during normal daily activities, leading to a loss of productivity,[2,3] and worsening quality of life.[2,4] Although many conservative treatment modalities are available for the management of mild-to-moderate OA, end-stage arthritis of the knee is best managed with total knee arthroplasty (TKA).[5]

From 2005 to 2030, the number of TKA procedures is projected to exponentially rise by 601%, reaching an estimated 3.48 million procedures annually.[2] Even in its current state, TKA is the most commonly performed inpatient surgical procedure within the USA.[3] As value-based care initiatives continue to focus on hospital readmission rates and patient satisfaction, it has become essential for health care providers to develop and implement a multidisciplinary approach to enhance TKA outcomes while minimizing unnecessary expenditures. Here, we review several systems based programs and specialty care practices that can be adopted into the standard orthopedic practice for a multidisciplinary approach to TKA.

Methods

A comprehensive literature review was performed using the PubMed, ScienceDirect, Google Scholar, and Scopus databases to identify potential review articles and studies for inclusion. Only articles that could be retrieved in the English language were included. All search results were initially reviewed by the first three authors (JEF, DN,

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and AAA) based on their title and abstract. Citations from the articles were further reviewed for potential inclusion.

Clinical care pathways (CCPs)

With the introduction of the Bundle Payments for Care Improvement (BPCI) initiative by the Centers for Medicare and Medicaid Services (CMS), CCPs have experienced a resurgence of interest over the past decade.[4,6] CCPs are systematic tools, which standardize, organize, and improve the quality and efficiency of patient care.[7] With respect to TKAs, adoption of CCPs has led to the increased utilization of multidisciplinary teams aimed at providing highly reliable levels of patient care, often involving primary care providers, inpatient specialists (ie, anesthesiology and critical care), and perioperative care experts (nursing, social work, physical therapy [PT], and occupational therapy [OT]).[4,8,9] Numerous studies have reported that implementation of CCPs can improve patient-reported outcomes (PROs), promote early mobilization, and reduce lengths of stay (LOS).[7,9–23] A study by Macario et al[12] also demonstrated significant reductions in hospital costs after the implementation of a CCP. Approximately 54% of the cost reduction were due to reductions in operating room (OR) time and improved OR resource utilization. Decreases in LOS contributed an additional 15% reduction in hospital costs.[12] Total hospital cost variability, as measured by the coefficient of variation, also decreased from 28% to 18%.[12] By reducing costs and cost variations, hospitals are better able to predict future resource utilization and allocation. Moreover, complication and readmission rates for venous thromboembolisms (VTEs), manipulation under anesthesia, wound infection, and stroke were reported to have decreased or remain unchanged.[9,10]

Arguably, these studies assessing the comparative effectiveness of CCPs are likely underestimating the beneficial effects of these pathways. Implementation of CCPs occurs at a systems level, and methods used for patients within a CCP likely carry over to all patients being treated within an institution, including those not partaking in a CCP.[9,12] Taken together, CCPs in TKA are proven methods for maximizing patient outcomes while improving hospital efficiency.[12]

Preoperative education

Preoperative patient education (PPE) programs are designed to improve patient compliance and outcomes through the education of proper self-care, rehabilitation, as well as setting realistic expectations by a variety of health care specialists including psychologists, physiotherapists, and physicians.[24] Several cohort studies have demonstrated that PPEs may decrease LOS and the incidence of falls in the immediate postoperative period.[25,26] In a study by Clarke et al,[27] PPE also increased the likelihood of spinal anesthesia over general anesthesia. However, randomized control trials, systematic reviews, and meta-analyses have failed to show consistent improvements in validated PRO scores, patient anxiety, LOS, functional outcomes, or complication rates.[24,28–31] This discrepancy is likely due to the large amount of heterogeneity seen with PPE sessions, duration, and time of administration between institutions. As such, we believe that PPE continues to be a valuable resource for patients and physicians alike.[32]

Preadmission testing (PAT)

Originally described by Crosby et al[33] in 1972, dedicated PAT clinics were developed to minimize inpatient LOS, reduce same day cancellations, and ensure that patients had been properly optimized prior to the day of surgery.[34] Today, PAT clinics are collaborative settings whereby patients may be examined and medically optimized by a multidisciplinary team of health care providers.[35] In an audit loop study by Kamal et al,[36] patients undergoing total joint arthroplasty (TJA) reported a significant 5% decrease in mortality, 50% reduction in unplanned Post-Anesthesia Care Unit (PACU) admissions, 60% reduction in unplanned admissions to the Intensive Care Unit (ICU), a half-day decrease in LOS in the sub-critical unit, and a 0.6 day decrease in LOS in the ICU following the implementation of a dedicated PAT clinic. Other studies have reported that the introduction of a dedicated PAT clinic can lead to a 38%–66% reduction in patient no-shows and medically related cancellations.[37–39] Patients referred to PAT also benefit from integrated perioperative medical management protocols, such as alterations in β blockade, angiotensin-converting enzyme inhibitors (ACEIs), and anticoagulation therapy preoperatively.[40] Additionally, the prevention of cancellations through PAT clinic reduces the associated frustration and anxiety experienced by both patient and hospital staff. For many, the upfront costs of developing a PAT clinic may act as a significant barrier. However, long-term benefits to patient safety make a clear argument for an integrated PAT pathway for all TKA patients.

Cardiac optimization and VTE prophylaxis

Despite major advancements in the medical management of cardiovascular disease (CVD), cardiovascular complications continue to be a significant source of postoperative morbidity and mortality.[41] In large cohort and randomized studies, perioperative myocardial infarction occurs in up to 6.2% of

noncardiac surgeries.[41] In a recent study of patients undergoing TJA by Bass et al,[42] high-sensitivity cardiac troponin T was found to be elevated in 13.5% patients on postoperative day 2. Of these patients, only 0.77% report clinical symptoms, suggesting that the incidence of myocardial injury may significantly be underreported. Asymptomatic myocardial infarctions can predispose to further cardiac morbidity and mortality, highlighting the importance of systematic preoperative cardiovascular risk evaluation and optimization prior to TKA through a multidisciplinary approach.[42,43] For patients with pre-existing or newly diagnosed CVD, hypertension, or dyslipidemia, a comprehensive review and adjustment of cardiac medications by the patient's primary care provider or cardiologist improves perioperative outcomes. In addition, proper patient counseling can help with the informed decision-making process and assists in aligning patient–physician expectations.[42]

Medical management

With a prevalence of ~30% among American adults older than 18 years, and >65% by the age of 60 years, hypertension is a common comorbid condition in the orthopedist's clinic.[44] Several recent studies have demonstrated that for patients receiving β blockers, continuing its use throughout the perioperative period reduces the incidence of acute myocardial infarction (MIs) (0.31% vs 0.22%), stroke (0.07% vs 0.04%; P=0.05), and overall risk of mortality (0.14% vs 0.07%) but increases the incidence of intraoperative hypotension (0.8% vs 1.7%).[45] As a result, the current American College of Cardiology (ACC), American Heart Association (ACA), and Surgical Care Improvement Project (SCIP) guidelines recommend patients on chronic β blocker therapy to continue its use perioperatively.[45,46] However, for patients with a Revised Cardiac Risk Index (RCRI) score of ≥3 (risk factors include diabetes, heart failure, CAD, renal insufficiency, and cerebrovascular accident) or newly diagnosed ischemic heart disease requiring β blockers, adequate lead time of 2–7 days should be provided for the cardiologist to properly assess the patient's tolerance to the drug.[26] Meanwhile, ACEIs and angiotensin receptor blockers (ARBs) should be discontinued on the day of surgery and restarted in the immediate postoperative period once the patient is euvolemic. Several studies have demonstrated an increased incidence of postinduction hypotension (OR 1.93–5.8), postoperative acute kidney injury (AKI; OR 2.68), LOS (3.3 vs 5.8), and use of ephedrine (OR 3.2).[47,48]

Similar to hypertensive disease, hyperlipidemia has now been reported to affect ~31.7% of US adults, with ~48.1% of patients receiving proper care.[44,49] Statins are effective lipid-lowering agents used to modify long-term cardiac risk factors in patients afflicted by hyperlipidemia.[50] Moreover, the use of statins throughout the perioperative period has demonstrated favorable outcomes in noncardiac surgery patients. Several large cohort meta-analyses have proven that statins significantly reduce the risk for mortality (RR 0.50) and MI (RR 0.53) in the immediate postoperative period.[51–53] More interestingly, a 10-year, retrospective study demonstrated a sizable reduction for revision total hip arthroplasty (THA) due to aseptic loosening (RR 0.36).[54] However, follow-up studies have reported that these results may be due to flawed study designs.[54,55] In summary, current recommendations state that statins should be continued preoperatively in patients currently taking statins and undergoing noncardiac surgery.[46,51] For statin naive patients, we recommended starting statin therapy 1–2 weeks prior to TJA.[51]

Cardiac coronary stents

Cardiac coronary intervention may increase the morbidity and mortality associated with elective TKA. Patients undergoing TKA within 6 months of percutaneous coronary intervention (PCI) with stenting may be at increased risk of stent thrombosis.[56,57] TJA should be delayed for a minimum of 6 months after a bare metal stent and 12 months after a drug eluting stent.[58] For patients with stents who are eligible for surgery, dual antiplatelet therapy (DAPT) should be discontinued prior to TJA. Current evidence indicates that continuation of DAPT in the perioperative period substantially increased the risk for severe bleeding without a decreased incidence for major cardiac events.[58]

VTE prevention

VTEs are one of the most common causes of 90-day readmissions for TJA.[59] Current VTE prevention recommendations aim to decrease a patient's LOS and hospital's financial burden by balancing adequate VTE prevention against the risks of hematoma development, wound drainage, and infection.[60] In patients who are appropriately risk stratified, the use of aspirin lowers the rate of periprosthetic joint infection, bleeding, and wound drainage, reduces hospital costs, and simplifies drug administration and monitoring.[61] The American Academy of Orthopaedic Surgeons (AAOS) also recommends the use of mechanical compression devices (MCD) in combination with aspirin.[62] A randomized control trial examining the effects of 6 weeks of MCD in patients receiving 325 mg aspirin twice daily for 3 weeks demonstrated a significantly lower incidence

of deep vein thrombosis (DVT) (0 vs 23.1%) for patients with MCD than without.[63]

In summary, deciding on a suitable prophylactic therapy to achieve the optimal balance of VTE and bleeding prevention necessitates an individualized evaluation of the patient's risk profile. Comorbidities such as blood clotting disorders, obesity (body mass index [BMI] >30 kg/m^2), chronic obstructive pulmonary disease (COPD), history of DVT/pulmonary embolism (PE), stroke, metastatic cancer, sepsis, anemia, depression, and atrial fibrillation place the patient at an elevated risk for developing symptomatic PE.[64] Studies are currently ongoing to assess the best thromboprophylaxis based on a patient's risk profile.

Anesthesia considerations and pain management

Anesthesia and postoperative pain management is critical for the delivery of high-quality and efficient orthopedic care. Anesthesiologists are charged with the task of medically managing the patient perioperatively while also employing prophylactic measures aimed at curbing the following four common postoperative events: volume depletion, blood loss, pain, and nausea.[65]

Current operative protocols at many medical centers require that patients remain nil per os the night before surgery, resulting in perioperative volume depletion. Current evidence suggests that early and aggressive volume status optimization preoperatively can act as a prophylactic measure for postoperative hemodynamic fluctuations, nausea, and vomiting and improves patient satisfaction while reducing LOS.[65] Current guidelines outlined by the American Society of Anesthesiologists (ASA) also indicate that clear fluid consumption 2 hours preoperatively does not increase the risk for intraoperative aspiration.[66] Moreover, oral volume enhancement with carbohydrates prior to surgery can decrease postoperative nausea and vomiting (PONV) and may prevent hypotensive episodes.[67] As oral fluid hydration provides greater hemodynamic stability among elderly TJA candidates, the risk for advanced medical interventions and intensive care consultation is reduced.

Over the last decade, the widespread utilization of tranexamic acid (TXA), an inexpensive antifibrinolytic, has been shown to substantially reduce postoperative blood loss. Sukeik et al[68] critically evaluated the literature and reported that preoperative or prolonged IV administration of TXA in THA led to a 20% reduction in blood transfusions. Complication profiles including clinically significant VTE events and infections remained unchanged. In addition, decreased postoperative blood loss, wound drainage, and hematoma development further promotes rapid rehabilitation following TJA.[69]

Multimodal pain management is essential for favorable short- and long-term outcomes following TJA. Robust perioperative pain management programs minimizing opioid administration while emphasizing a multitargeted approach have been shown to promote postoperative rehabilitation and reduce LOS.[70,71] Perioperative analgesics should emphasize a variety of drug classes such as non-steroidal anti-inflammatory drugs, acetaminophen, long-acting opioids, ketamine, and/or gabapentin.[65,71] Neuraxial and peripheral blocks, including spinal and adductor blockades, are effective at controlling acute postoperative pain following TJA. Compared to general anesthesia, spinal blockade has also demonstrated significant reductions in VTE, overall complications rates, 30-day mortality rates, LOS, bleeding, and perioperative opioid usage.[72] Periarticular injection cocktails with both short- and long-acting agents injected into the joint and surrounding soft tissues have also been shown to reduce pain levels.[73–75] Implementation of multimodal pain control eliminates the need for patient-controlled analgesia (PCA) devices, which have been shown to prolong LOS, increase patient morbidity, and prevent early rehabilitation.[74–76] Despite reduced narcotic intake, PONV still remains a preoperative challenge and may be more intimately associated with hemodynamic status. The proactive use of antiemetics and glucocorticoids prior to anesthesia can effectively reduce postoperative morbidity and improve recovery.

Dietary weight loss and bariatric surgery

Obese patients are at increased risked for intraoperative and postoperative TKA complications. The complications include MI, stroke, component malpositioning, readmission rate, incidence of revision surgery, rate of postoperative infections, functional outcomes, overall complication rate, and 10-year survival rate.[77–83] Financially, Kremers et al84 found for every 5 U increase in BMI >30 kg/m2, hospital costs for primary TKA are increased by $250–$300 due to the associated complications. Weight loss initiatives have, therefore, gained favor by the orthopedic community, with the AAOS recent guideline update promoting weight loss for all patients with BMI >25 kg/m^2.[85] Additionally, due to the increased risk of surgical complications, many institutions have placed a hard stop on TKA candidates with BMI >40 kg/m^2.[86] However, weight loss in the obese population remains a challenge for both the patient and the physician. Conservative, nonsurgical weight loss interventions, including dietary restriction and

exercise, have been proven to produce significant weight loss in obese patients. The process of weight loss through diet and exercise can also lead to self-reported improvement in walking distance, stair climbing, pain, and disability.[87] Furthermore, patients with dietician-led weight management prior to TKA may benefit from continued weight loss 1 year following TJA.[88] Recent studies have also shown promising results from medically supervised, very low-calorie diets (VLCD) with high-protein supplements.[89] For patients who are unable to lose weight with diet and exercise, bariatric surgery should be considered.

Bariatric surgery has proven to be an effective and safe weight loss modality with mortality rates as low as 0.1%.[86,90] Several studies have demonstrated that patients who undergo bariatric surgery prior to TKA show superior improvements in physical function, stiffness, knee pain, wound infection, and readmission rates post-TKA.[82,86,91,92] Despite these positive findings, other studies have remained equivocal.[93] One study by Martin et al[94] has even reported an increased risk for revision surgery in patients with staged bariatric surgery. This discrepancy in outcomes may be explained by a propensity for malnutrition and a persistent catabolic state for 2 years following bariatric surgery.[95,96] Bariatric surgery should therefore be assessed on a case-by-case basis.

Physical therapy

During the immediate postoperative period, patients continue to experience weakness and impairments in functional performance following TKA.[97] Functional performance worsens 20%–25% (1 month) following TKA along with deficits in knee extension strength as large as 35% (1–2 years) following TKA.[98,99] Absence of a standardized rehabilitation regimen and program among providers has caused low enrollment in postoperative rehabilitation programs, with reports showing a participation level of 26%, varying by institution and surgeon preference.[100] While there is a paucity of conclusive data supporting the use of a structured rehabilitation or PT program, studies have generally been positive with some reports demonstrating improved functional performance 1 year following TKA in patients enrolled in an exercise rehabilitation program and others report improvements in joint ROM and the quality of life 3–4 months postoperatively.[99,101]

Outpatient PT regimens employing strengthening and functional exercises under the guidance of a trained physical therapist have been shown to provide the best outcomes as they allow a more individualized approach to treatment.[100] While other studies have found that postacute exercise programs failed to reduce knee pain and activity limitations 1 year after TKA, the authors note that only 50% of participants were able to complete the full 16-class program, with time constraints being reported as a major limitation for patients.[102] Accessibility to health care may therefore be a barrier to optimal care. A plausible solution involving telerehabilitation technology for patients struggling to adhere to PT programs has been recently introduced. Using videoconferencing and prerecorded instructional videos, physical therapists can observe and guide patients in completing various exercises from the comfort of their home. Preliminary results show that this type of PT is noninferior to those that involve face-to-face interactions.[103–105] As the technology is new, further evaluation is required to assess the effectiveness of this treatment modality.

Shared decision making (SDM) and patient activation

SDM is a collaborative process between patients and physicians that helps develop an ideal treatment and care plan aligning with the clinical goals and values of the patient. SDM models have been used with increasing frequency as the CMS continues to advocate for medical initiatives that promote patient-centered care. A recent systematic review demonstrated that patients who had SDM aids integrated into their care not only played a more active role in their treatment plan but were also more likely to receive care aligning with their personal goals.[106] In addition, patients who engage in SDM typically opt for less invasive interventions, reducing the morbidity and mortality associated with the management of chronic diseases. When executed in accordance with the guidelines set by the Institute of Medicine (IOM), physicians and patients can expect reduced hospital expenditures while significantly improving treatment plan adherence and enhancing functional and PROs.[107]

A major barrier to the widespread implementation of the SDM principles is patient activation, or more simply, the active participation of patients in their medical optimization throughout their perioperative course. The importance of patient activation is paramount within the perioperative setting, an environment that is highly dependent on the degree of patient-directed interventions including PT and OT. In a study by Andrawis et al,[108] TJA recipients with greater preoperative involvement achieved improved pain relief, resulting in higher patient satisfaction scores following surgery.

SDM in total joint arthroplasty

SDM requires the effective delivery of accurate, clinically relevant information, presented in a format that the public

can understand. The presented information must describe the basic disease state, procedure, as well as relevant risks and benefits associated with the intervention. Additionally, the information should be presented in an interactive manner allowing patients to make informed decisions aligning with their personal values.

In an effort to objectively present risk factors associated with specific interventions, physicians have utilized risk stratification instruments when engaging in SDM discussions. Although several of these instruments are readily collected (eg, Charlson Comorbidity Index [CCI] and ASA score), these instruments can be difficult to interpret in a clinically meaningful manner.[109,110] Thus, it is critical that preoperative screening instruments be clinically relevant and interpretable to patients. In response, the Readmission Risk Assessment Tool and American Joint Replacement Registry (AJRR) Total Joint Risk Calculator were developed by the AAOS in an effort to more precisely calculate an individual's risk profile when undergoing TJA.[111,112] Risk calculators, such as AJRR Total Joint Risk Calculator, may provide clinicians with the resources necessary to improve health care transparency, while enhancing the patient–physician relationship. In addition, these tools provide patients with the baseline metric that they need to initiate risk reductive behaviors. Most importantly, health benefits achieved during the preoperative optimization period can provide the patient with the foundation for long-term healthy living.

Clinical efficacy of SDM

Several studies have evaluated the clinical efficacy of SDM following orthopedic procedures. In a landmark study by Bozic et al,[113] patients were randomized to a SDM cohort consisting of digital videos and booklets or a control cohort receiving the surgeons' standard of care. Patients within the SDM cohort reported improvements in informed decision making, confidence, and satisfaction. A separate study by Sepucha et al[114] demonstrated that orthopedic patients who met SDM criteria had significantly higher disease-specific and overall quality of life. Moreover, patients who participated in the SDM model were less likely to regret their selected treatment modality and had higher self-reported satisfaction scores.[115]

Despite these positive outcomes, several barriers may preclude physicians and hospitals from implementing a SDM model. Substantial costs associated with designing and implementing decision-making aids (eg, digital video disks, pamphlets, and electronic applications) can be prohibitive, particularly within a small specialty practice. Moreover, many of the available SDM instruments require continuous collection of patient-reported metrics in a systematic and organized manner. Such a process often necessitates institutions with advanced electronic medical record (EMR) systems, further straining resources.[116] In spite of the challenges, patients participating in SDM are more likely to select conservative interventions and are more invested in modifying their risk factors prior to surgery, effectively reducing health care costs and improving outcomes.[106,117,118]

Innovative approaches at implementing SDM

Over the past decade, modern technologies that take advantage of web-based platforms and wearable devices have helped connect patients with their care teams. These applications provide both patients and physicians with tools that can monitor a multitude of clinical metrics. The implementation of sensors in wearable devices including tactile, heart rate, and pulse oximetry sensors, in combination with scheduled administration of questionnaires, may also assist health care providers by alerting clinicians of poor patient rehabilitation progress. Through these innovative tools and integration of real-time data, orthopedic surgeons can remotely provide feedback to patients, ensure that clinical goals are achieved, maximize patient autonomy, and strengthen the physician–patient relationship. While several preliminary studies have demonstrated that web-based electronic rehabilitation programs can be noninferior in providing postoperative rehabilitative care, further studies are needed to evaluate which of these tools may be best suited for the standard orthopedic practice and how these tools can be implemented systematically across a diverse spectrum of clinical practices.[104,105]

Dependence and psychiatric issues

Outcomes following TKA are highly influenced by the degree of patient-directed involvement, including participation in programs such as PT/OT. TKA candidates who are motivated, knowledgeable, and willing to adjust their behavior can achieve better outcomes as they become an integral member of the health care team. This higher level of patient activation ultimately results in improved reported outcomes postoperatively.[108] Studies have also shown that the presence of psychiatric conditions can negatively impact recovery following TKA as they may preclude patient activation.[119–122]

In a large retrospective study, Singh and Lewallen[123] reported that patients undergoing TKA with a concomitant diagnosis of anxiety had higher knee pain scores at 2 (OR 1.4) and 5 years (OR 1.9) postoperatively. It was also dem-

onstrated that patients diagnosed with depression had similar suboptimal pain scores at 5 years postoperatively (OR 1.7).[123] Depression, anxiety, and perceived disability can therefore negatively impact preoperative mental health scores in TKA patients, predisposing these patients to a lower quality of life following TKA.[124–126] Moreover, pain catastrophizing, the exaggeration of pain severity and belief that one is helpless in controlling it, is a predictor of poor outcomes following TKA with studies showing that these patients benefit from a patient-centered approach emphasizing various behavioral pain-coping interventions. This includes patient counseling and patient-specific intervention protocols, such as cognitive behavioral therapy (CBT).[127–129] Preoperative substance abuse and illicit drug use have also been shown to negatively impact postoperative outcomes as it is associated with increased pain scores, longer LOS, and other perioperative complications, including infection and VTEs.[125,130–132]

Prior to TKA, patients should be screened using validated and reliable instruments such as the AUDIT-C[133] for alcohol abuse and dependence, the DAST-10[134] for drug abuse, the PHQ-2[135] for depression, and the GAD-7[136] for anxiety. A high score on any of these screening tools warrants further evaluation by a mental health expert, and surgery should be delayed until a formal diagnosis and treatment plan has been made. Management of psychiatric disorders includes a course of medication and/or psychotherapy. A preoperative CBT program can address psychiatric risk factors by providing accurate information to the patient, setting realistic expectations, modifying negative thoughts, and teaching meditation/relaxation with guided imagery.[28,137–139]

Active illicit drug abuse is an absolute contraindication to surgery, and patients should be referred to an appropriate drug rehabilitation center prior to even considering surgery.[140] Surgery should only be considered if there is a documented 1 year period of illicit drug use abstinence as shorter durations have been correlated with a higher rate of drug relapse and septic failure.[140]

Conclusion

With a greater emphasis on reducing hospital LOS, rehabilitation services are becoming increasingly utilized. Shifting from a primarily medical service, rehabilitation is now a multidisciplinary effort involving various health care teams including physical and occupational therapists. Patients treated by such teams reported improvements in outcome measures and high satisfaction with their care, owing to the organization, ease of communication, and availability of health care professionals.[141] The implementation of a multidisciplinary approach to patient care can therefore provide significant fiscal and clinical benefits.

Disclosure

The authors report no conflicts of interest in this work.

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