Costs

Reducing Pain and Costs with Innovative Postoperative Pain Management

Steve E. Zimberg

Individual patient responses to some of the standard-of-care treatments for post operative pain management are unpredictable, but studies have shown undertreatment of acute post operative pain is common.

There are new, innovative techniques for postoperative pain management that may improve a patients' recovery period. These techniques are also economically beneficial, and may contribute to the reduction of long-term care costs.

Overall, the less time a patient is removed from normal day-to-day activity, the more satisfied they tend to be with their surgical experience. The following article addresses these and other issues surrounding the reduction of pain and cost after surgery.

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The cost of delivering new techniques is often a major drawback to the introduction of innovative methods of treating patients. The introduction of such techniques, however, may sometimes yield increased benefits in the form of improved recovery and faster discharge from hospital with consequent reductions in the cost of delivering quality healthcare.

This is the case with the delivery of effective postoperative pain management. It has been documented that 40 to 70 percent of postoperative patients experience moderate to severe pain in the first three days following surgery. Initially, managing pain in the immediate postoperative period was important for humanitarian reasons; however, there is evidence that postoperative pain relief has significant physiological and economic benefits. Not only does effective pain relief mean a less complicated postoperative course with earlier discharge from the hospital, decreased resource utilization, and lower direct and indirect costs, but it may also reduce the onset of chronic pain syndromes, which in turn will reduce long-term care costs.

An institution's goal for postoperative pain management is reducing or eliminating both pain and discomfort while maintaining patient satisfaction. This usually requires a physician to deliver treatment with minimal side effects at a low cost. Now that the Joint Commission on Accreditation of Healthcare Organizations (JCAHO)

Stephen Zimberg, *M.D., M.S.H.A., is a board certified obstetrician and gynecologist who has been in practice for more than 20 years. He is currently on staff at Cleveland Clinic Florida in Fort Lauderdale, FL. Dr. Zimberg received a doctor of medicine degree from the Medical College of Virginia, Richmond, VA, and a master's degree in health administration from Virginia Commonwealth University, Richmond, VA.*

requires documentation of pain control, the issues of postoperative pain management have become more than just a financial issue for the institution. In order to achieve the highest quality of postoperative pain relief, the unique needs of each patient must be taken into account. These needs encompass clinical, patient-related, and institutional factors. In the final analysis, the ultimate determinant of the adequacy of pain relief will be the patient's own perception.

As pain is multifactorial in origin, the approach to pain management must also take on a multimodal approach. Pain causes an increase in the sympathetic response of the body with subsequent higher heart rate, cardiac work, and oxygen consumption. Prolonged pain can reduce physical activity and lead to venous stasis and an increased risk of deep vein thrombosis and consequent pulmonary embolism. In addition, there can be widespread effects on gut and urinary tract motility that may lead, in turn, to postoperative ileus, nausea, vomiting, and urine retention. The use of narcotics to treat pain in the postoperative setting may increase the risk of these comorbidities, may be unpleasant for the patient, and may prolong the hospital stay.

Standard of Care Narcotics

The standard of care in treating postoperative pain has been intramuscular or intravenous opioid injection (usually morphine). The effects of opioid drugs vary greatly among patients, thus individual responses cannot be predicted. Many studies have shown that under-treatment of acute postoperative pain occurs because doctors and nurses often overestimate the length of action and the strength of these drugs, and that they have fears about respiratory depression, vomiting, sedation, and narcotic dependency. Improvement in the use of opioids in the management of postoperative pain can be achieved with better education for all staff members and patients, and by making the assessment and recording of pain levels part of the routine management of each patient (currently being mandated by JCAHO in standards for providing pain management in healthcare delivery institutions).

Addressing Pain Directly

Regional anesthesia has been used for many years with great success in providing intraoperative pain management. It follows that a technique that can be used for the surgical procedure could provide ideal postoperative pain relief if it could be prolonged beyond the time of the surgery. Long-acting, local anesthetics have been injected as a bolus at the end of surgical procedures and have been found to be effective for four to eight hours in managing postoperative pain. The problem with these long-acting, local anesthetics is that they don't last long enough. Pain following surgery is most severe for 48 to 72 hours and local anesthetics may only be effective up to eight hours. When the local anesthetic wears off, the patient can experience a spike in pain significant enough to warrant supplemental narcotics.

A relatively new therapy involves a continuous infusion of local anesthetic delivered by an elastomeric pump that offers up to five days of postoperative pain relief. A continuous infusion of a local anesthetic into the surgical incision has been shown to provide effective postoperative pain relief in a variety of procedures including OB/GYN, oncology, cardiovascular, thoracic, orthopedic, colorectal, and plastic surgery. This type of field anesthesia can be administered with minimal risk to the patient, providing the benefits of non-narcotic postoperative pain relief increased respiratory and cardiovascular function, as well as earlier ambulation, all of which can improve convalescence and decrease the length of hospital stay.

The Cost of Pain

In a study of the ON-Q™ Pain Relief System, a continuous infusion device, 30 women without malignant disease who were scheduled to undergo elective abdominal hysterectomies were randomized to 0.5 percent ropivacaine, 0.5 percent bupivacaine, or 2 percent lidocaine delivered by this elastomeric pump to the surgical site as postoperative pain management. The ON-Q system delivered 2 ml/h of the selected local anesthetic for 48 hours postoperatively. The study patients were discharged from the hospital in 24 +/- 2 hours. The data from these patients were compared with 15 patients undergoing the same procedure who were not offered the ON-Q system.[1]

Actual costs to the hospital decreased by 30 percent for the study patients when compared to the control patients who underwent hysterectomy without the

elastomeric pump over the study period. Mean gross charges decreased by 5 percent in the study group compared to controls ($13,784 versus $14,548, respectively) even with the cost of the pump included in the study-patient charges. The reduced length of stay and reduced nursing interventions on the floor contributed not only to the cost savings, but also to greater patient safety and satisfaction.

The pain assessment profile shows this technique to be a valuable adjunct, completely eliminating the need for narcotics in 43.3 percent of patients after PACU and greatly reducing the need for narcotics in the remaining patients. This reduction/elimination of narcotics may also result in faster return of bowel function and the elimination of the complications of PCA or epidural analgesia.

In another study of 130 patients undergoing bowel surgery, the 65 patients who received the ON-Q system used 40 percent fewer narcotics postoperatively and had their bowel function return a day earlier than those patients who did not receive ON-Q. This resulted in a one-day decrease in their hospital stays.[2]

Although it was not quantified in this study, the cost advantages of managing postoperative pain resulting in a shorter length of stay offers other advantages to the institution. These include increased capacity of the institution, reduction in staff overtime, and reduction in morbidity associated with narcotic use.

From a patient's perspective, there is the issue of cost and quality of recovery. An increase in patient satisfaction results from less time away from activities of normal living and a decrease in lost time from work due to significantly less time needed for recovery.

Decreased costs of care and resource utilization, increased patient satisfaction, and higher quality of recovery make postoperative pain management with a continuous infusion device worthy of consideration as policy makers, healthcare providers, and quality improvement managers develop new initiatives, healthcare plans, and strategies for reducing the human and economic burden associated with postoperative pain.

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采用新的镇痛方法缓解疼痛以及降低费用支出

Steve E. Zimberg

患者个体对于标准的术后镇痛治疗的反应是不可预测的，研究已经证明了对于急性术后疼痛的处理不足是非常普遍的。

现在有一种新的术后镇痛技术，它可以改善患者术后的恢复，而且它还具有很好的经济效益，可以减少长时间治疗的费用支出。

总的来讲，患者术后恢复正常生理活动的时间越短，他们对外科治疗的满意度就越高。下面的内容讲述了这种新方法可以在手术后降低疼痛以及降低医疗费用。

通常把一种新技术介绍给临床使用的时候遇到最大的障碍是这种新技术的费用问题。这些新技术引入临床使用的时候，有时会以可以改善患者术后恢复，使患者能够尽快出院等方式来说明可以减少医疗机构的费用支出。

下面的内容与有效的术后镇痛有关。根据报道，术后病人有40%-70%在术后3天内经历过中度到重度的疼痛。最初认为术后提供镇痛治疗的重要性是基于人道主义，然而，有证据显示有效的控制术后疼痛可以带来显著的生理上以及经济上的效益。术后疼痛的有效缓解不仅仅可以使术后恢复简单化，使患者早期出院，减少了资源的利用，降低了直接和间接的费用；它还可以减少慢性疼痛综合症的发生，因而降低了长期治疗的费用。

术后镇痛的目的是减轻或者消除患者的疼痛以及不适同事维持患者对治疗的满意度。这通常需要医生在给药的时候考虑最小化药物的副作用以及节省的花费。现在Joint Commission on Accreditation of Healthcare Organizations (JCAHO)（注：医疗鉴定联合委员会）需要镇痛管理的记录，对于医疗机构来讲，术后管理这件事情远非财政支出问题这么简单。为了达到术后高质量缓解疼痛，应该考虑每个病人的个体需要。这些需要与临床因素，患者自身因素和医疗机构因素有关。在最后的分析中，最终决定疼痛缓解是否适宜要依靠患者自己的感觉。

因为疼痛的起源是多因素的，所以疼痛管理也应该是多种方法联合应用的。疼痛引起机体交感神经反应增强，随之导致心率增加，加重心脏负担和氧消耗量。持续的疼痛可以减弱机体的活力，导致静脉瘀滞，提高了发生静脉栓塞和肺栓塞的风险。另外，持续疼痛可以广泛的影响内脏和泌尿系统功能，可以导致术后的肠梗阻，恶心呕吐，以及尿潴留。术后镇痛使用阿片药物会增加这些症状联合出现的风险，会导致患者对治疗不满意以及延长患者的住院时间。

阿片药物治疗的标准

术后镇痛治疗的标准是肌注或者静脉使用阿片药物（通常使用吗啡）。阿片药物的作用在患者之间的差异是很大的，因而不能预测患者对药物的个体反应。许多研究证明了因为医生或者护士高估了这些阿片药物的活性以及效力，或者他们担心阿片药物带来的呼吸抑制，恶心呕吐，嗜睡，药物依赖等原因，从而导致对术后患者的急性疼痛治疗不足。对使用阿片药物的镇痛方式进行改善可以通过对医务人员和患者进行相关教育来达到目的，也可以通过把评估和记录患者的疼痛水平作为日常工作的一个部分来执行（这种方法已经被JCAHO定为医疗机构治疗疼痛的标准工作）。

直接缓解疼痛

局麻药物在手术中成功的用于镇痛已经有很多年了。在外科治疗中，如果一种技术可以维持比外科治疗时间更长的镇痛时间，那么这种技术就提供了理想的镇痛作用。已经发现在手术结束前一次性的注射长效麻醉剂可以在术后4-8小时内保持镇痛作用。而这些长效麻醉药的局限性在于它们不能维持更长时间的作用。最严重的术后疼痛发生在术后48-72小时，而长效局麻药

的作用最多能够维持8小时。当局麻药失效后，患者会感到尖锐的疼痛，这就成为使用阿片药物辅助镇痛的依据。

一种相对较新的治疗方法是持续局麻药物的灌注，通过弹性泵输送局麻药物可以提供最多5天的镇痛治疗。已经证明了手术切口持续局麻药灌注在不同种类的临床手术后（妇科，肿瘤科，心血管科，胸科，骨科，普外科，整形科）可以提供有效的镇痛，它可以使患者术后治疗的风险降低，提供不依靠阿片药物的术后镇痛，从而增加了患者呼吸系统以及心血管系统的功能，同时，它可以使患者更容易的早期活动，所有的这些因素都有助于患者术后的恢复以及减少住院时间。

疼痛带来的费用

在一项关于持续局麻灌注系统的研究中，30名没有恶性肿瘤疾病接受择期子宫切除术的患者，她们接受的术后镇痛方式为通过ON-Q弹性泵的灌注系统，随机地接受0.5%的罗哌卡因，0.5%的丁哌卡因或者2%的利多卡因做切口区域灌注。ON-Q系统的灌注速度是2ml每小时，持续48小时。被研究的患者在术后24小时前后的2小时时间内出院，这些病人的数据同15名经历同样手术但没有接受ON-Q系统局麻灌注患者的资料进行比较[1]。

同对照组进行比较的时候发现实验组有30%的患者节省了在医院的医疗费用，同对照组比较，实验组患者平均医疗费用减少了5%（13，784美元 vs 14，548美元，实验组费用中包括了弹性泵灌注系统的费用）。住院时间和医疗护理干涉时间的缩短不仅能够节省医疗费用，还能提高患者的安全和满意度。

疼痛评估的概况显示了这种技术对镇痛是一个有价值的助手，在PACU中使用这种技术后有43.3%的患者根本不需要阿片药物，而其他接受这种镇痛方式的患者也大大减少了阿片药物用量。这种阿片药物用量的消减有助于肠功能的恢复，消除PCA镇痛方法或者硬膜外镇痛方法的并发症。

在另一个对130名接受肠道手术的患者进行的研究中，65名接受ON-Q持续局麻灌注方法的患者与没有接受这种镇痛方法的患者做对比，ON-Q组病人在术后使用吗啡的剂量上减少了40%，术后肠功能恢复提前1天。这使得他们比其他病人可以提前1天出院[2]。

尽管这项研究没有对这种镇痛方法导致住院时间缩短，从而带来的医疗成本优势上进行定量分析，但是却为医疗机构提供了其他好处，包括减少医务人员的工作负荷，减少与阿片药物有关的疾病发生率。

患者主要考虑的是医疗的花费和康复的质量。康复时间显著缩短意味着患者可以更快地恢复正常生活，减少不工作的时间，从而可以提高患者对治疗的满意度。

降低治疗费用和医疗资源的使用，提高患者满意度，高质量的康复，这些因素使得持续局麻药灌注这种术后镇痛方式值得决策者，医务人员和质量管理者思考，在与术后镇痛有关的治疗计划和策略上充分考虑患者的经济负担。

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