Compact Clinical Guide to Critical Care, Trauma, and Emergency Pain Management
An Evidence-Based Approach for Nurses

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This newest addition to Springer Publishing’s Pain Management Series for advanced health care practitioners presents evidence-based national guidelines and treatment algorithms for managing pain in patients in the critical care, trauma, and emergency department settings. Such patients may present with comorbid and complex conditions that make accurate pain assessment and treatment challenging. These individuals are often unable to communicate and are at the highest risk for experiencing unrelieved pain.

In an easy-to-use format, the book provides the most current information on assessing and managing pain in a variety of critical conditions. Both pharmacologic management therapies and nonpharmacologic interventions are included along with information about pain assessment screening tools for special populations. Topics covered include the basics of pain physiology in critical, emergency, and operative care patients; assessing pain in the critically ill; medications and advanced pain management techniques useful with this population; and commonly occurring conditions in the various care environments. Also addressed is the management of particularly challenging patients (elderly, obese) and conditions (chronic pain, renal failure, chemical dependency, and burns). Short case studies and questions to consider reinforce the concepts in each chapter. The book includes tables that efficiently summarize information, figures to illustrate key concepts, pain rating scales, and a helpful equianalgesic conversion table.

KEY FEATURES:
• Provides evidence-based guidelines for treating pain in critical care, trauma, and emergency department patients for all practice levels
• Facilitates quick access to pertinent clinical information on treatment options and pain types
• Provides easy-to-use assessment and screening tools and advanced pain management techniques
• Includes information for treating especially challenging and difficult-to-manage patient pain scenarios
• Covers pharmacologic management interventions and complementary and integrative therapies

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I dedicate this book to my husband Gary and children, Ashlie, Vincent, and Daniel who unconditionally love and support me through all my professional endeavors.

Liza Marmo
Contents

Preface ix
Acknowledgment xi

SECTION I: OVERVIEW OF PAIN

1. The Problem of Pain in the Critically Ill 1
2. Physiologic and Metabolic Responses to Pain 7

SECTION II: ASSESSING PAIN

3. The Art and Science of Pain Assessment 17
4. Assessment Tools 33
5. Assessing Pain in Specialty Populations 45

SECTION III: MEDICATIONS AND TREATMENT FOR PAIN

6. Medication Management With Nonopioid Medications 59
7. Opioid Analgesics 77
8. Coanalgesics for Additive Pain Relief 101
9. Complementary and Integrative Therapies for Pain Management 113
10. The Effect of Opioid Polymorphisms and Patient Response to Medications 129

SECTION IV: ADVANCED PAIN MANAGEMENT TECHNIQUES

11. Surgical and Procedural Pain Management in Critical Care 143
12. Using Patient Controlled Analgesia (PCA) in Critical Care 155
13. Regional Techniques and Epidural Analgesia for Pain Relief in Critical Care 171

SECTION V: CRITICAL CARE, EMERGENCY DEPARTMENT AND TRAUMA PATIENTS WITH PAIN

14. Managing Pain in Cardiothoracic Critical Care Patients 189
15. Managing Patient Pain in the Medical Intensive Care Unit 203
16. Managing Patients Seeking Pain Relief in the Emergency Department 225
17. Managing Pain in the Patient Suffering Trauma 273

SECTION VI: DIFFICULT TO TREAT PATIENT POPULATIONS

18. Managing Pain in Special Patient Populations 311
19. Pain, Addiction, and Opioid Dependency in Critical Care Patients 331

Index 345
Pain is one of the most common symptoms experienced by patients. Critically ill patients, particularly those not able to communicate, are at high risk for experiencing unrelieved pain. This population is often unable to speak for themselves and rely on their caregivers to be their voices. Many of us had limited education on pain while in school—my pain education was limited to just one lecture. We did the best that we could with the knowledge we had.

Each of us has gotten caught up in the common misconceptions surrounding pain. Comments such as “You can’t give the patient anything for pain because you might drop their blood pressure” or “That patient is drug seeking because he calls for his pain medication like clockwork” and “Sleeping patients can’t be experiencing pain” continue to exist today.

In the late 1990s the Joint Commission was buzzing about making pain a priority and mandating that each patient be assessed. I was asked to attend a day-long conference on pain management where Chris Pasero was the speaker. It was one of the best conferences I attended. Chris spoke so passionately about the plight of patients who experience pain—it was the day I changed how I render care to my patients. I took my new knowledge back to my department and began trying to make a difference.

As a nurse, I am in charge of each of my patients and often I am their voice. It is the responsibility of health care professionals to ensure the comfort of each of their patients and to minimize the untoward sequelae of unrelieved pain. We must ensure that those patients that can communicate are heard, and use our critical thinking and advanced assessment skills for those patients that cannot alert us if they are experiencing pain.

As Jo Eland, President of American Society of Pain Management Nurses, says “Nurses own pain.” Pain is the one thing that nurses really own and have the ability to make a difference to our patients. It is imperative that all health care professionals understand pain and have a basic understanding of pain mechanisms, both physiologically and psychologically.
This knowledge is essential in attempting to alleviate the pain and the suffering that is associated with it.

This book in the Compact Clinical Guide series is for the health care professional who cares for patients in various settings that may be experiencing pain. The book provides some basic concepts on pain and pain medications, and then focuses on specific types of pain such as abdominal pain and chest pain. Each chapter contains short case studies that focus on the concepts of the chapter. All information is based upon evidence-based guidelines and evidence-based practice.

A critical care nurse for more than 10 years and with 10 years practicing in pain management, I hope that you find this book a helpful resource in managing your patients’ pain and help in improving their outcomes.

Liza Marmo, MSN, RN-BC, CCRN

x Preface
Acknowledgments

This book could not have been written without Yvonne D’Arcy, who not only served as the series editor, but also encouraged and challenged me throughout this endeavor. Without her mentoring, guidance, and support this book would not have come to fruition. I am forever and truly grateful.
"Pain is a major health care problem. Although acute pain may reasonably be considered a symptom of disease or injury, chronic and recurrent pain is a specific healthcare problem, a disease in its own right." (IASP, 2011; EFIC, 2011)

Admission to a critical care setting is usually a threat to the life and well-being of the patient. Critical care nurses often see the intensive care unit as a place where fragile lives are carefully analyzed and cared for. Patients and their families often see admission to critical care as a sign of imminent death. Understanding what the critical care setting signifies to patients may help health care professionals care for their patients. However, communication with a critically ill patient is often challenging and frustrating due to the barriers that exist related to the patient’s physiological condition, or the presence of endotracheal tubes which inhibit communication, or mind altering medications, or other conditions that affect cognitive function.

Researchers have long studied the patient experience related to an ICU stay. Many patients recall negative feelings related to fear, anxiety, sleep disturbance, cognitive impairment, and pain or discomfort. Many patients mistakenly believe that pain is to be expected and endured or they fear opioid use will result in addiction. Health care professionals are often unaware of a patient’s discomfort or do not understand the physiological effects of uncontrolled/unrelieved pain. Despite the advances that have been made overall, unrelieved pain is still a major problem.

Pain is a stressor for the critically ill patient and provides significant challenges for the health care professional. Critically ill patients may suffer excessive pain from their life-threatening illnesses, injuries, or nursing care
and/or procedures (turning, endotracheal suctioning, removal of a chest tube). The critically ill often are unable to effectively communicate to their caregivers, making it difficult to assess and manage their pain effectively. In an effort to solve this ongoing problem, health care professionals must be able to recognize pain particularly in the critically ill. One must assume that all critically ill patients are in pain or are at high risk for pain.

The health care team must work together with the patient to establish common pain treatment goals. In order to select the most appropriate treatment, thorough pain assessment and in-depth understanding of pain physiology are needed. An understanding of how pain is processed at each stage allows the treatment plan to be tailored for each individual patient.

In most instances, the goal of the treatment strategy may be to achieve the maximal analgesia but when that is not possible, the goal shifts to reducing pain to a level that the patient finds tolerable and that allows for the performance of activities of daily living. Once that goal has been established the next step is to develop a plan to meet that goal.

PREVALENCE OF PAIN

Pain can significantly impact a patient’s recovery. The exact prevalence is unknown although we know that it is high and can come from many different sources. Pain can occur as a result of surgery, procedures, illness, or trauma, and pain for most patients does not resolve until healing has occurred.

Apfelbaum, Chen, Mehta, and Gann (2003) conducted a randomized qualitative study of 250 patients who had recently undergone surgery. The study found that approximately 80% of patient’s experienced acute pain after surgery. Of these patients, 86% had moderate, severe, or extreme pain, with more patients experiencing pain after discharge than before discharge. Almost 25% of patients who received pain medications experienced adverse effects, although almost 90% of them were satisfied with their pain medications. This study identified a need for additional efforts in order to improve pain suppression.

The American Association of Critical Care Nurses (AACN) supported the Thunder Project II, a large research study in which pain perception and responses to tracheal suctioning, as well as five other procedures, were evaluated (Puntilllo et al., 2004, 2001). Thunder Project II was a comprehensive, descriptive study of pain perceptions and responses of patients to these six common procedures: turning, removal of wound drains, tracheal suctioning, removal of femoral catheters, insertion of central venous catheters, and non-burn wound dressing change. Data were obtained from
6,201 patients aged 4 to 97 years, 5,957 of which were adults. Numeric rating scales were used to measure pain intensity and procedural distress and word lists were used to measure pain quality. Mean pain intensity scores for turning and tracheal suctioning were 2.80 and 3.00, respectively (scale, 0–5). In adults, mean pain intensity scores for all procedures were 2.65 to 4.93 (scale, 0–10); mean procedural distress scores were 1.89 to 3.47 (scale, 0–10). The most painful and distressing procedure for adults was turning. Less than 20% of patients received opiates before procedures.

A study by Gélinas (2007) described the pain experience of cardiac surgery ICU patients. After the patients were transferred to the surgical unit, 93 patients were interviewed about their pain experience while they were in the ICU. Sixty-one patients (65.6%) recalled being ventilated and 72 patients (77.4%) recalled having pain. Turning was the most frequent source of pain experienced by these patients. A large proportion of the patients (47.3%) identified the thorax as the location of their pain. All patients had a sternal incision. Pain was mild for 16 patients, moderate for 21, and severe for 25 of them. While ventilated, head nodding and movements of the upper limbs were the most frequent means of communication used by the patients.

These findings are disturbing, and revealed that pain still exists and many the patients still experience moderate and severe pain despite all of the advances that have been made in pain management.

THEORIES OF PAIN

Pain has been experienced by everyone regardless of age, gender, or economic status. Pain is usually described as an unfavorable experience that has a lasting emotional and disabling influence on the individual. Theories that explain and assist in understanding what pain is, how it originates, and why we feel it are the Specificity Theory, Pattern Theory, and Gate Theory.

Since the beginning of time, the many theories regarding the cause, nature, and purpose of pain have been debated. Most early theories were based on the assumption that pain was a form of punishment. The word “pain” is derived from the Latin word “poena” meaning fine, penalty, or punishment. The ancient Greeks believed that pain was associated with pleasure because the relief of pain was both pleasurable and emotional. Aristotle reassessed the theory of pain and declared that the soul was the center of the sensory processes and the pain system was located in the heart. The Romans came closer to contemporary thought, viewing pain as something that accompanied inflammation.
In the second century, Galen offered the Romans his works on the concepts of the nervous system. In the fourth century, successors of Aristotle discovered anatomic proof that the brain was connected to the nervous system. Aristotle’s belief prevailed until the 19th century, when German scientists provided unquestionable evidence that the brain is involved with sensory and motor function.

**Specificity Theory**

In the 17th century, Descartes described pain in physical terms. Pain was a physical occurrence traveling along a specific path suggesting that pain is caused by injury or damage to body tissue. The damaged nerve fibers in our bodies send direct messages through specific pain receptors and fibers to the pain center, which causes the individual to feel pain (Adams & Bromley, 1998). The amount of pain experienced by an individual is related to the severity of the injury.

The Specificity Theory was the most widely accepted theory of pain transmission through the end of the 19th century. The theory supports the idea that the body’s neurons and pathways for transmission are as specific and unique as those for other body senses such as touch and taste. The free nerve endings in the skin act as pain receptors, accepting sensory input and transmitting this input along highly specific nerve fibers. These fibers synapse in the dorsal horns of the spinal cord, and cross over to the anterior and lateral spinothalmic tracts. The pain impulses then ascend to the thalamus and cerebral cortex, where painful sensations are perceived. The theory does not explain the difference in pain perception among individuals, nor does it satisfactorily account for the effect of physiologic variables, the effect of previous experience with pain, phantom limb pain, or peripheral neuralgias.

**Pattern Theory**

The Pattern Theory was introduced in the early 1900s. It identifies two major types of pain fibers, rapidly and slowly conducting fibers (A-delta and C fibers, respectively). The stimulation of these fibers forms a pattern. The theory also introduced the concept of central summation. Peripheral impulses from many fibers of both types are combined at the level of the spinal cord, and from there a summation of these impulses ascends to the brain for interpretation. The theory does not account for individual perceptual differences and psychological factors. The Pattern Theory
claims that pain is felt as a consequence to the amount of tissue damaged (McCance & Huether, 1990).

**Gate Control Theory**

In 1962, Ronald Melzack and Patrick Wall proposed the Gate Control Theory. This theory explains how an individual’s emotions and thinking can affect one’s own perception of pain. It was hypothesized that there is a mechanism in the brain that acts as a gate to either increase or decrease the flow of nerve impulses from the peripheral nerve fibers to the central nervous system. If the gate is open it allows the flow of nerve impulses and as a result the brain perceives pain. If the gate is closed the nerve impulses do not let the brain perceive pain or decrease it.

Gate Control Theory is the first and the only theory to take into account psychological factors of pain experiences. Experiences of pain are influenced by many physical and psychological factors such as beliefs, prior experience, motivation, emotional aspects, anxiety, and depression, all of which can increase pain by affecting the central control system in the brain.

**Neuromatrix Theory**

In 1999, Melzack and Wall came up with a newer theory of pain, the Neuromatrix Theory (Melzack, 1999). The theory suggests that every human being has their own intrinsic network of neurons that is affected by all aspects of the person’s physical, psychological, and cognitive traits, and their experience. Pain sensations are processed by a neural network in the brain. It integrates various inputs to produce the output pattern perceived as pain.

**FACTORS AFFECTING PATIENTS’ RESPONSES TO PAIN**

Everyone has the same pain threshold; everyone perceives pain stimuli at the same stimulus intensity. What varies then is the patient’s perception of and reaction to pain.

*Age:* The older adult with normal age-related changes in neurophysiology may have decreased perception of sensory stimuli and a higher pain threshold.

*Sociocultural influences:* People’s response to pain is strongly influenced by the family, community, and culture. Sociocultural influences affect the way in which a patient tolerates pain, interprets the meaning of pain, and
reacts verbally and nonverbally. Cultural influences teach an individual how much pain to tolerate, what types of pain to report and to whom to report the pain, and what kind of pain treatment to seek.  

**Emotional status:** The sensation of pain may be blocked by intense concentration or may be increased by anxiety or fear. Pain often is increased when it occurs in conjunction with other illnesses or physiological discomforts such as nausea and vomiting.  

**Past experiences with pain:** If the patient’s childhood experiences with pain were responded to appropriately by supportive adults, as an adult they will usually have a healthy attitude.  

**Source and meaning:** If the patient perceives the pain as deserved, the patient may actually feel relief that the punishment has commenced.  

**Knowledge deficit:** If the patient has a clear and accurate perception of pain, it is far easier for health care professionals to increase the patient’s knowledge of both the significance of pain and the strategies the patient can use to diminish discomfort.

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