N311 Care Plan 1

Natalie Zizumbo

Lakeview College of Nursing

N311: Foundations of Professional Practice

Professor Michele Hartke

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Demographics (5 points)

Date of Admission 09/18/23	**Client Initials** NH	**Age** 87	**Gender** F
Race/Ethnicity White/Caucasian	**Occupation** Retired Bookkeeper at Smith's Architects	**Marital Status** Widowed	**Allergies** No known allergies (NKA)
Code Status Full Code	**Height** 4'7	**Weight** 166 lbs	

Medical History (5 Points)

Past Medical History: Obstructive sleep apnea, restless leg syndrome, Type II diabetes mellitus with diabetic neuropathy and long-term use of insulin, essential hypertension, spinal lumbar stenosis, peripheral artery disease, hypokalemia, vitamin D deficiency, vitamin B12 deficiency, iron deficiency, and closed fracture of right patella

Past Surgical History: TAVR (2017), colonoscopy (2013), hysterectomy, cataract surgery: left eye (2013) and right eye (2018)

Family History: Father had stomach cancer

Social History (tobacco/alcohol/drugs including frequency, quantity, and duration of use): No history of tobacco, alcohol, or illicit drug use

Admission Assessment

Chief Complaint (2 points): Nonhealing wound/ulceration of the left great toe

History of Present Illness – OLD CARTS (10 points):

Patient is an 87-year-old woman who presents with a nonhealing wound on her left great toe. She states that she visits her podiatrist to have her toenails trimmed. At one of her visits, she states, "the assistant was cutting my nails, and she cut me a little on my toe. She didn't tell me that she cut me and then it started to hurt." The wound has been present for three months and states that

the wound does not hurt when lying down but “burns a little” when she ambulates. Patient has tried treating with antibiotics but wound has not gotten better. Patient ranked her pain a 3 when she ambulates on a 0-10 pain scale.

Primary Diagnosis

Primary Diagnosis on Admission (3 points): Acute osteomyelitis of left foot

Secondary Diagnosis (if applicable): N/A

Pathophysiology

Pathophysiology of the Disease, APA format (20 points):

Osteomyelitis

Osteomyelitis is an infection of the bone and bone marrow most caused by *Staphylococcus aureus.* Infection occurs when there is a break in the protective skin barrier, and bacteria enter the wound, eventually invading the bone tissue. According to Capriotti (2024), contiguous osteomyelitis is the type of osteomyelitis that results from wounds. Contiguous osteomyelitis occurs from direct bacterial infection of the bone or adjacent tissue. Infection can happen from trauma, surgery, joint prostheses, or pressure injuries. Contiguous osteomyelitis is found in foot lesions in older adults with diabetes due to impaired blood flow and immunosuppression.

Staphylococcus aureus adheres to the surface of the bone or surrounding tissue by binding to the ECM proteins. The bacteria then multiply and form microcolonies known as staphylococcal abscess communities (SACs). These SACs form a fibrin network that protects the bacteria from the body’s immune cells. *Staphylococcus aureus* can also form biofilms, communities of microorganisms surrounded by an extracellular matrix that protects the bacteria

from immune cells. Bacteria in biofilms are “less susceptible to antibiotics, because of several factors, including reduced oxygen levels and metabolism” (Hofstee et al., 2020). *Staphylococcus aureus* has toxins like superantigens and pore-forming toxins which target host cells. For example, the superantigen toxic shock syndrome toxin 1 “has been associated with bone infection” (Hofstee et al., 2020).

Staphylococcus aureus in the body triggers an “innate immune response primarily driven by PMNs, macrophages, and adaptive responses mediated by T cells, B cells, and pathogen-specific antibodies” (Hofstee et al., 2020). Osteocytes and osteoblasts attract immune cells to the site of the infection. PMNs (polymorphonuclear neutrophils) are the immune cells that can kill planktonic *Staphylococcus aureus* with phagocytosis. They also work together with macrophages to trap and kill the bacteria. However, the effectiveness of the PMNs decreases when the infection becomes chronic and the bacteria form biofilms. Once the infection becomes chronic, the bone can deteriorate and become necrotic. This necrotic bone can cause other bacteria to form, such as *Clostridium perfringens*, which causes gas gangrene (Capriotti, 2024).

Patients with osteomyelitis may present with chills, fever, pain, tenderness, swelling, erythema, wound breakdown, drainage, and increased localized temperature. They may also be unable to move the affected extremity as the infection progresses. Patients with diabetes or peripheral vascular disease often “lack sensation in the affected extremity and therefore experience less pain” (Capriotti, 2024). Because of the lack of sensation and pain, these individuals will often not seek care until the infection has become severe.

According to Capriotti (2024), the patient’s history can help identify the most likely pathogen of the infection and the mechanism of action. History should identify whether the patient has had any recent skin, musculoskeletal system, oropharynx, bladder, and kidney

infections and if the patient has any underlying immunosuppressive medical conditions such as diabetes or sickle cell anemia. The patient should also be asked if they have had any recent traumas on their skin.

Laboratory tests are not used to diagnose osteomyelitis specifically but help identify infection and help determine treatment. Diagnostic imaging, such as X-rays, only shows results when the infection has become severe but can help rule out any other potential causes. MRIs are the "highest combined sensitivity and specificity" (Momodu, 2023) in diagnosing osteomyelitis in the early stages of infection. Bone biopsies are essential in "identifying the causative organism" (Capriotti, 2024) and help choose the correct antibiotic therapy.

Treatment for osteomyelitis begins with antibiotic therapy intravenously for 2 to 6 weeks. Hyperbaric oxygen therapy has also been used to increase the oxygen to the bone and permeability for antibiotics. Debridement of necrotic tissue is necessary if there is an excessive amount, which may cause therapy to fail. In more severe and advanced cases of osteomyelitis, amputation of the infected extremity is necessary (Capriotti, 2024).

Osteomyelitis is an infectious disease that can infect all bones. The most common bacterium for the infection is one of the normal florae of the skin, which shows how important it is to protect the skin barrier and treat it immediately if it is compromised. Osteomyelitis is a severe condition and, if left untreated, can cause permanent damage to the patient.

Pathophysiology References (2) (APA):

References

Capriotti, T. (2024). *Davis Advantage for pathophysiology: Introductory concepts and clinical perspectives* (2nd edition). F.A. Davis Company.

Hofstee, M. I., Muthukrishnan, G., Atkins, G. J., Riool, M., Thompson, K., Morgenstern, M., Stoddart, M. J., Richards, R. G., Zaat, S. a. J., & Moriarty, T. F. (2020). Current concepts of osteomyelitis. *American Journal of Pathology*, 190(6), 1151–1163. https://doi.org/10.1016/j.ajpath.2020.02.007

Momodu, I. I. (2023, May 31). Osteomyelitis. StatPearls – NCBI Bookshelf. https://www.ncbi.nlm.nih.gov/books/NBK532250/

Vital Signs, 1 set (5 points) – HIGHLIGHT ALL ABNORMAL VITAL SIGNS

Time	Pulse	B/P	Resp Rate	Temp	Oxygen
0700	71	125/48	18	97.3	93

Pain Assessment, 1 set (5 points)

Time	Scale	Location	Severity	Characteristics	Interventions
0751	0-10 pain scale	Left great toe	3	Burning sensation when ambulating	Patient has been resting in bed, only ambulating when necessary with assistance