



# Comfort

## Pain Mechanisms

---

### Case Studies

The six cases presented in this module can be used to support the instructional material for the mechanisms of pain. The last three cases are common cases that also can be found in modules for other topics. The common cases are illustrated with video and audio clips.

#### Case 1: 48-year-old Paula G.

Paula G., a 48-year-old female presents to the emergency room with a complaint of abdominal pain. Paula states the pain has been increasing over several days. The pain is dull and achy and increases when she lies flat. She also has had some shortness of breath and weight loss. The physician completes a comprehensive history and physical exam and orders a chest x-ray. The x-ray films show a right pleural effusion, masses in the upper lobes bilaterally, and a mediastinal mass. The RN administers local anesthesia and assists the MD with the thoracentesis, which removed 1.5 liters of fluid. Immediately after the procedure, Paula's abdominal pain decreases and her breathing improves. The physician refers Paula to an oncologist for work up of probable lung cancer. The work up includes a CT scan of the chest and head, fiber optic bronchoscopy for biopsy and blood work that includes CBC, liver profile, BUN and creatinin. The work up is positive for metastatic nonsmall cell lung cancer.

Paula decides she does not want aggressive treatment and wants to be followed by a hospice team that includes a nurse practitioner (NP) with specialization in palliative treatment of pain and other symptoms. Since Paula's pain after the thoracentesis was 2/10 (mild), the NP prescribed a step1 analgesic, celebrex (Cox 2 specific NSAID), 200 mg day for her abdominal pain, a nociceptive type of pain caused by the liver metastasis.

Palliative care goals will address end-of-life issues and the need for pain control, as well as other symptoms.

- What other symptoms might the hospice RN expect given Paula's type of cancer?
- Why is Paula at risk for pancoast syndrome? What is it? What sensations are associated with it?
- What types of pain might Paula experience?

**Instructor note:** Paula is at risk for dyspnea and the side effects of opioids including constipation, dry mouth and nausea. The hospice RN should recognize that the upper lobe lung masses could compress the brachial plexus, causing pancoast syndrome, a neuropathic pain that often responds to tricyclic antidepressants. Paula is also at risk for bone metastasis especially to the spine. Bone metastasis causes a nociceptive type of pain that often responds to corticosteroids, NSAIDS, opioids and palliative radiation therapy.

## Case 2: 86-year-old man

The nursing staff at a subacute nursing facility calls the physician about an 86-year-old man who reports rib pain. The patient is a poor historian and has mild dementia. The staff thinks he may have fallen. He is able to describe the pain as shooting and lancinating. He uses one finger to show that the pain starts in the mid-back and travels along his 7th rib. There are no signs of abrasion or bruising. The nursing staff asks the physician if this man needs a rib x-ray to rule out a rib fracture. The physician thinks the pain he is describing is a neuropathic type of pain and declines the x-ray.

The physician prescribes a low dose tricyclic anti-depressant at bedtime and an opioid for mild to moderate pain. Two days later, the staff nurse calls the physician and reports the patient has a series of fluid filled blisters along the painful rib. The physician confirms her previous diagnosis of Herpes Zoster and prescribes Acyclovir and continues the analgesics.

This man has an acute neuropathic pain related to a treatable etiology, herpes zoster. Unfortunately, this elderly man is at risk for post-herpetic neuralgia. Post-herpetic neuralgia is not curable, so treatment is for the relief of the pain and hypersensitivity in the area. In addition to the tricyclic anti-depressant at bedtime and an opioid for mild to moderate pain, treatment may include capsaicin cream, nerve blocks, TENS unit or acupuncture. Capsaicin cream renders skin insensitive to pain by depleting substance P in the peripheral sensory neurons.

- What characteristic of the patient's pain and condition most likely led the physician to conclude he was developing Herpes Zoster and did not have a fractured rib?
- What is the lay term for Herpes Zoster?

**Instructor note:** The neuropathic descriptors (shooting and lancinating) are consistent with a rib fracture. He uses one finger to show that the pain starts in the mid-back and travels along his 7th rib, which also is indicative of neuropathic pain. There are no signs of abrasion or bruising, additional evidence against a rib fracture. His age, 86-years, and declining condition put him at risk for Herpes Zoster, also known as shingles.

**Case 3: 67-year-old, B.A.**

B.A., a 67-year-old with metastatic ovarian cancer was admitted to the hospital with a small bowel obstruction secondary to adhesions and tumor invasion. Prescriptions included NPO status, hydration fluids, anti-emetic medications, and morphine sulfate 2-4 mg IV every 1-hour prn for pain. About two hours after admission, B.A. complained of severe pain in the upper, left quadrant of the abdomen. She described the pain as sharp, piercing and unlike the pain she had a few hours ago. She called the pain as "200 out of ten".

The nurse consulted with the physician and the bolus opioid dose range was increased to allow titration to comfort. During the night B.A. became diaphoretic, hypotensive, and tachycardic. Later she became disoriented and confused. The next morning, abdominal x-rays showed a perforated bowel. Because of her underlying medical condition, her family refused surgery. She died 24 hours later.

- What early indicator could have alerted the health care providers to the bowel perforation?
- What were important consequences of not recognizing the bowel perforation earlier?

**Instructor note:** B.A. reported pain that did not fit the diagnosis of small bowel obstruction. The pain from a small bowel obstruction is dull and steady. B.A.'s ovarian cancer pain was usually well controlled with oral medications. The pain she experienced was very different from her previous pain. The new pain had a sudden onset, was much more intense and was in a different location. Other physical signs increased heart rate and diaphoresis, pointed to an acute pain episode. If the health care team had considered the potential causes of a new pain, B.A. could have had more aggressive titration to a sufficient comfort level with a morphine infusion, not the prn bolus doses she received during the night. The infusion also would have been much more effective from the perspective of the nursing staff. Furthermore, early recognition of the emergent condition could have allowed B.A. to participate in the end-of-life decisions that her family subsequently made for her, all of which were consistent with B.A.'s wishes that she had expressed earlier in the course of her cancer experience.

#### Case 4: Mrs. Gregory

Mrs. Gregory is a 62-year-old woman who has been a patient for many years at the office where you work as an office nurse. For the past few months, she has complained of increasingly severe upper abdominal pain and weight loss. An ultrasound ordered by Dr. Minor revealed a mass highly suspicious for primary liver cancer.

As the disease progresses, Mrs. Gregory is increasingly in more pain. At night she cries, when she thinks no one can hear her. In the morning, she is silent again – and she hasn't spoken more than a few words to her daughters in several days since her last talk with Chaplain Olsen. She told the Chaplain that she wants a drug or treatment that won't make her feel anything at all. One day, Mrs. Gregory and her three daughters ask Dr. Minor for help. The two older daughters want to abide by their mother's wishes and help her, in her words, "sleep through the whole process," as much as possible. Gloria, her youngest daughter, wants her mother to have pain care, but wants her to be conscious so they can talk with one another.

- What is the most likely cause of Mrs. Gregory's increasing level of pain?

Three weeks after Mrs. Gregory's pain medications were increased – giving her the level of relief that she wanted – she goes into a coma abruptly. It sends a wave of fear and anguish through the Gregory daughters. In the hallway outside the intensive care unit, the older daughters tell the ICU nurse and Gloria to "let her go peacefully." Gloria pulls out of her purse her copy of the power of attorney document, which states that her mother would want them to fight this out – unless it caused her to suffer. She shows it to the nurse and her sisters and says, "You weren't there, but mom asked us to fight. And I promised her that I'd make sure that everything is done to help her get better." The nurse arranges for a meeting with Dr. Minor, Chaplain Olsen, and the three daughters to decide what to do.

- How likely is it that Mrs. Gregory's pain medication is contributing to the coma?

**Instructor note:** Based on the information available, Mrs. Gregory's increasing pain is most likely related to her enlarging liver as a consequence of her liver cancer. As the tumor expands the size of the liver, the liver capsule is stretched causing nociceptive pain that often responds to nonsteroidal anti-inflammatory medications, particularly Indocin. The most likely cause of coma in this situation is hepatic encephalopathy, not her pain medications.

### Case 5: Mr. William's

Mr. Williams is a 53-year-old heavy smoker. Seven months ago he had surgery to remove a segment of his lung as part of his treatment for adenocarcinoma of the lung. You're close to Mr. Williams. And as his hospital nurse, his family grew close to you – especially his wife, Mary. Weak and thin, Mr. Williams returned home with the surgeon's confident assurances to the family that he would make a "complete recovery." That never happened. Today he was readmitted with distressing symptoms including shortness of breath, severe pain, weakness and anorexia. His body has deteriorated rapidly, showing cachexia. He's even more quiet and frail than you remember. You encounter his family while on rounds. They're visibly upset, but relieved to see a familiar face. Mary says to you, "He's really bad and in a lot of pain. None of the doctors are telling us anything." She asks you to help them figure out what to do.

After a few days of discussion with the doctors and nurses, Mr. and Mrs. Williams agree to accept referral to hospice services. They feel strongly that the curative treatment options available to them at this point offer too few benefits and too many burdens to be acceptable. Their hope now is directed to having more time – time in their own home, time with their children and friends around, and time where Mr. Williams' quality of life is maximized. They are referred to you, the admitting hospice nurse, to formulate a plan for palliative care. In talking about the services available through hospice, financial issues, and policies, you explain that all clients enrolled in this particular hospice group are required to sign a "do-not-attempt-resuscitation" agreement and instructed to call the hospice rather than 911 in the event of an emergency. Mrs. Williams is stunned to hear that her husband would not receive CPR if or when he experiences an arrest. She tells you that she was not aware that hospice would just let Mr. Williams die without trying to help him at all and expresses fear about being alone with her husband and facing a situation where he is in extreme pain and discomfort from dyspnea without professional assistance.

- What is the most likely cause of Mr. Williams' increasing level of pain?

**Instructor note:** Based on the information available, Mr. Williams's increasing pain is most likely related to his metastatic lung cancer. There is insufficient data to conclude anything about the type of pain he has; there is no pain assessment data.

Adenocarcinoma of the lung could be associated with nociceptive pain (bone, liver, or kidney metastasis) or neuropathic pain (brachial plexus or other nerve involvement), similar to Case 1, Paula.

**Case 6: Sammy**

Janelle and James Jones are both attorneys in their 40s. They were joyously awaiting the birth of their first child – which they expected several months from now. One night, they rushed to the emergency room with Janelle in hard labor after only a 25-week gestation. Despite the intervention of the hospital staff, their son Sammy was born prematurely, weighing just over 1.5 lbs. He required immediate medical attention and was put on mechanical ventilation in the NICU. An admission history takes place between you, the hospital nurse, and Janelle. You are meeting for the first time today. He developed necrotizing enterocolitis and required surgery to remove part of his intestine. Within days of surgery, he had Grade 4 cerebral bleeding. Yet he hung on. Either Janelle or James was at Sammy's NICU bedside nearly 18 hours a day.

- Is it possible for Sammy to feel pain after the surgery? Why or why not?

**Instructor note:** Sammy will sense pain if he does not receive analgesics. The sensory pain fibers are developed early in neonatal development, before week 25 gestation. The C fibers are not myelinated, so will not undergo significant development after birth. The A-delta and A-alpha or A-beta fibers are not myelinated at this stage of development. Hence, conduction of the A-delta fibers may be slow at Sammy's developmental age. Also, the A-alpha or A-beta fibers, which could contribute to nonpharmacologic pain control, are not likely to provide much comfort to Sammy at his developmental stage. Lack of large fiber input for comfort means that it is even more important to provide sufficient analgesia for his post operative pain and the other painful procedures he will experience in the NICU.