

**Advances in Postoperative Pain Management:
Novel Approaches to Optimum Care **CME/CE****

O. Alton Barron, MD

Laura Clark, MD

Arthur G. Lipman, PharmD

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This activity is intended for anesthesiologists, surgeons, neurologists, orthopedists, pharmacists, nurses, and hospitalists.

Goal

The goal of this activity is to educate clinicians on emerging strategies for the treatment of acute postoperative pain and the importance of a multimodal approach to pain management.

Learning Objectives

Upon completion of this activity, participants will be able to:

1. Summarize the benefits and limitations of existing and newer analgesic options in postoperative pain management
2. Describe the clinical application of multimodal, combination treatment, and multidisciplinary approaches to managing postoperative pain

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Moderator

O. Alton Barron, MD

Assistant Clinical Professor of Orthopedic Surgery, Columbia College of Physicians and Surgeons; Senior Attending Physician, Department of Orthopedic Surgery, St. Luke’s-Roosevelt Hospital Center; Attending Hand Surgeon, CV Starr Hand Surgery Center, Roosevelt Hospital, New York, New York

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Presenter(s)

Laura Clark, MD

Professor, Residency Program Director, Director of Regional Anesthesia and Acute Pain, University of Louisville, Louisville, Kentucky

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Arthur G. Lipman, PharmD

Professor of Pharmacotherapy, Adjunct Professor of Anesthesiology, University of Utah College of Pharmacy and School of Medicine, Salt Lake City, Utah

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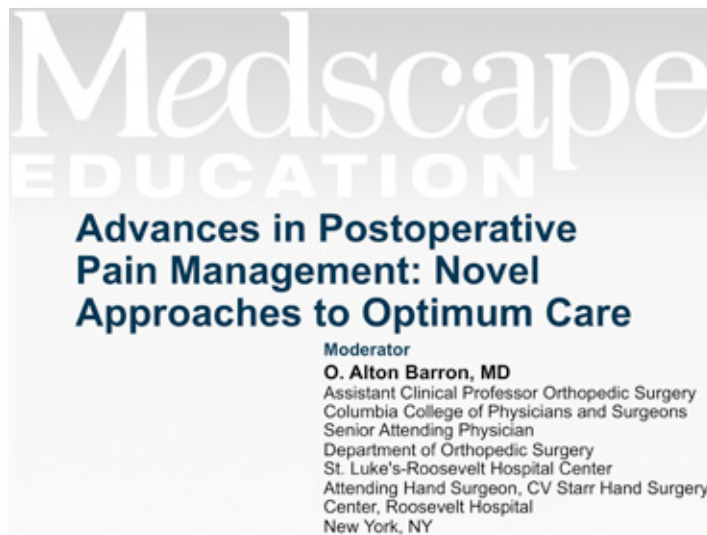
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O. Alton Barron, MD; Laura Clark, MD; Arthur G. Lipman, PharmD

CME/CE Released: 02/29/2012; Valid for credit through 02/28/2013



Alton Barron, MD: Hello. I'm Dr Alton Barron, assistant clinical professor of orthopedic surgery at Columbia College of Physicians and Surgeons, senior attending physician in the Department of Orthopedic Surgery at St. Luke's Roosevelt Hospital Center, and an attending hand surgeon at the CV Star Hand Surgery Center at Roosevelt Hospital in New York City.

Welcome to today's presentation, "Advances in Postoperative Pain Management: Novel Approaches to Optimum Care."



I have with me today 2 colleagues, Dr Laura Clark, professor and director of regional anesthesia and acute pain residency program director at the University of Louisville in Louisville, Kentucky, and Dr Arthur Lipman, professor of pharmacotherapy, adjunct professor of anesthesiology, and director of clinical pharmacology at the Pain Management Center at the University of Utah, Salt Lake City, Utah. He is also the Editor of the *Journal of Pain and Palliative Care Pharmacotherapy*.

Learning Objectives

- Summarize the benefits and limitations of existing and newer analgesic options in postoperative pain management; and
- Describe the clinical application of multimodal, combination treatment, and multidisciplinary approaches to managing postoperative pain

Our learning objectives for today's presentation are as follows: to summarize the benefits and limitations of existing and newer analgesic options in postoperative pain management; and to describe the clinical application of multimodal combination treatment and multidisciplinary approaches to managing postoperative pain.

Scope of the Problem

- Good postoperative pain control is important to prevent negative outcomes^a
- Unrelieved postoperative pain may have negative psychological and physiological consequences^{a,b}:
 - Pain, suffering
 - Impaired gastrointestinal motility
 - Impaired wound healing
 - Tachycardia
 - Hypertension

a. Vadivelu N, et al. *Yale J Bio Med.* 2010;83:11-25.
b. Smith HS. *Pain Med.* 2011;12:961-981.

Let's discuss the scope of the problem. Good pain control postsurgery is important to prevent negative outcomes. Unrelieved postoperative pain may have negative psychological and physiological consequences, such as pain and suffering, impaired gastrointestinal motility, impaired wound healing, tachycardia, and hypertension, just to name a few.

Scope of the Problem (cont)

- Unsatisfactory acute postoperative pain management is one of the most common medical reasons for delayed discharge after ambulatory surgery^a
- 80% of patients had pain after surgery^b
 - Of these, 86% had moderate/severe/extreme pain with more patients experiencing pain postdischarge than they did before the procedure^b

a. Vadivelu N, et al. *Yale J Bio Med.* 2010;83:11-25.
b. Apfelbaum JL, et al. *Anesth Analg.* 2003;97:534-540.

Unsatisfactory acute postoperative pain management is one of the most common medical reasons for delayed discharge after ambulatory surgery. A study by Apfelbaum found that 80% of patients had pain after surgery, which is logical, but of these, 86% had moderate, severe, or extreme pain, with more patients experiencing pain after discharge than before discharge. Yet recently we have seen breakthroughs in the field of pain medicine. These important developments may provide better care for your patients and result in better outcomes, and that is why we are here today.

Problems With Current Treatment Options

Opioids are still the drug of choice, but use is limited by adverse events

- Nausea/vomiting
- Rash/hives or itching

Many patients refuse opioids because of nausea

Let's talk a little about the problems with current treatment options. Dr Clark, can you discuss what the majority of clinicians are using?

Laura Clark, MD: I would be glad to. I do not mean to say that we are behind on pain therapy, but we first started using morphine in the Civil War. And today that is still the mainstay of treatment. Yes, we have developed new opioids, but [the fact remains that] opioids continue to be the drug of choice and are used primarily all across the country and even the world. But they have been very problematic in actually treating pain, because of side effects and negative outcomes from using opioids alone. One of the biggest problems is nausea and vomiting.

Dr Barron: Absolutely. Many of my patients call me well after hours for this very problem.

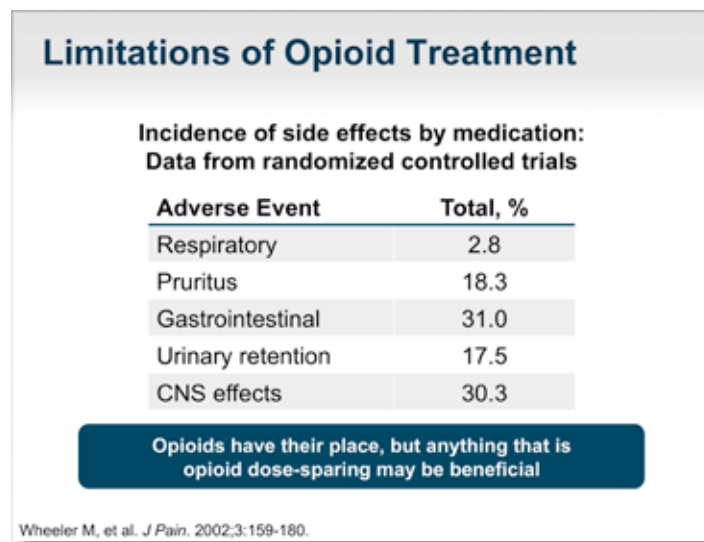
Dr Clark: Sometimes we have to readmit them. That is something that you never forget, too. As an anesthesiologist, I find when taking the patient's history, if they have a history of nausea and vomiting, one of the first things they will say is that "It was horrible. I hated it. Please do anything to avoid it."

Dr Barron: Do they actually refuse opioids?

Dr Clark: They will ask me to do anything I can, and some will say, "Yes, anything but that." But until recently we have not made many advances in pain therapy. [In terms of adverse events], itching and those types of effects and respiratory depression are, of course, huge issues with opioids, even with the one advancement that we have made with patient-controlled analgesia (PCA) -- allowing people to press a button [to administer the analgesia themselves]. Yes, that's a good advancement, but opioids still cause a lot of problems. There is still a lot of respiratory depression.

Dr Barron: Dr Lipman, can you discuss the study by your group showing the limitations of opioid treatment?

Arthur Lipman, PharmD: Indeed. More than a decade ago our research group looked at medical records, both electronic and individually monitored, for over 50,000 patients who had received at least 1 dose of opioid postoperatively during a 10-year period. We were quite surprised to find what the true prevalence of adverse events was.



As Dr Clark mentioned, we are always concerned about respiratory depression in the acute phase, but in fact fewer than 3% of the patients had respiratory difficulties. Pruritus occurred in over 18% of the patients and gastrointestinal side effects, namely nausea and vomiting occurred in 31% of these 50,000 patients. There was urinary retention in 17.5% and overall total CNS side effects in over 30%. GI events, most commonly nausea and vomiting, were the single biggest issue. And as you asked, patients who had previous postoperative experience with opioids frequently requested that they not get opioids postoperatively because of how disturbing these side effects were.

Dr Barron: Yes. That is incredible. That is a great study. Can you discuss these 2 studies that look at cost?

Impact of Inadequate Postop Pain Management

Survey of $\approx 61,000$ hospitalized patients found that the ADE rate among patients receiving opioids resulted in

- One-half day increase in length of stay
- \$840 in average additional hospital costs per patient

Oderda GM, et al. *J Pain Symp Manage*. 2003;25:276-283.

Dr Lipman: Our pharmacotherapy outcomes research group recently completed 2 studies in which they looked at postoperative care, pain, and effects of opioids. In one study of nearly 61,000 hospitalized patients, we found that the adverse drug event rate among the patients receiving opioids postoperatively extended the length of stay by about a half day at a cost of almost \$850 per patient.

Impact of Inadequate Postop Pain Management (cont)

Survey of 42,469 patients with opioid-related ADE (mean unadjusted results)

- Length of stay for patients with opioid-related ADE was significantly longer than for patients without: 5.1 days vs 4.0 days, $P < .001$
- Total cost of hospitalization for those with opioid-related ADE vs those without: \$18,310 vs \$17,232
- Those with opioid-related ADE had
 - 2.1 times higher adjusted odds of being a LOS outlier
 - 1.3 times higher adjusted odds of being a cost outlier

Oderda GM, et al. ASHP 2011 Midyear Clinical Meeting. Poster 3-185.

A recent poster presented at the American Society of Health-System Pharmacists' midyear clinical meeting looked at 42,469 patients with an opioid-related adverse drug event and matched those patients to patients who had not received opioids. The mean unadjusted result showed that the length of stay for patients with opioid-related adverse drug events was significantly longer -- 5.1 days versus 4 days, with a P value indicating highly statistically significant differences.

The total cost of hospitalization for the patients with opioid-related adverse drug events versus those without was \$18,300 versus \$17,200, a significant cost difference. Patients with opioid-related adverse drug events had 2.1 times higher adjusted odds of having a length of stay that put them into the outlier category, and 1.3 times higher adjusted odds of being a cost outlier. Opioid adverse events extend costs and they extend lengths of stay.

Dr Barron: Yes. Those obviously are critical to the bottom line of most of our healthcare institutions. What are some of the newer approaches to acute postoperative pain?

New Approaches to Acute Postop Pain Management

- Multimodal approach
 - Involves clinicians at various levels
 - Surgeon
 - Anesthesiologist
 - Nurse
 - Pharmacist
- Combination pharmacotherapy
- Recognition of the deleterious effects of undertreated pain
 - Regional anesthesia and multimodal therapy
 - Timing of treatment: preemptive, intraoperative, postoperative, beginning treatment in the field or emergency department
 - Concept of acute pain service: a novel physician and nurse specialty to focus on the acute treatment of pain

Dr Lipman: The biggest change, of course, is the multimodal approach, where we are not using strictly pharmacotherapy but using regional anesthesia techniques and some of the newer approaches that we will describe. In pharmacotherapy we have learned that combination pharmacotherapy, particularly when we can have opioid dose-sparing effects, leads to better outcomes.

Dr Barron: Great. Dr Clark?

Dr Clark: We are now including more technical types of treatment for pain such as regional anesthesia. In some instances, we can cut out the opioids totally. We are also looking at combined pharmacotherapy using multiple drugs. Sometimes I explain to patients that it is like a barnyard with a fence and several gates; each gate opens into the barnyard. It is the same with pain -- there are receptors at various different areas. One reason that we cannot use only regional anesthesia is that there are chemicals released into the blood, the humoral factors, and we need adjuncts to these. By combining [pharmacotherapies] with regional anesthesia when possible, using different types of multimodal pharmacotherapy, we can go a long way to decreasing, and sometimes eliminating, opioids from the therapy.

Timing of treatment is an issue as well. We find that if we can manage pain preemptively, before the insult, or at least intraoperatively, rather than waiting until the postoperative period and trying to play catch-up, that makes a big difference. In some studies we are even showing that if you do a block in the field -- in other words, the emergency treatment in the field from the ambulance or even in the emergency room before the patient gets to surgery -- this can make a huge difference. Building on that, we now have the concept of the acute pain model. And that is usually led by an anesthesiologist in a multidisciplinary approach. Pain is not a side issue. It is their main focus.

Dr Barron: Yes. As a case in point, I will get a call from a resident or a fellow about some problem that is acutely dramatically painful for the patient. I will quickly call one of my anesthesia colleagues, who will hustle down there to see the patient. After the patient has been fully assessed, the anesthesiologist will put in a block and suddenly the whole pattern has changed. The patient is calm. The family is calm. Then you can make a careful decision about what comes next. Everyone is in much better shape and that is great.

Dr Clark: Exactly. With the acute pain team having this focus, it does not have to be just a single-shot block. It can be a catheter. If this severe pain is going to persist longer than the 10 hours or so that a block will last, we will put in a catheter, and that catheter can stay in for days. We can send the patient home with a catheter and follow them up at home. So many more options are available now than there have been.

Dr Lipman: An important outcome that we have learned about in the last decade is that more effective, sometimes more aggressive, immediate postoperative pain management lessens the risk that patients will develop chronic pain syndromes, which can be month-long, year-long, or even life-long. So we really need to become more attentive to good, aggressive, immediate postoperative pain management [to improve] the long-term outcomes.

Dr Barron: That is a very good point. Thank you. So let's discuss some specific new, or newer, treatments. Can you describe for me the pros and cons of these and how you would use them either alone or with other therapies?

New Approaches to Acute Postop Pain Management (cont)

Intravenous acetaminophen^{a,b,c}

- Recently approved in US
- Safe, effective for mild-to-moderate postoperative pain
- Side effect profile similar to placebo
- Useful when oral agents may be impractical
- Using IV acetaminophen + opioids decreases
 - Pain
 - Sedation
 - Nausea/vomiting
 - Time to extubation
- Antipyretic effect could mask signs of postop fever

Intravenous ibuprofen^d

- Pre- and postop administration significantly reduces pain and morphine use in orthopedic surgery patients
- Contraindicated in CABG

a. Smith HS. *Pain Med.* 2011;12:961-981; b. Jones VM. *J Pain Palliat Care Pharmacother.* 2011;25:340-349. c. Memis D, et al. *J Critical Care.* 2010;25:458-462. d. Singla N, et al. *Pain Med.* 2010;11:1284-1293.

Dr Lipman: We have had some new drugs introduced in this country. Recently we received [FDA approval for] intravenous acetaminophen, which has been used in Europe for years with very good results. The availability of this safe, effective intravenous formulation in this country has proved to be a valuable adjunct in postoperative care. By adding acetaminophen to opioids we have an opioid dose-sparing effect. For mild to moderate pain, acetaminophen intravenously by itself is often adequate. But for moderate to severe pain we get better outcomes when we add this to an opioid.

Dr Barron: We are using that now for my patients and it is wonderful.

Prescribing Information for IV Acetaminophen and IV Ibuprofen

	IV acetaminophen ^a	IV ibuprofen ^b
Indications and usage	For children ≥ 2 years old through adults for the: <ul style="list-style-type: none"> • Management of mild to moderate pain • Management of moderate to severe pain with adjunctive opioid analgesics • Reduction of fever 	For adults for the: <ul style="list-style-type: none"> • Management of mild to moderate pain • Management of moderate to severe pain as an adjunct to opioid analgesics • Reduction in fever
Contraindications	<ul style="list-style-type: none"> • In patients with known hypersensitivity to acetaminophen or to any of the excipients in the IV formulation • In patients with severe hepatic impairment or severe active liver disease 	In patients: <ul style="list-style-type: none"> • With known hypersensitivity to ibuprofen or other NSAIDs • With asthma, urticaria, or allergic-type reactions after taking aspirin or other NSAIDs • During the peri-operative period in the setting of coronary artery bypass graft (CABG) surgery
Adverse reactions	<ul style="list-style-type: none"> • Nausea, vomiting, headache, and insomnia in adult patients and nausea, vomiting, constipation, pruritus, agitation, and atelectasis in pediatric patients 	<ul style="list-style-type: none"> • Nausea, flatulence, vomiting, headache, hemorrhage, and dizziness

a. OFIRMEV [package insert]. San Diego, CA: Cadence Pharmaceuticals, Inc.; 2010.
b. Caldolor [package insert]. Nashville, TN: Cumberland Pharmaceuticals Inc.; 2011.

Dr Lipman: We also have intravenous nonsteroidal anti-inflammatories (NSAIDs). We have had ketorolac for a number of years, but recently intravenous ibuprofen became available in the United States for pre- and postoperative administration, and this of course significantly reduces pain and is synergistic with morphine. As we all know, when we see a patient postoperatively and ask the patient about his or her pain intensity, it can be quite low when the patient lies still, receiving an intravenous opioid, but as soon as the patient moves, that pain spikes dramatically. By adding an NSAID to the therapy, we really help patients with their comfort levels with activity. Obviously this is contraindicated in some situations, such as when there are renal difficulties and immediately post-CABG.

Dr Barron: Dr Clark, what are some other options?

Other Treatment Options

- Anticonvulsants
 - Gabapentin
 - Produces significant opioid-sparing effects
 - May improve postoperative pain score, compared to controls
 - Pregabalin
 - Similar mechanism of action to gabapentin
 - Better pharmacokinetic profile
 - Mixed results in studies for postoperative pain; research ongoing
- Ketamine (subanesthetic doses)
- Others
 - NSAIDs
 - COX-2 inhibitors
 - TCAs

Vadivelu N, et al. *Yale J Bio Med.* 2010;83:11-25.

Dr Clark: One option is gabapentin or pregabalin. I think pregabalin is a little bit easier to dose, and it has been shown to be very good for neuropathic pain. A lot of studies have shown that in acute postoperative pain it also has an opioid-sparing effect.

Another drug that we use is ketamine. A lot of studies show ketamine's utility intraoperatively and in postoperative indications, especially for chronic pain that may be very hard to manage. COX-2 inhibitors, when indicated. And tricyclic antidepressants also have a role.

Dr Barron: Dr Lipman, do you want to tell us about other medications?

Other Treatment Options (cont)

- Capsaicin^a
 - TRPV1 agonist
 - TRPV1 is a receptor markedly reduced in inflammatory conditions
 - Nonnarcotic; acts peripherally
 - Currently undergoing trials as injectable for postoperative pain for knee and hip replacement, shoulder arthroscopy, hernia repair
- Tapentadol^a
- Alvimopan^b
 - Peripherally acting mu-opioid antagonist
 - Has norepinephrine reuptake properties

a. Vadivelu N, et al. *Yale J Bio Med.* 2010;83:11-25; b. Viscusi ER, et al. *Anesth Anal.* 2009;108:1811-22.

Dr Lipman: As we learn more about the pathophysiology of pain, we are developing better approaches. One clear physiological issue involves the TRPV1 receptors. For a long time capsaicin has been used as an adjunct in chronic pain, but we now know that more aggressive use of capsaicin as a TRPV1 agonist is extremely useful as an additive to the opioids. It is a nonnarcotic and it reduces inflammation. Currently, trials of systemic capsaicin are being undertaken. Topical capsaicin has been used both in the low doses available as a nonprescription form and in the 8% concentration for resistant neuropathic pain. But injectable capsaicin shows some real promise as a future direction in postoperative pain management.

Dr Barron: And especially for some orthopedic procedures.

Dr Lipman: Certainly.

Dr Barron: How about alvimopan?

Dr Lipman: We know that the colon is the region of the body with the second-highest concentration of mu receptors; the CNS is the first. For the mu-1 effects of analgesia, it is advantageous to give opioids. But we cannot get away from the mu-2 effect of constipation due to the activation of mu receptors in the colon. Alvimopan is 1 of the 2 commercially available peripherally acting mu opioid antagonists. Alvimopan is specifically FDA approved as an adjunct to be used in postoperative ileus. There are some limitations: hospitals have to be registered in a specific program, alvimopan is for short-term use, and some toxicities are associated with its use. The other mu antagonist that is peripherally active is methylnaltrexone, but currently that is only approved for long-term opioid-induced constipation rather than immediate postoperative ileus.

We also have a new drug that actually is the first totally new chemical entity opioid in over a quarter of a century and that is tapentadol. This is a drug that is both a mu agonist like morphine and our other strong opioid analgesics, and at the same time the same molecule is a norepinephrine reuptake inhibitor. This synergistic combination results in the need for less mu agonism. Clinical studies show that there is dramatically and statistically significantly less nausea, vomiting, and constipation with tapentadol than a comparable analgesic dose of oxycodone.

Dr Barron: Let's switch gears a little. We all know that patient care requires an interdisciplinary team approach. Let's talk about how this type of pain treatment is actually managed. In my hospital in New York City I rely heavily and almost uniformly on the anesthesiologist. Anesthesiologists are the experts, and they are the ones who are engaged directly with the anxious patient who is about to undergo surgery and who will experience the pain that I or my surgical colleagues create. I try to be there as often as I can with the patient to discuss our postoperative plan of action. But it is the anesthesiologist who is really monitoring closely and creating the game plan to manage this patient postoperatively and to minimize the patient's suffering.

The nurses are also critical, especially in the PACU. The nurses are critical because they have the hands-on, moment-by-moment monitoring of the patient, the nonverbal and verbal cues about the patient's pain, as well as the vital signs, which also can be indicators. More and more hospitals are having a pharmacist in the PACU to make recommendations, watch for drug interactions, and so forth.

All of these participants underscore that [post-op pain management requires] a team approach. I have been there to learn and to facilitate, but it is really these other core people who have so much knowledge and who are managing these patients and getting them through this very tough time.

Dr Clark, are your experiences similar?

Dr Clark: Dr Barron, I have to commend you; one of the main obstacles we as anesthesiologists have to overcome is that we need to have the surgeon on board. If we do not have the surgeon on board and we are trying to treat pain, it has been shown time and time again [that we will not succeed]. It helps when the surgeon can talk to patients about what I am going to say to them, because many times, I only have a few minutes to explain this high level of care to the patient. When [the surgeon does] that ahead of time, it makes our job so much easier. It is so important to educate all professionals as to what is really [needed].

We have an acute pain service team, which includes a nurse who is a pain specialist and myself. We round on these patients twice a day. We call them if they are at home. We have developed a whole hospital team approach where we have identified pain nurse champions on each floor so that other nurses have someone to come to. We have tried to elevate this care so that it is an important focus, and it is our mission. We provide regional anesthesia, [and we adjust treatment when indicated].

One of the important concepts is titration. Pain management is not a "one size fits all." There is no one single order for PCA, because one patient's pain is so different from that of the patient in the next bed. We will find that we need to adjust our approach over time. As pain recedes during the postoperative period, we have to titrate therapy, to individualize it, and to use all these modalities and others.

Dr Barron: We know we cannot ignore the bottom line. I know there has been some flux in reimbursement for these incredible services that you and your team are providing. Do you have anything you can tell our audience about that?

Dr Clark: We also need to educate the insurance services. Historically, pain treatment has been bundled with surgery. It has been an afterthought, an accessory. It can no longer be an accessory. We have to educate insurance providers that this is a bona fide service. It is becoming a specialty of its own. We have to state that this pain therapy has been requested by the surgeon. We would say, "Dr Barron has requested us to treat the pain of his patient." It would be much more efficient to have this as a physician-led service with nurses involved to provide this level of treatment to all patients.

Dr Barron: So if a formal consultation is requested for that postoperative pain treatment, that tends to be reimbursed or recognized by the insurance companies in your experience?

Dr Clark: Correct.

Dr Barron: You have a team that has been managing this patient's pain. When the patient is discharged, is your team involved in receiving phone calls from the patient? I know I certainly receive phone calls from my patients about their pain.

Dr Clark: Yes. My hospital sends out a Press Ganey survey about how the pain was treated. Many times when I round on patients in our service, I hear them say "You sat down and you talked to us, you are the one who got me out of bed." Because we are the ones who tell them, "You need to get up, you need to move, I'm going to give you medication. We do not want you to lie in bed. We want you to recover." We have a monthly pain meeting with the pharmacists, the different directors of nursing on each floor, and the anesthesiologist, to look at what we have seen happen and what can be improved.

Dr Barron: So once again, it comes back to communication but within a team approach.

Dr Clark: Correct.

Dr Barron: Dr Lipman, are your experiences similar?

Dr Lipman: Very much so. We have had acute pain services now for well over a decade at our university hospital, at our orthopedic center, and at our neurosurgery center. We find in each case that different disciplines bring specific expertise to the team. As pharmacotherapy is becoming more sophisticated and more complex, having a pharmacist available as a drug information resource to the team has repeatedly shown itself to be valuable. But the anesthesiologist does take the lead. Postoperative pain management and indeed the preoperative interview are part of the Joint Commission anesthesiology standard. Now [these steps] can be taken by a surgeon or another health professional, but the responsibility ultimately lies with anesthesiology. We find that the interdisciplinary approach to perioperative pain management you have both described is far more effective than a unidisciplinary approach.

Interdisciplinary Team Approach to Treatment

Survey of US hospitals (200 nonteaching, 101 teaching):

- 74% had an organized acute pain service
- IV PCA managed mostly by surgeons (75%)
- Epidural analgesia and peripheral nerve block infusions managed exclusively by anesthesiologists
- RNs could:
 - Adjust the IV PCA settings within set parameters (62%)
 - Adjust epidural infusion rates (43%)
 - Peripheral nerve catheter local anesthetic infusion rates (21%)

Nasir D, et al. *Pain Res Treat*. 2011; doi:10.1155/2011/93493.

Dr Barron: You both are familiar with a survey of 200 nonteaching and 101 teaching hospitals in the United States. The survey found that 74% had an organized acute pain service, and in up to 75%, IV PCA was mostly managed by the surgeons. The epidural analgesia and peripheral nerve block infusions were managed exclusively by the anesthesiologist. The nurses could adjust the IV PCA settings within set parameters in 62% of cases, could adjust epidural infusion rates in 43%, and could manage the peripheral nerve catheter local anesthetic infusion rates in 21%. So there is quite a lot of variability in who has been approved within a given institution to perform these various tasks and monitor these various infusion rates and so forth. Obviously you have well-honed and organized systems in place, but have those changed in your experience in your hospitals over the last, say 5 years?

Dr Clark: In our hospital we have had this service for about 10 years as well. Each hospital is going to have to determine what is the most cost-effective way to provide this pain service, because this is really in its infancy. We do not have a true definition yet, but as we have discussed, this is a multidisciplinary anesthesiologist-led approach with a specialized pain nurse involved. Now, how do you implement that [kind of service]? Having the anesthesiologist visit patients each day is one model. Another is a nurse-led service, in which the nurse reports to and consults with the anesthesiologist. We are still looking at all these types of avenues to provide this level of pain service.

Dr. Lipman: We are finding that, as pain management is becoming more of a specialty as Dr Clark has described, people are identifying themselves as specialists within their particular discipline. Indeed we are seeing that increased confidence in the ability to use the drugs, to use the regional procedures, to use the other interventions for pain has made a real difference. We know that many of our colleagues in surgery, in nursing, in pharmacy may not be as comfortable with pain management as many of our anesthesiology colleagues. But as more and more people within each of the disciplines are becoming more sophisticated in pain management, outcomes are improving. This reflects on the educational endeavor also. We need to do a better job of teaching pain management to medical students, to nursing students, and to pharmacy students. We all need to have a better understanding of the pathophysiology of pain, knowledge of which is really unfolding at an increasing rate. As we understand this, we are better able to provide targeted drug therapy that is specific to the type of pain patients are experiencing.

Dr Barron: I think it is good that the experts in pharmacotherapy are now spending time in the PACU and are able to further educate team members on a real-time basis about these various medications and their uses and the ways not to use or abuse them.

Dr Clark: We are making such strides now in the science of pain that it is becoming a discipline. It is not just, "Oh, we are going to treat this pain with morphine and then we are going to move on." We are learning so much about pain every day. I foresee the day when we recognize that everybody does not metabolize morphine in the same way. I can give one patient morphine, but it may not treat their pain with the same effect as it would that of another person. So perhaps, in the not too distant future, we are going to be able to determine, along with your regular blood test in your preoperative exam, how well you metabolize morphine and [predict] how effective it is going to be for you and adjust your pain therapy based on that. It is really exciting, what is happening in the field.

Dr Barron: Right now, both my anesthesiologist and I tell the patient categorically, absolutely, we are not going to be able to eliminate all of your pain. Maybe our Shangri-La is that one day we can say, "Now that we have studied your particular metabolism, we are going to eliminate all of your pain."

Dr Lipman: Our goal is to make the patient as comfortable and functional as possible within safety parameters. So, certainly a zero pain level may be unrealistic, but on a scale of 0 to 10, with 0 being no pain and 10 as bad a patient can imagine, numerous psychometric studies have shown that patients with a 1, 2, or 3 level really function quite well and report that they are reasonably comfortable. So having realistic goals is an important part of this.

And we are going to see personalized medicine. We now have numerous genetic polymorphisms that have been identified, not just variants on the mu-2 receptor but also other polymorphic issues, other genes that have a definite role. So as Dr Clark mentioned, we are going to see personalized medicine in postoperative opioid care, and by adding nonopioids to our opioids we can improve outcomes further.

Physician Confidence on Pain Management

Results from a Medscape Education activity survey:

- 50% of physicians were only "somewhat confident" that they were up to date in pain medicine
- 8% were "not at all confident"
- 60% of nurses and pharmacists were "somewhat confident"

Dr Barron: We are talking about the ultimate need for educating as many people as possible who are involved in direct care of the patient who has pain. A Medscape Education activity on pain management found that 50% of physicians were only somewhat confident that they were up to date in their understanding of pain management; 8% reported "not at all," and 60% of nurses and pharmacists were only somewhat confident. So obviously we need to educate and empower our colleagues to be able to treat pain better, especially postoperative pain which is the most severe in many cases. Dr Lipman, is there an increase in training, and are there certification changes that have occurred?

Training/Certification

- The American Society for Pain Management Nursing and the American Nurses Credentialing Center offers a national pain management certification exam
- The Board of Pharmaceutical Specialties is conducting feasibility study of an exam for pharmacist board certification in pain management

Dr Lipman: Absolutely. The American Society for Pain Management Nursing has made a huge difference and we have more and more nurses now who are certified both in acute pain and chronic pain management. The Board of Pharmaceutical Specialties is currently conducting a feasibility study on a certification examination for pharmacists, through which they can become certified in pain management. As the science increases, we will need people who have this more specialized training.

Dr Barron: Let's spend some time briefly discussing cost, because that is an inevitable and important issue. Potential savings occur related to fewer complications, decreased hospital stays, and lower readmission rates, all of which are closely monitored by the government for Medicare purposes and so forth. Dr Clark, do you have further thoughts on the cost and cost containment issue?

Dr Clark: Although it is a very difficult thing to study, there have been some studies that actually focus on cost. Some of those have been in hip and knee surgery, which are easier to study because they have a nice subset of patients, a lot of standardized types of regimentation that they can use to actually look at cost and reduce some of these variables. They have shown that if you have an optimal or an improved pain therapy treatment, patients are allowed to go home sooner, decreasing the length of stay. As we alluded to earlier, they are having fewer complications with nausea and vomiting. One study showed that the nursing care alone that is involved in one episode of nausea and vomiting really increases the cost of treating the patient.

Dr Barron: One important point is that we all are aware that basic narcotics, oxycodone and hydrocodone and so forth, are quite cheap, relatively speaking. We also have these newer medications that you have been educating us about. But how do we justify the costs of using the newer, apparently more effective [but more expensive] ones instead of the basic opioids? How do we convince clinicians to use these appropriately and the insurance companies to allow us to use these?

Dr Clark: In these days of evidence-based, outcome-based medicine, we can readily see the effects [in our practice] but we need to have [these results documented] on paper.

Effective Protocols Reduce Pain, Complications, Length of Stay

Results of studies on multimodal/regional anesthesia and tight protocols

- Use of continuous intercostal nerve block improved pulmonary function and pain in rib fracture patients^a
- Preemptive pain control resulted in no overnight stays due to pain control in hip replacement patients^{b,c}
- 80% of hip and knee replacement patients could be discharged within 48 hrs^d
 - Reasons for not discharging at 48 hrs included pain, dizziness and weakness (80% of patients); and administrative factors (20%)^d

a. Trullit MS, et al. *J Trauma*. 2011;71:1548-1552; b. Berger RA, et al. *Clin Orthop Relat Res*. 2009;467:1424-1430; c. Mears DC, et al. *Clin Orthop Relat Res*. 2009;467:1412-1417. d. Husted D, et al. *Acta Orthopaedica*. 2011;82:679-684.

Some of the rib fracture studies show that these patients have lower rates of pneumonia and [thus have reduced] cost, so it is worth putting in an epidural catheter for these patients. In Pittsburgh they did a study on patients after hip surgery; 40% of the patients were allowed to go home the day of surgery with a catheter in place to treat their pain [and nearly three quarters of these required no further outpatient or home nursing care]. A Danish study showed that 80% of hip and knee surgery patients could be discharged within 48 hours of surgery. In another study, preemptive pain control resulted in no overnight stays. Now, we are not saying that we are trying to get everybody out of the hospital, but we are pointing out examples that illustrate improved pain treatment, people can get up and have a speedier recovery than without it.

Dr Barron: Should we also mandate that all CEOs of every insurance company actually undergo some orthopedic or significantly painful procedure so they can experience this first hand?

Dr Lipman: From your mouth to God's ear.

Dr Clark: It makes a huge difference. It sounds funny, but residents who have had an ACL repair [are more likely to believe in the importance of pain management].

Dr Barron: Right.

Dr Lipman: The cost of readmission is an important issue. Increasing our upfront cost somewhat by having a more effective postoperative pain management service, by assuring that there is a proper medication reconciliation before the patient is discharged, makes a big difference. By reducing readmissions, which are common for patients with postoperative pain, we remarkably reduce costs overall.

Dr Barron: Absolutely, no question.

To summarize this interesting discussion I would like to ask each of our panelists to provide a few take-home points for our audience. Dr Clark?

Take-Home Messages

- Providing a higher level of acute pain treatment with multimodal therapy is more effective than opioids alone
- Effective treatment has beneficial outcomes
 - Short term: fewer side effects, improved recovery, decreased re-admissions
 - Long term: decreased incidence of chronic pain, impact on economics and quality of life
- Acute pain specialists (physicians, nurses) have engaged a model multidisciplinary team approach
 - Diligent education of all HCPs can overcome historical barriers to provide improved treatment of patients

Dr Clark: First, we know that providing a higher level of acute pain treatment with multimodal therapy is more effective than using opioids alone. That is a given bottom line. We also know that effective treatment has beneficial outcomes, in the short term with fewer side effects, improved recovery, fewer readmissions, reduced costs, and in the long term with a lower incidence of chronic pain, which has tremendous implications on the economics of health care and on a patient's quality of life.

We also know that pain is becoming a specialty discipline of its own, for physicians, nurses, and adjunct medical personnel. We need to use a model multidisciplinary team approach for this to be effective. We also need diligent education of all healthcare providers about these new approaches. We are overcoming historical barriers to provide improved treatment of patients.

The other thing that we need is education of patients. Patients are the ultimate driver. As soon as more patients realize that there is a higher level of pain therapy that they can get, they will demand it. As you know, a patient about to undergo a total knee replacement who knows that a friend had a [nerve] block will come to you and demand, "I want this."

Dr Barron: Absolutely. I practice in New York City and my patients are very, very sophisticated. They come in with reams of medical knowledge that they have been collecting. Hopefully they are going to be watching this Medscape program as well, because there is much that they can glean from this, even though we have talked about a lot of specific technical, pharmacologic data. But the take-home points about these strategies are very clear and important for the consumer as well. Dr Lipman?

Take-Home Messages (cont)

- Postoperative pain remains the biggest area of dissatisfaction of surgical patients for both inpatient and same-day surgical procedures
- Opioids remain the major postoperative pharmacotherapy for moderate to severe postoperative pain
 - Pharmacotherapy is seriously limited by ADEs, especially nausea, vomiting, and constipation
- Newer nonopioid agents are opioid dose-sparing, reducing GI side effects and resulting in better postoperative pain management pain outcomes

Dr Lipman: Dr Clark referred earlier to the patient satisfaction surveys which most hospitals now use, and the follow-up is teaching us a lot. Postoperative pain remains the single largest source of dissatisfaction among surgical patients. So we need to pay attention to this. Hospital administrators are waking up and realizing that this is important. And we as healthcare professionals need to recognize at the same time that must be a priority. Opioids certainly remain the major pharmacotherapy for moderate to severe postoperative pain.

As we have discussed extensively, use of other nonopioids in combination with opioids often improves outcomes, and patient satisfaction. And we need to recognize that opioid dose-sparing techniques with some of the newer drugs, with some of the combination pharmacotherapies, and with multimodal therapy, really will improve patient outcomes. We have learned a lot, now we need to apply that knowledge directly to patient care.

Dr Barron: I think one of the big take-home points for me is that the buck stops with me, in terms of following up with the patients in those subsequent weeks and if their pain is not managed well they are angry at me. They are not angry at the pharmacist, they're not angry at -- well, occasionally they are angry at the anesthesiologist -- but usually it is me. And so they feel like everybody else involved is there to help them and I am the only one creating all the heartache. So it is very important I think, as you said, that the surgeons are receptive to learning this, because if the patient experiences this as a true multidisciplinary approach, it is better for everybody. It makes them feel more loved, more cared for, and certainly it takes a little bit of the pressure off of us.

We have these newer therapies that are fantastic and that we need to be continually educated about.

Summary

- Multimodal approach to care
- Newer therapies
- Interdisciplinary team approach
- Economic and patient outcome benefits

We have this multimodal approach to care, which I am experiencing in my hospital and which is a great evolution of this process of pain management. We have this interdisciplinary team approach, which is critical to bringing everybody's knowledge base to bear on the treatment of this patient. And of course the hospital's bottom line is going to benefit. Certainly, if there are 27 patients in a month who are writing back to the hospital, saying "How could you have put me through this? My pain management was nonexistent!" then they are not going to send 27 family members to that hospital. They are going to go elsewhere, where they think they may get a little better pain control. So the economic and patient outcome benefits are clear.

Dr Clark and Dr Lipman, thank you so much for joining me in this. It has really been fantastic and very informative. I would also like to thank you, the audience, for your interest in acute postoperative pain management.

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Abbreviations Used in This Activity

ADE = adverse drug event

CABG = coronary artery bypass graft

COX-2 = cyclo-oxygenase 2

LOS = length of stay

NSAID = nonsteroidal anti-inflammatory drug

PACU = postanesthesia care unit

PCA = patient-controlled analgesia

TCA = tricyclic antidepressant

TRPV1 = transient receptor potential cation channel subfamily V member

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