



Symptom Management of Bone Metastasis at End of Life

Paul Ensom Coyne, MBA, MSF, MSN, AGPCNP-BC

Caring for persons with bone metastasis at the end of life is complex. There are a variety of pharmacologic and nonpharmacologic measures that have been shown to provide patients with relief and comfort. Through the use of a case narrative, this article demonstrates the complexity of palliative care as it relates to the pain management of bone metastasis at end of life from both the pharmacological and psychosocial perspectives. Treatment interventions for pain in each of these domains is explored, illustrating that metastatic bone pain at end of life is a multifaceted experience and therefore requires a multimodal approach to care.

KEY WORDS

bone metastasis, cancer, end-of-life care, pain management

The aging population combined with advances in pharmacology and medicine will continue to lead to a challenging and complex environment regarding end-of-life decisions and treatment as it relates to advanced cancer. Not only will this increase in longevity increase cancer rates, but also advances in medicine will delay the terminal aspect of the disease. This combination of factors increases both the number of people living with cancer and the likelihood of extended survival despite metastases. As the role of nursing continues to grow to fill the need of symptom management for these patients, it is essential that all nurses are aware of a basic understanding of what bone metastasis at the end of life entails from both the perspective of the patient and the provider in order to provide optimal care and adequately treat patient pain and suffering. The following case will illustrate a multimodal approach to care for individuals with metastatic bone pain at end of life that utilizes both pharmacologic and nonpharmacologic interventions.

Paul Ensom Coyne, MBA, MSF, MSN, AGPCNP-BC, is DNP candidate, Columbia University, New York.

Address correspondence to Paul Ensom Coyne, MBA, MS, BS, RN, 1313 Grand Street Apt 504, Hoboken, NJ 07030 (PEC2118@columbia.edu).

The author has no conflicts of interest to disclose.

DOI: 10.1097/NJH.0000000000000152

CASE STUDY

Mr Cabrera, a 49-year-old man diagnosed with renal cancer 6 years ago, was recently admitted to a specialized palliative care facility. Despite nephrectomy (right) 5 years ago and the completion of multiple chemotherapy regimens, his cancer metastasized to the bone, bone marrow, spinal cord, liver, and lungs. As a result of the cancer spreading to the bones, he had numerous pathological fractures including both hips (which required surgery 2 years ago) and most recently the left humerus. He elected to receive the hospice benefit 3 months ago and was cared for at home through a visiting nurse agency. Two months ago, his pain and hypercalcemia became uncontrolled, and he was admitted to a local hospital under hospice. He remained hospitalized for 2 months until he was transferred to a palliative care facility for assistance with pain management as his pain had become increasingly uncontrollable.

Upon admission to the palliative care facility, Mr Cabrera was in severe pain (10/10 using Wong-Baker Faces Pain Rating scale), crying, and irritable. At 1 point, he angrily told a nurse who wanted to clean him, "I'll tell you when I need to be changed and not before." His wife stated, "I am sorry, he just really wants to go home."

Mr Cabrera's review of systems were normal except for musculoskeletal issues described as severe bilateral leg weakness, constipation, and a deep, dull ache in the femur and tibia, reinforcing cancer pain secondary to bone metastasis and hypercalcemia. During the physical examination, he was alert to person, place, and time, and his examination was unremarkable except for marked weakness, particularly in the bilateral lower extremities, and a stage II sacral pressure ulcer. Blood work done on admission revealed low levels of albumin and elevations in white blood cell count and calcium. All other electrolytes were within normal limits.

Referrals were written for Mr Cabrera to have consultations with pastoral care, social work, and physical therapy. In the notes for each consultation visit, he expressed his wishes to go home the following Saturday for a celebration of the living, or a living funeral. He expressed his desire to be *do not resuscitate/do not intubate*, stated all assets should be left to his wife, and wished for cremation immediately following his death, with no additional services in addition to a living funeral.



After initial adjustments to pain management regimen through the use of patient-controlled analgesia (PCA) proved effective, Mr Cabrera became much more amicable and willing to discuss the reasons for his expressed wishes, specifically his desire for a living funeral. Mr Cabrera stated, "I don't care if I am in pain. The greatest cause of my suffering is not being able to go home for a living funeral." He explained that he and his wife of 20 years operated a "day care" in their home. Because of the increase in the numbers of the children there after school hours, he would assist his wife on a daily basis. As a result, both Mr Cabrera and his wife stated that although they had no children, they "watched hundreds of the children over the last 20 years grow into adulthood." He stated that many of the individuals he helped raise had been in touch with him and wanted to see him to say goodbye. Mr Cabrera said, "it would be easier for them and me if they could see me at home instead of in a casket." It was for this reason that he wanted to have a "living funeral," currently scheduled for next Saturday, as that is the time his mother was able to arrive by plane.

During the goals-of-care discussion, Mr Cabrera was very well aware of his limitations and barriers to returning home. He stated that as a result of weakness and pain due to metastasis, he is incontinent of urine and stool. While he was bedbound and required assistance with all activities of daily living, he did have an adequate support system to care for him at home. His wife of 20 years was his primary caregiver and health care proxy and was with him daily at the palliative care facility and could care for him daily at home. In addition, he had 1 brother who resided in the same town and also had a brother-in-law who stayed overnight 3 nights a week to assist with care and could resume this schedule again if he returned home.

Mr Cabrera had a peripheral intravenous line, and while visiting nurse service hospice could arrange for him to go home if his pain is well controlled, he must have central access in order for him to be able to continue Dilaudid PCA at home. Central access lines for home use have been shown to be safer and more likely to ensure consistent administration of analgesia when compared with peripheral access because of their longevity.¹ The longevity of central line intravenous access was also preferred to the shorter duration of subcutaneous infusions. In addition, no dosage adjustments were needed if administration continued via the intravenous route. Therefore, a decision was made that if his pain remained controlled over the weekend, arrangements would be made for a peripherally inserted central catheter to be placed. This would allow for Mr Cabrera to return home on Friday and not only continue his current medication regimen at home but also be able to have his living ceremony.

At this point in care, pain control and symptom management became of even greater importance than it had been

previously. The staff and Mr Cabrera had 7 days to work together to ensure that he was in a position to return home on Friday.

TREATMENT OF METASTATIC BONE PAIN AT END OF LIFE

Pharmacologic guidelines for the treatment of pain at the end of life fall into 3 broad categories of analgesic: opioids, nonopioid analgesics, and the adjuvant analgesics, which comprise numerous agents in diverse classes.² For the pain management of Mr Cabrera, opioid use of fentanyl and hydromorphone was chosen. Nonopioid analgesic of acetaminophen was also prescribed, as well as the adjuvant analgesic of pamidronate because of the nature of bone pain secondary to hypercalcemia caused by bone metastases.

Opioids

With regard to opioid selection, studies show that pain can be treated adequately even with advanced cancer pain at end of life, with only 3% patients experiencing severe pain and 52% experiencing no pain at all if guidelines are followed.³ Mr Cabrera arrived to the facility on morphine but still experienced uncontrolled pain in addition to experiencing breakthrough pain as evidenced by patient self-reporting of pain 10/10 and his requesting of PRN medication an average of 3 times more than ordered.

Because of his renal insufficiency and breakthrough pain, hydromorphone PCA was initiated with rescue doses available, and pain was adequately controlled. Hydromorphone has active metabolites that are produced in relatively low concentration in comparison to morphine.⁴ Therefore, it was a better choice for this patient because of his renal cancer. As fentanyl and methadone have lower levels of active metabolites when compared with other opioids such as codeine, they should also be considered as an alternative in patients with renal insufficiency.⁵ Mr Cabrera was given PCA as opposed to standing order in order to experience some sense of control over his pain. The rapid acting nature of hydromorphone allowed Mr Cabrera to see the most immediate effect from "pushing the button" when compared with opioids with a longer onset.

Nonopioid Analgesics

Acetaminophen was chosen for a nonopioid analgesic. The World Health Organization analgesic ladder for cancer pain suggests that the administration of acetaminophen or nonsteroidal anti-inflammatory drugs (NSAIDs) may be additive to that of opioids, leading to the possibility of lessening the opioid dosage and reducing the adverse effects.⁶ As Mr Cabrera was already suffering constipation from opioids, this was seen as a potential benefit as the addition of nonopioid analgesics lessened Mr Cabrera's requests for as-needed opioids. Renal insufficiency due to renal



vasoconstriction and acute interstitial nephritis has been associated with NSAID use.⁷ Because Mr Cabrera had evidence of renal insufficiency, use of NSAIDs was contraindicated. In this setting, acetaminophen is the preferred agent as it is hepatically cleared.

Adjuvant Analgesics

Metastatic bone involvement usually results in multiple skeletal complications leading to a significant deterioration in the quality of life for cancer patients. Pain, hypercalcemia, and skeletal-related events, such as pathological fractures shown here with Mr Cabrera, are problems typically derived from bone metastases. In bone metastases, the interaction of tumor cells and osteoblasts causes hypercalcemia secondary to bone resorption in addition to severe debilitating pain. Over the last 2 decades, clinical trials have shown that bisphosphonates, specifically pamidronate (Aredia), have been the most effective treatments in delaying or preventing skeletal-related events in patients with bone metastases.⁸

Bisphosphonates, such as pamidronate, are administered systemically but are deposited at sites of active bone remodeling. Bisphosphonates accumulate in the bone and are ingested by osteoclasts during bone resorption, thus inhibiting osteolysis. Gastrointestinal adverse effects must be monitored following administration as clinical trials have shown increased incidences of diarrhea with these medications.⁹

However, as Mr Cabrera already had 2 pathological fractures, it was essential that this be part of his pain management regimen, as bisphosphonates have been shown to both palliate symptoms of pain due to metastatic bone cancer and prevent future pathological fractures.¹⁰ While the prevention of future pathological fractures was no longer paramount because of Mr Cabrera's life expectancy, Mr Cabrera continued to receive bisphosphonates for their analgesic effects.

It is well recognized that opioids cause gastrointestinal immotility; however, not all opioids are equally constipating. Two systematic reviews concluded that oral sustained-release morphine is one of the most constipating opioids, reinforcing the choice for the aforementioned opioid selection.¹¹ With regard to which laxative choice to use, Cochrane systematic review of management of constipation in palliative care patients analyzing 4 randomized trials comparing different kinds of laxatives showed no significant differences among them.¹² Dual-therapy of docusate (Colace), a stool softener, and *Senna*, a fleet enema, were chosen for Mr Cabrera in an attempt to treat this issue with 2 different mechanisms of action.

Nonpharmacologic Interventions

In addition to these pharmacologic treatments, physical therapy was also prescribed. Daily stretching and exercise,

when done properly, have been shown to limit risk of pathological fractures in bone metastases.¹³ As Mr Cabrera's pain was worse with weight bearing, hydrotherapy is also an alternative form of exercise that was considered as it has been shown to be beneficial for patients with chronic pain, although it was not available at this facility.

Massage therapy has been shown to help ease general aches and pains, especially in patients who are bedbound or who have limited mobility.¹⁴ In addition, recent studies surrounding the efficacy of massage therapy on cancer patients with bone metastases showed significant improvement in pain and anxiety even up to 18 hours following the session.¹⁵ The results showed the most significant improvement immediately following the massage therapy session, making the importance of caregiver training and assistance essential.

In order to address a patient's mental and spiritual well-being, pastoral care and social work can ensure all of the patient's needs are met. Studies have shown that while both clinicians and patients view pain and symptom management as important, patients view many other needs as equally important at the end of life that clinicians tend to overlook. These include having funeral arrangements planned, not being a burden, and coming to peace with God.¹⁶

Therefore, a multidimensional approach that utilizes all aspects of the care team was used with Mr Cabrera as it has been shown to best provide optimum quality of life, while reducing the feelings of hopelessness and despair that accompany pain.

CONCLUSION

In the case of Mr Cabrera, the aforementioned treatment interventions proved fruitful as his pain was controlled enough for him to have a peripherally inserted central catheter line inserted on Thursday in preparation for his transfer home on Friday. Most importantly, he was able to have his "living funeral" on Saturday.

This case shows the complexity of palliative care from both its pharmaceutical and psychosocial perspectives. The interplay of these 2 equally important treatment approaches must be paramount to the practitioner. While this case outlines treatment guidelines for bone metastasis at the end of life, it also explores the complexity of the human experience of pain and suffering and illustrates many lessons that can be utilized in future practice.

First, this case shows that it should not be assumed that the patient's needs are the same as the provider's and that every patient deserves to be asked what he wants at the end of his life, even if he has not yet expressed this information. In addition, this case shows that a provider should be aware of the possibility that pain may affect a patient's demeanor in a negative way. This is essential for providers



to remember to ensure that a hostile interaction with a patient in pain will not influence the provider's judgment of that patient's character or, more importantly, his right to immediate pain relief.

This case also illustrates that pain is a multifaceted experience and therefore must be assessed and treated in all domains of human existence. The patient's right to immediate pain relief does not solely entail pharmacologic treatment. By assessing the patient's needs (in this case, the desire to have a "living funeral"), the patient's experience of pain may be more bearable, even if it cannot be completely physically alleviated. While numerous pharmacological interventions were utilized, perhaps the best treatment for this patient's pain was the acknowledgement of it, companionship during it, and the ability to facilitate hope that the patient would be able to accomplish his goals despite it. The interdisciplinary team is the most crucial part of this accomplishment, because without it, all aspects of the human experience of pain are not addressed adequately.

Pain and suffering are not entirely synonymous. As one can suffer without having physical pain, it stands to reason that one can also have the same amount of physical pain with various degrees of suffering. As nursing is the health care profession that lends itself to be the most equipped to meld the pharmacological and the psychosocial domain, nurses must continue to advocate for patients at the end of life to ensure not only that optimal pain relief is met, but also that suffering is minimized. If modern medicine is focused on pain management, then palliative nursing, especially the role of the palliative care nurse practitioner, can best be utilized in managing a patient's suffering, recognizing that physical pain is merely 1 aspect of a patient's suffering at the end of life, and as shown in this case, is not necessarily the largest contributing factor to the suffering of the patient.

References

1. Johansson E, Hammarskjöld F, Lundberg D, Arnlind MH. Advantages and disadvantages of peripherally inserted central venous catheters (PICC) compared to other central venous lines: a systematic review of the literature. *Acta Oncol.* 2013; 52(5):886-892.
2. Fine PG. Treatment guidelines for the pharmacological management of pain in older persons. *Pain Med.* 2012;13(suppl 2): S57-S66.
3. Foley KM. How well is cancer pain treated?. *Palliat Med.* 2011;25(5):398-401.
4. King S, Forbes K, Hanks GW, Ferro CJ, Chambers EJ. A systematic review of the use of opioid medication for those with moderate to severe cancer pain and renal impairment: a European Palliative Care Research Collaborative opioid guidelines project. *Palliat Med.* 2011;25(5):525-552.
5. Caraceni A, Hanks G, Kaasa S, et al. Use of opioid analgesics in the treatment of cancer pain: evidence-based recommendations from the EAPC. *Lancet Oncol.* 2012;13(2):e58-e68.
6. Swam RA. The management of pain in patients with cancer. *J Natl Compr Canc Netw.* 2013;11(suppl 5):702-704.
7. Plantinga L, Grubbs V, Sarkar U, et al. Nonsteroidal anti-inflammatory drug use among patients with chronic kidney disease in the United States. *Ann Fam Med.* 2011;9(5):423-430.
8. Perez-Garcia J, Muñoz-Couselo E. Bone metastases: causes, consequences and therapeutic opportunities. *Eur J Cancer.* 2013;88(2):254-256.
9. Aapro M, Saad F, Costa L. Optimizing clinical benefits of bisphosphonates in cancer patients with bone metastases. *Oncologist.* 2010;15(11):1147-1158.
10. Singh T, Kaur V, Kumar M, Kaur P, Murthy RS, Rawal RK. The critical role of bisphosphonates to target bone cancer metastasis: an overview. *J Drug Target.* 2014;23(1):1-15.
11. Tassinari D, Drudi F, Rosati M, Maltoni M. Transdermal opioids as front line treatment of moderate to severe cancer pain: a systemic review. *Palliat Med.* 2011;25(5):478-487.
12. Candy B, Jones L, Goodman ML, Drake R, Tookman A. Laxatives or methylalnaltrexone for the management of constipation in palliative care patients. *Cochrane Database Syst Rev.* 2011; 1:CD003448.
13. Lowe SS. Physical activity and palliative cancer care. *Recent Results Cancer Res.* 2011;186:349-365.
14. Buga S, Sarria JE. The management of pain in metastatic bone disease. *Cancer Control.* 2012;19(2):154-166.
15. Jane SW, Wilkie DJ, Gallucci BB, Beaton RD, Huang HY. Effects of a full-body massage on pain intensity, anxiety, and physiological relaxation in Taiwanese patients with metastatic bone pain: a pilot study. *J Pain Symptom Manage.* 2009;37(4): 754-763.
16. Steinhauser KE, Christakis NA, Clipp EC, Mcneilly M, Mcintyre L, Tulsky JA. Factors considered important at the end of life by patients, family, physicians, and other care providers. *JAMA.* 2000;284(19):2476-2482.

For more than 54 additional continuing education articles related to hospice and palliative care, go to NursingCenter.com/CE.