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Aromatase Inhibitors and Bone Loss Prevention

Independent Case Study Report

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University of North Dakota College of Nursing and Professional Disciplines

Permission

Title Aromatase Inhibitors and Bone Loss Prevention

Department Nursing

Degree Master of Science

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Abstract

Aromatase inhibitors are currently one of the best adjuvant therapies for postmenopausal women who have hormone receptor positive (HRP) breast cancer. As with most drug therapies, aromatase inhibitors come with side effects. One of these side effects is an increased rate of bone mineral density loss and bone cell turnover, leading to increased risk of fracture. In the following case study, a postmenopausal female on arimidex, a commonly used aromatase inhibitor, suffered from a common adverse side effect of aromatase inhibitor use. She experienced a hip fracture and was diagnosed with osteoporosis after her fracture. After completing a thorough literature review, it was found that this adverse side effect can effectively be reduced or prevented by utilizing a bisphosphonate at the initiation of aromatase inhibitor therapy. Many studies have shown that women's bone mineral density can actually improve over the course of aromatase inhibitor treatment when used, in conjunction with, a bisphosphonate. Nearly one fourth of people over 50 who sustain a hip fracture will die in the 12 months after the fracture occurs (Van Poznak et al., 2010). Fractures are costly, both financially and emotionally. The following case study and literature review will provide evidence encouraging health care providers to ensure that when a patient is started on an aromatase inhibitor, they are also started on a bone protective medication regimen, including the use of bisphosphonates.

Aromatase Inhibitors and Bone Loss Prevention

Background

“Breast cancer is the second leading cause of cancer deaths in women” (American Cancer Society, “ACS”, 2017, para. 1). It is estimated that 300,000 new cases of breast cancer will be diagnosed in 2017 (ACS, 2017). As prevalent as this seems, we know that the technology to catch breast cancer early and the medical advances to treat breast cancer more effectively is constantly improving (ACS, 2017). One of the common types of breast cancer is called hormone receptor positive (HRP) breast cancer. HRP breast cancer cells grow in the presence of hormones. This means that this type of cancer usually responds well to adjuvant hormone reducing therapy, especially in postmenopausal women. Aromatase inhibitors are one type of hormone reducing therapy that works very well at treating HRP breast cancer (American Society of Clinical Oncology, 2016). As with most medications, these effective drugs come with side effects and risks.

One notable side effect of a common aromatase inhibitor, Arimidex (anastrozole), is bone softening and eventual weakening (Arimidex.com, 2016). This is due to the mechanism of action of this type of medication, which is to lower the amount of estrogen that is circulating in body. While this helps kill and prevent the growth of breast cancer cells that are HRP in nature, it also leads to an increased rate of osteopenia and osteoporosis in postmenopausal women, who are already at increased risk of this (Eastell et al., 2008). Twenty-five percent of people over 50 years old who sustain a hip fracture will die within the 12 months following the injury (Van Poznak et al., 2010). With how devastating a bone fracture can be and how beneficial and lifesaving aromatase inhibitors are, attention must be given to prevent complications from this drug class.

Dual-energy x-ray absorptiometry, or DEXA, scans are utilized to monitor bone mineral density. This is how health care providers can diagnose and monitor osteopenia and osteoporosis. This is also a method many research studies used to monitor the effectiveness of interventions while subjects were on aromatase inhibitors. Understanding the results of DEXA scans is necessary to understand the outcomes of many of the studies in the following literature review. Two scores are typically discussed when referring to DEXA scan results. They are a T-score and a Z-score. A T-score compares the patient's bone mineral density to a younger, healthy adult of the same sex. If the T-score is -1 or higher, bone density is considered normal. If the T-score is from -1 to -2.5, osteopenia can be diagnosed. T-scores of -2.5 and below typically indicate osteoporosis. The Z-score is a reading of the standard deviations away from a normal DEXA scan when considering age, weight, ethnicity, and sex. When the Z-score is -2 or less, the patient has abnormal bone loss that is not due to normal aging. An underlying cause would need to be sought out (Mayo Clinic, 2017). Women who are on an aromatase inhibitor should receive a baseline DEXA scan and every two years after to monitor for bone loss (Runowicz et al., 2016).

The 67 year old female that is presented in this case study was an example of how important monitoring a patient's health, as a whole, really is. With this patient, her bone health should have been considered when she was taking an aromatase inhibitor for breast cancer. This patient had many risk factors for osteoporosis, even before taking a medication that can speed up the bone weakening process. The patient was female, Caucasian, advanced age, a heavy tobacco smoker, does not exercise, postmenopausal, and has a low body weight. These are all risk factors for osteoporosis (National Institutes of Health, 2015). After presenting the following case report, this paper will explore different options to protect women's bone health while they undergo aromatase inhibitor treatment and prevent disabling complications of this drug class.

Case Report

Chief Complaint: 8 week hospital follow up post right hip replacement

HPI: This 67 year old female presents today to follow up on a recent hospitalization. Patient fell in her bath tub and had a total right hip fracture. She had a right hip replacement eight weeks ago. Patient had a post-operative follow-up appointment with her surgeon two weeks post op. She denies any current complaints. Patient states that she has mild residual pain in her right hip and will occasionally take two regular strength acetaminophen with acceptable pain relief. Patient is currently working with physical therapy. She denies fever, weakness in her legs, or any drainage or pain in her right hip incision.

Past Medical History: Hypertension, Right breast cancer

Past Surgical History: Right hip surgery 8 weeks ago

Medications:

Lisinopril 10 mg PO daily

Arimidex 1mg PO daily

Social History: Patient is widowed. She has three children that are grown. Patient is a tobacco smoker. She smokes 1.5 packs per day for 50 years, which equals 75 pack years. Patient admits to social/occasional alcohol use. She denies regular exercise. Patient is retired.

Allergies: None

ROS:

Constitutional: Denies fever, malaise, or fatigue

HEENT: Denies headaches, dizziness, or dizziness with standing

CV: Denies chest pain or palpitations. Denies edema in all extremities.

Lungs: Denies shortness of breath

GI: Denies abdominal pain, constipation, change in bowel habits, or diarrhea

Skin: Denies drainage, swelling, pain, pressure at right hip surgical site

MSK: See HPI

Neuro: Denies numbness and tingling in all extremities.

Physical Exam:

General: Patient resting comfortably in chair in exam room. She appears to be free from any distress

CV: Heart with regular rate and rhythm. Audible S1 and S2. No rubs, clicks, or murmurs auscultated. No edema in any extremity.

Lungs: Clear in all posterior and anterior lung fields.

GI: Bowel sounds present in all four quadrants. Abdomen soft, nontender to palpation.

Skin: Right hip incision approximated and healed. No pain to palpation. No redness, swelling, or drainage at incision line

MSK: Normal range of motion in bilateral hips with hip flexion, knee bent. Strength equal in bilateral legs and feet to opposition. Able to get up and down on exam table without difficulty.

Neuro: Equal sensation in bilateral thighs and feet.

Diagnostics:

DEXA Bone Density Scan: Date of scan 02/15/17

Results:

Lumbar Spine: The total BMD for L1 to L4 is 0.594 g/cm. The BMD is 67% of the young adult reference population and 69% of the age matched population. The T-score is -4.1

WHO Classification: Osteoporosis

Femoral Neck: The total BMD is 0.620 g/cm. The BMD is 73% of the young adult reference population and 90% of the age matched population. The T-score is -2.1.

WHO Classification: Osteopenia

Comparison: Today's study is compared with a previous examination dated 5/16/11 and a baseline examination of 5/18/10.

Lumbar Spine: There has been an interval decrease in lumbar spine BMD of 1.7% when compared to the baseline examination with an interval increase of 2.9% when compared to the previous examination.

Hip: There has been an interval increase in hip BMD of 0.2% when compared to the baseline examination with an interval decrease of 1.0% when compared to the previous examination.

Conclusion:

1. Bone density is consistent with osteoporosis
2. Fracture risk is high.

Recommendations:

1. Adequate vitamin D and calcium
2. Follow up DEXA scan in 2 years to evaluate for change or response to treatment

Assessment:

Hospital follow up post hip replacement

Osteoporosis of lumbar spine

Osteopenia of hip

Plan:

1. Everything looks good as far as your hip replacement healing. Please continue to work with PT and OT.
2. Please contact OT about obtaining shower/bathtub modification equipment to improve safety. If you are unable to get equipment from them, call or message me to obtain a prescription for equipment.
3. Please start 1000 mg of calcium with 800 IU of vitamin D daily to help with bone loss
4. Please start Fosamax 70mg once weekly to help slow the rate of bone loss
5. When you take Fosamax, please take it first thing in the morning with a full 8oz glass of water and do not eat for 30 minutes after taking it. Also, remain upright/do not lie down for at least 30 minutes after taking the medication.
6. Please follow up with me in 2-3 months to see how things are going. Please call me or come in if you have increased pain, swelling, or drainage at your right hip incision, fever, or if you have any other concerns.

Literature Search Process

In order to explore the topic of aromatase inhibitors and bone loss, a literature review was completed using the PubMed and CINAHL databases via the Harley E. French Library of the Health Sciences at the University of North Dakota. While using PubMed, a search was completed using the medical subject headings (MeSH) “Aromatase Inhibitors” AND “Osteoporosis”. This resulted in 173 results. The “English language” filter was used, dropping the results to 150. The “Published within the last eight years” filter was also applied, leading to 90 results. Five articles were deemed relevant. After looking at the reference section of one of the articles that was not actually used in the literature review, three additional articles were deemed relevant.

CINAHL database was also utilized. The search terms of “Aromatase Inhibitor” AND “Osteoporosis” AND “Prevention” were utilized, revealing 64 results. A filter to limit articles to the past nine years revealed 52 articles. Two of these articles were deemed relevant and utilized for this literature review. Many of the articles that were found in CINAHL were already discovered in the PubMed database.

Literature Review

Oncology patients are a challenge for the primary care practitioner. Thorough communication is needed between all members of the patient's care team. Decisions need to be made about who is ordering things that the patient needs, who is ordering labs, who is monitoring those labs, and who is acting upon labs that are abnormal. As was seen with our case study, this patient was on a form of cancer treatment that has consistently proven to be detrimental to bone mineral density. With this, she was not on any medication therapy to help protect her from weakened bones. A hip fracture resulted and could have possibly been prevented. The following literature review will explore options that research has proven to help protect the bone health of patients on aromatase inhibitors.

Risedronate

Bisphosphonates are a class of medications that have been used to slow the rate of age-related bone loss and help treat osteopenia and osteoporosis for over twenty years. They are relatively safe and have few serious side effects (Kennel & Drake, 2009). One medication in this class is risedronate sodium. This medication was used in many studies to see if it could help with bone loss related to aromatase inhibitor use.

Our first study looked at how risedronate sodium could help HRP breast cancer patients, who were taking aromatase inhibitors, with their bone health. Twenty-seven women took part in this study. Seventeen participants took anastrozole, an aromatase inhibitor, 1mg daily only. The other ten participants took the same aromatase inhibitor, but also took risedronate sodium 2.5 mg daily. All of the participants had had a surgical tumor resection prior to aromatase inhibitor therapy. Their ages ranged from 54-72 years of age. DEXA scans were performed at the start and end of the trial, which was completed over a six month period (Yonehara et al., 2007).

The group that took only the aromatase inhibitor had a -2.5% and -3.0% change in their bone mineral density readings (T- and Z-score) after six months. The group that took the aromatase inhibitor and bisphosphonate had an increase in their bone mineral density T- and Z-score of 4.5% and 3.3%. That is a large difference. The risedronate strengthened the bone mineral density in common fracture areas, even while taking a medication that is known to cause the opposite. The control group in the study illustrates how an aromatase inhibitor does, in fact, lower bone mineral density. This study shows how well bisphosphonate use can allow women to safely utilize aromatase inhibitors to help cure their breast cancer (Yonehara et al., 2007).

The second study that looked at risedronate use explored how different baseline bone mineral scores were affected by an aromatase inhibitor. Age of the patient was also taken into account. Markopoulos et al. (2012) completed a post hoc analysis of a large trial involving the, “Arimidex Bone Mass Index Oral Bisphosphonates (ARBI) prospective trial, studying the effect of risedronate on bone mineral density of postmenopausal, early breast cancer patients receiving arimidex” (para. 1). The participants were divided into two groups. One group had normal bone mineral density or mild osteopenia, with a T-score > -2.0 . This group was on the aromatase inhibitor, Arimidex, only. The second group had participants who had more advanced osteopenia to osteoporosis with a T-score < -2.0 at baseline. These two groups were then divided into cohorts based on age when aromatase inhibitor treatment was started. The cutoff was 65 year old. The bone mineral density of the hip and lumbar spine was monitored for 12 months. The study had a total of 213 participants. Participants 65 years of age or younger made up 54.5% of the participant pool, with the remaining 45.5% of participants being over age 65 (Markopoulos et al., 2012).

For the first group, who had normal to mildly decreased bone mineral density at baseline and were treated with the aromatase inhibitor only, both age groups had bone mineral density loss. The cohort of 65 years and younger had a decrease of -5.8% at the lumbar spine, as compared to the cohort over 65 years, who had a decrease of -0.5%. The decrease of hip bone mineral density was also noted in this group. The younger cohort had a decrease of -1.4% at the hip. The older cohort had a decrease of -5.3% at the hip (Markopoulos et al., 2012).

The second group that had a baseline of severe low bone mineral density at the start of the trial received the aromatase inhibitor plus risedronate. The younger cohort had a +4.2% increase in bone mineral density at the lumbar spine. The older cohort had a +8.1% increase. Both age cohorts had decreases in bone mineral density at the hip, but they were minimal decreases. The younger cohort had a -0.2% decrease in hip bone mineral density, and the older cohort had a decrease of -0.4% decrease in hip bone mineral density. This is one of many studies that have shown that women who have baseline low bone mineral densities can be given an aromatase inhibitor and risedronate, a bisphosphonate, and end up with better bone density than they started with. This is important because the treatment with hormone reducing breast cancer medications usually is needed for years. These patients need a medication therapy to help protect their bone mineral density and avoid complications. If the patient in the case study had been given this type of treatment, a fracture may have been prevented (Markopoulos et al., 2012).

Age seemed to impact the results of the previous study. Another study was completed in an older population with different baseline bone mineral densities to see if age affected results. Sergi et al. (2012) looked at bone health and aromatase inhibitors in an older population. The study looked at 51 women that were 70 years or older who had HRP early stage breast cancer. Pre-study testing included a DEXA scan to identify baseline bone mineral density and T-scores

for the hip and low spine. The 51 women were divided into two groups. One group was made up of women with T-scores that did not show osteoporosis and were free of vertebral fracture. This group received 1mg/day of anastrozole, an aromatase inhibitor, orally plus 1000 mg of calcium and 800 IU of vitamin D supplements per day. The other group had T-scores that put them into the category of having osteoporosis or they had a history of vertebral fractures. This group received 1mg/day of anastrozole orally, 35mg/week of risedronate, 1000mg of calcium, and 800 IU of vitamin D supplements daily (Sergi et al., 2012).

The participants were assessed at 12 and 24 months into the study. In the first group, no participant was considered osteoporotic after 12 months of the aromatase inhibitor only treatment, but one fourth of the group was osteoporotic after 24 months. Bone mineral density and T-scores were worse in this group at multiple sites including the femoral neck, trochanter, and lumbar spine. The second group also showed signs of decreased bone mineral density in their lumbar spine, similar to the numbers seen in the first group. The femoral neck and trochanter, however, did not show any loss of bone mineral density. The number of patients in the second group who had been clinically classified as having osteoporosis at the start of the study had a decrease of positive osteoporosis diagnosis by 14% by the end of 24 months. This study showed that aromatase inhibitors do have a detrimental effect on bone health in those that take it, but also, that antiresorptive medications can help limit this. Also, the age of the patient was shown to not affect a positive response to bisphosphonates while taking aromatase inhibitors (Sergi et al., 2012).

A well-known study, the SABRE study, also looked at safe aromatase inhibitor use in those who may have low bone mineral density at baseline. According to Van Poznak et al. (2010), "In this study (study of anastrozole with the bisphosphonate risedronate [SABRE]), we

investigated the effects of adjuvant anastrozole, with or without risedronate, on BMD in postmenopausal women with hormone-sensitive EBC and pre-existing lower, moderate, or higher risk of fragility fracture” (para. 9). The random, double-blind study took place over two years and had 234 participants. These participants were divided into three groups based on their bone fracture risk. A DEXA scan was completed at baseline and every six months for two years to help identify fracture risk and to monitor bone mineral density throughout the study. The high risk group had either a DEXA T-score of less than -2.0 in the lower spine or hip or a history of fracture. This group consisted of 38 participants and was given anastrozole 1mg/day, along with risedronate sodium at a dose of 35mg/week. The low risk group had a T-score of -1.0 or higher and did not have a history of fracture. This group consisted of 42 participants and was given anastrozole 1mg/day only. The moderate risk, or middle risk, group was made up of participants with a T-score between -1.0 and -2.0 with no history of fracture. The participants who fell into this range but also had an increased risk of fracture due to things like low body weight or current tobacco use were placed into the high risk category. The moderate risk group consisted of 154 participants and was divided by using a double-blind, random assignment to either receive anastrozole 1mg/day with risedronate sodium 35 mg/week or anastrozole 1mg/day plus placebo. All participants in all groups were encouraged to take 500mg of calcium supplementation, along with 200 IU of vitamin D twice a day (Van Poznak et al., 2010).

In the high risk group that received the aromatase inhibitor and the bisphosphonate, the lumbar spine bone mineral density increased by 3% and the hip bone mineral density increased by 2.0% by the end of the study. In the moderate risk group, the arm that received the bisphosphonate had an increase in lumbar spine bone mineral density of 2.2% and hip bone mineral density increased by 1.8%. The arm that received the placebo had a decrease in lumbar

spine bone mineral density of -1.8% and a decrease of -1.1% in the hip bone mineral density. In the low risk group that only received the aromatase inhibitor, a decrease in lumbar spine bone mineral density of -2.1% was found, along with a -0.4% decrease in hip bone mineral density. This is another study that shows how important bisphosphonates are to patients on aromatase inhibitors who start treatment at all stages of baseline bone strength. Those participants that did not receive a bisphosphonate were worse off at the end of the study. Those that did take a bisphosphonate had much better bone densities, even when they started with a baseline high fracture risk (Van Poznak et al., 2010).

When looking at what treatments can prevent the adverse effect aromatase inhibitors have on bone density in women who have a low baseline bone mineral density, Greenspan et al. (2015) completed a randomized trial over a two year period that was double-blind and placebo-controlled in nature. The trial looked at 109 postmenopausal women that were on aromatase inhibitor therapy for HRP breast cancer that also had a known low bone mass at the start of therapy. All participants were placed on calcium and vitamin D supplements. One group was also placed on risedronate 35mg orally once a week. The other group received a placebo (Greenspan et al., 2015).

The results of this study were very positive. The group that received the bisphosphonate, risedronate, had bone density that improved over the course of the trial. They also showed a lowered rate of bone turnover than the group who received placebo. The placebo group had a decreased bone mineral density, as compared to the beginning of the trial, and an increased rate of bone turnover. The bisphosphonate group had an increase in spinal bone mineral density of 2.3% over 24 months. The placebo group had a decrease in spinal bone density of -1.7%. This

study shows that a woman with known low bone mineral density could more safely take an aromatase inhibitor while taking a bisphosphonate (Greenspan et al., 2015).

There are multiple studies looking at risedronate and aromatase inhibitor use. They all showed that women had better bone mineral density outcomes when these two classes of medications are used together. The patient in the case study had many risk factors, at baseline, for fracture. Her aromatase inhibitor use only increased the risk. Her lack of bisphosphonate use is something that cannot be missed.

Zoledronic Acid

Another bisphosphonate has also been studied multiple times with aromatase inhibitors. One of these studies looked at the effectiveness of the bisphosphonate, zoledronic acid, when taken by women who had HRP breast cancer and were taking letrozole, an aromatase inhibitor. This observational study had 60 postmenopausal women participants. It was also a single-arm and open-label study type. All participants in this study were known to already have osteopenia or osteoporosis at the start of their aromatase inhibitor therapy. All of the women in this study received the same medication regimen. This included the aromatase inhibitor letrozole, along with calcium and vitamin D supplements. All participants also received an infusion every six months of the bisphosphonate, zoledronic acid. This went on until their breast cancer advanced or for a maximum trial time of five years. Patients were checked every six months for bone fractures. A DEXA scan was completed at the initiation of the study and then every year after for the duration of the study (Majithia et al., 2016).

The results of this study were promising. For the participants that completed the five year study, an average of 11.6% increase in bone density was observed. This means that some patients with osteopenia or osteoporosis had so much improvement in their bone density that they no

longer were classified as such by the end of the study. The effectiveness of aromatase inhibitors has been proven time and time again for HRP breast cancer. Those with preexisting bone disease were historically not given a medication from this effective drug class due to worries of worsening bone status, increased risk of fracture, decreased quality of life, and increased mortality. This study showed that even patients with known bone disease can be safely treated with an aromatase inhibitor, along with a bisphosphonate, such as zoledronic acid, and calcium and vitamin D supplementation (Majithia et al., 2016).

Taking a study that looked at the efficacy of zoledronic acid in the prevention of bone loss with aromatase inhibitor use worldwide was important. Bundred et al. (2008) completed a randomized study with 1065 postmenopausal women, who were getting an aromatase inhibitor, letrozole, as part of their breast cancer treatment. This study was conducted in 28 countries in over 100 cancer treatment centers over a five year period. Oral calcium and vitamin D supplements were suggested to each participant. The variable was if and when each group received a bisphosphonate. Participants were given either immediate 4mg zoledronic acid every six months IV or were given the same dose of zoledronic acid in a delayed fashion after their bone density dropped below a certain level or they had a fracture. This went on for five years (Bundred et al., 2008).

The results of this study showed bone density increased in the group that immediately received the zoledronic acid infusions every six months. This group also had fewer fractures throughout the study. The group that received delayed zoledronic acid, when their bone mineral density dropped or they had a fracture, had an overall decrease in bone density. This study not only showed the benefits of a bisphosphonate during aromatase inhibitor therapy, but also that

starting one at the initiation of aromatase inhibitor therapy can improve bone health by the end of treatment and reduce the risk of fracture (Bundred et al., 2008).

Alternative Therapy

Alternative therapies and treatments to prevent bone loss during aromatase inhibitor therapy have been looked in to. One example of this is a randomized, double-blind, and placebo-controlled study that was completed with 98 Korean postmenopausal females with HRP breast cancer. The participants were taking an aromatase inhibitor, along with supplemental calcium and vitamin D. The study took place over 24 weeks. The participants were randomly assigned to one of two groups. One group received a low dose, 5mg, of the bisphosphonate, alendronate, and 0.5ug calcitriol daily. The other group received placebo. All participants received a DEXA scan at the beginning and end of the six month trial (Rhee et al., 2013).

The placebo group was found to have a decreased lumbar spine bone mineral density by the end of the 24 week study. The experimental group had an increase of three percent in their lumbar spine bone mineral density, as compared to the placebo group. The experimental group did not gain bone mineral density, but they maintained what they started with. Both groups had similar hip bone mineral density readings and had no significant change in that area. With some of the non-desirable long term side effects of bisphosphonate at normal doses, such as atypical fractures and jaw problems, finding effective alternative dosing is important option for patient safety (Rhee et al., 2013).

Another alternative therapy was investigated in a 2014 study. Ninety-one Chinese HRP breast cancer patients were enrolled in a study to help alleviate bone pain and osteoporosis in those taking an aromatase inhibitor. The study participants were divided into two groups. One group was given salmon calcitonin 200 IU/day, along with 600 mg/day of Caltrate D. The

second group only was given 600 mg/day of Caltrate D. The study was conducted over a three month period. A DEXA scan was completed three months before the study and then again three months after (Liu, Yang, Xie, Zhou, & Liu, 2014).

Bone mineral density of the spine in the group who only received the Caltrate D was decreased at the end of the study. Bone mineral density of the spine in the group that also received the salmon calcitonin did not change from the beginning to the end of the study. The bone mineral density of the femur did not change in either group. The bone pain that was reported by the experimental group was less than the control group. This shows that adjuvant therapies can help maintain bone mineral density and lower pain in patients that are taking an aromatase inhibitor (Liu et al., 2014).

Compliance to prescribe drug regimens can be just as important as the patient compliance with following treatment suggestions. Research has been conducted in populations that are on the types of medications discussed above. In a prospective study by Boskovic et al., (2017), 438 Croatian patients participated in a non-interventional study that looked at the compliance of patients on aromatase inhibitors to take prescribed calcium with vitamin D supplements or bisphosphonates. The patients included in this study were either newly diagnosed with breast cancer up to those who had already been on aromatase inhibitor therapy for 3.5 years or less. All participants were postmenopausal and had HRP breast cancer. The study also looked at the compliance of oncologists to prescribe these medications, knowing that patients on aromatase inhibitors have a higher incidence and faster rate of bone loss than those people not on them (Boskovic et al., 2017).

Seventy-five percent of the participants took calcium and vitamin D at some point during the study. Eleven percent of this group reported that they were not compliant with this therapy,

with a majority of these patients citing forgetting to take the medication as the reason for non-compliance. Twelve percent of patients were given bisphosphonates. Five percent of this group reported non-compliance. Thirteen percent of patients were not treated with any bone loss prevention medications, indicating that either their oncologists did not advise them to or they did not prescribe any. This would be the group our case study falls in to. She was not treated with calcium with vitamin D or a bisphosphonate while on her aromatase inhibitor and she had a resulting hip fracture (Boskovic et al., 2017).

Breast cancer is a prevalent disease that affects many women. Many effective treatments are available to help women battle this disease. Unfortunately, these treatments come with side effects. The primary health care provider has a responsibility to ensure that they are active members of the health care team, as a patient endeavors on this scary journey. This includes helping to treat and prevent side effects from treatments that are prescribed by other disciplines. Aromatase inhibitors are a great adjunctive class of drugs to help treat hormone receptor positive breast cancer. If a patient is on an aromatase inhibitor, their bone health has to be monitored. The patient must be on a medication to help protect their bone mineral density and help prevent fractures. One medication class that has been proven to help with this is bisphosphonates.

This literature review looked at two different types of bisphosphonates, at different therapeutic regimens. Every study showed that bisphosphonates benefitted the participants, while they were on aromatase inhibitors, and helped to prevent fractures at multiple sites. With nearly 50% of women over 65 having low bone mass at baseline, it is imperative that they be protected if they ever have to be on this type of breast cancer treatment (Looker & Frenk, 2015). The intervention to protect our patients is easy and well-tolerated. If an oncologist is handling this

part of the patient's treatment, good communication is a must. We owe, at least this, to our patients.

Learning Points

- Aromatase Inhibitors are an effective treatment for hormone receptor positive breast cancer.
- This drug class increases the amount and rate of bone loss in postmenopausal women with hormone receptor positive breast cancer, who are already at increased risk of bone loss.
- Calcium and Vitamin D supplementation is not enough to prevent this bone loss.
- All patients who are starting on an aromatase inhibitor need to be started on a bisphosphonate at the initiation of treatment.
- Bone mineral density should be closely monitored in those taking aromatase inhibitors.

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