ISSN: 0975-8585

Research Journal of Pharmaceutical, Biological and Chemical Sciences

A Study to Assess the Effectiveness of Nursing Care on Patients with Osteomyelitis.

R Ramani*.

Department of Medical Surgical Nursing, Sree Balaji College of Nursing, Bharath University, Tamilnadu, India.

ABSTRACT

The study was conducted to evaluate the effectiveness of nursing care on patients with osteomyelitis. In elderly persons, osteomyelitis is second only to soft-tissue infection as the most important musculoskeletal infection. Bone and joint infections are painful for patients and frustrating for both them and their doctors. The high success rates of antimicrobial therapy in most infectious diseases have not yet been achieved in bone and joint infections owing to the physiological and anatomical characteristics of bone The key to successful management is early diagnosis, including bone sampling for microbiological and pathological examination to allow targeted and long-lasting antimicrobial therapy. The various types of osteomyelitis require differing medical and surgical therapeutic strategies. These types include, in order of decreasing frequency: osteomyelitis secondary to a contiguous focus of infection (after trauma, surgery, or insertion of a joint prosthesis); that secondary to vascular insufficiency (in diabetic foot infections); or that of haematogenous origin. Acute osteomyelitis is usually acquired hematogenously, and the most common pathogen is Staphylococcus aureus. Acute osteomyelitis can usually be cured with antimicrobial therapy alone. In contrast, chronic osteomyelitis may be caused by S. aureus but is often due to gram-negative organisms. The causative organism of chronic osteomyelitis is identified by culture of aseptically obtained bone biopsy specimens. Because of the presence of infected bone fragments without a blood supply (sequestra), cure of chronic osteomyelitis with antibiotic therapy alone is rarely, if ever, possible. Adequate surgical debridement is the cornerstone of therapy for chronic osteomyelitis, and cure is not possible without the removal of all infected bone. Generally, a multidisciplinary approach is required for success, involving expertise in orthopaedic surgery, infectious diseases, and plastic surgery, as well as vascular surgery, particularly for complex cases with soft-tissue loss.

Keywords: Osteomyelitis, complication and prevalence.

Corresponding author

ISSN: 0975-8585

INTRODUCTION

Osteomyelitis is inflammation of the bone caused by an infecting organism. Although bone is normally resistant to bacterial colonization, events such as trauma, surgery, the presence of foreign bodies, or the placement of prostheses may disrupt bony integrity and lead to the onset of bone infection. Osteomyelitis can also result from hematogenous spread after bacteremia. When prosthetic joints are associated with infection, microorganisms typically grow in biofilm, which protects bacteria from antimicrobial treatment and the host immune response.

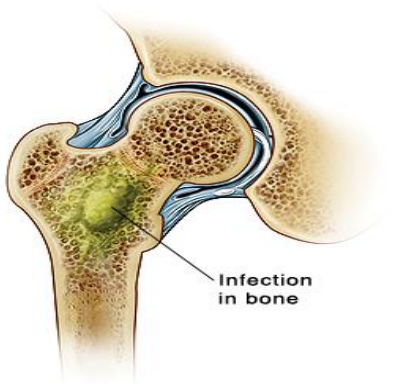

Fig.1.Osteomyelitis

Early and specific treatment is important in osteomyelitis, and identification of the causative microorganisms is essential for antibiotic therapy.[1] The major cause of bone infections is *Staphylococcus aureus*. Infections with an open fracture or associated with joint prostheses and trauma often must be treated with a combination of antimicrobial agents and surgery. When biofilm microorganisms are involved, as in joint prostheses, a combination of rifampin with other antibiotics might be necessary for treatment.

DEFINITION

Osteomyelitis is infection in the bone. Osteomyelitis can occur in infants, children, and adults. Different types of bacteria typically affect the different age groups. In children, osteomyelitis most commonly occurs at the ends of the long bones of the arms and legs, affecting the hips, knees, shoulders, and wrists. In adults, it is more common in the bones of the spine (vertebrae), feet, or in the pelvis.

CLASSIFICATION

The definition of Osteomyelitis is broad, and encompasses a wide variety of conditions. Traditionally, the length of time the infection has been present and whether there is suppuration (pus formation) or sclerosis (increased density of bone) is used to arbitrarily classify Osteomyelitis . Chronic Osteomyelitis is often defined as Osteomyelitis that has been present for more than one month. In reality, there are no distinct subtypes, instead there is a spectrum of pathologic features that reflect balance between the type and severity of the cause of the inflammation, the immune system and local and systemic predisposing factors.

- Suppurative osteomyelitis
  - Acute suppurative osteomyelitis
  - Chronic suppurative osteomyelitis
    - Primary (no preceding phase)
    - Secondary (follows an acute phase)

- Non-suppurative osteomyelitis
  - Diffuse sclerosing
  - Focal sclerosing (condensing osteitis)
  - Proliferative periostitis (periostitis ossificans, Garré's sclerosing osteomyelitis)
  - Osteoradionecrosis

ISSN: 0975-8585

CAUSE

Age group	Most common organisms
Newborns (younger than 4 mo)	S. aureus, Enterobacter species, and group A and B Streptococcus species
Children (aged 4 mo to 4 y)	S. aureus, group A Streptococcus species, Haemophilus influenzae, and Enterobacter species
Children, adolescents (aged 4 y to adult)	S. aureus (80%), group A Streptococcus species, H. influenzae, and Enterobacter species
Adult	S. aureus and occasionally Enterobacter or Streptococcus species
Sickle cell anemia patients	Salmonella species are most common in patients with sickle cell disease.

Osteomyelitis is a secondary complication in 1–3% of patients with pulmonary tuberculosis. In this case, the bacteria, in general, spread to the bone through the circulatory system, first infecting the synovium (due to its higher oxygen concentration) before spreading to the adjacent bone. In tubercular osteomyelitis, the long bones and vertebrae are the ones that tend to be affected.

Staphylococcus aureus is the organism most commonly isolated from all forms of osteomyelitis. Bloodstream-sourced osteomyelitis is seen most frequently in children, and nearly 90% of cases are caused by Staphylococcus aureus. In infants, S. aureus, Group B streptococci (most common) and Escherichia coli are commonly isolated; in children from one to 16 years of age, S. aureus, Streptococcus pyogenes, and Haemophilus influenzae are common. In some subpopulations, including intravenous drug users and splenectomized patients, Gram-negative bacteria, including enteric bacteria, are significant pathogens.

PATHOGENESIS

In general, microorganisms may infect bone through one or more of three basic methods

- Via the bloodstream (haematogeneously) - the most common method
- Contiguously from local areas of infection (as in cellulitis), or
- Penetrating trauma, including iatrogenic causes such as joint replacements or internal fixation of fractures or secondary periapical periodontitis in teeth.

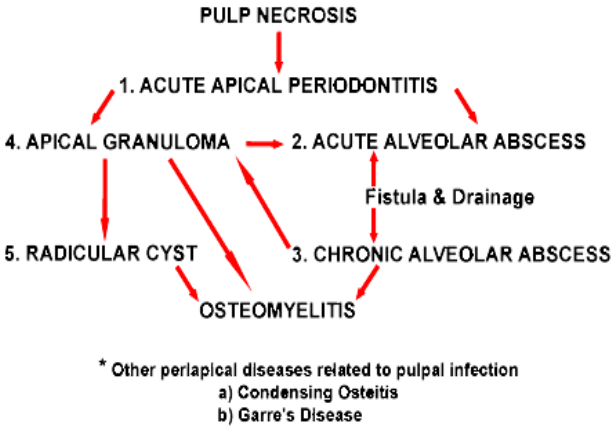

Fig.2. Pathogenesis for Osteomyelitis

The area usually affected when the infection is contracted through the bloodstream is the metaphysis of the bone Once the bone is infected, leukocytes enter the infected area, and, in their attempt to engulf the infectious organisms, release enzymes that lyse the bone. Pus spreads into the bone's blood vessels, impairing their flow, and areas of devitalized infected bone, known as sequestra, form the basis of a chronic infection. Often, the body will try to create new bone around the area of necrosis. The resulting new bone is often called an involucrum. On histologic examination, these areas of necrotic bone are the basis for distinguishing between acute osteomyelitis and chronic osteomyelitis. Osteomyelitis is an infective process that

encompasses all of the bone (osseous) components, including the bone marrow. When it is chronic, it can lead to bone sclerosis and deformity.

DIAGNOSIS

Mycobacterium doricum osteomyelitis and soft tissue infection. Computed tomography scan of the right lower extremity of a 21-year-old patient, showing abscess formation adjacent to nonunion of a right femur fracture.

The diagnosis of osteomyelitis is complex and relies on a combination of clinical suspicion and indirect laboratory markers such as a high white blood cell count and fever, although confirmation of clinical and laboratory suspicion with imaging is usually necessary. Radiographs and CT are the initial method of diagnosis, but are not sensitive and only moderately specific for the diagnosis. They can show the cortical destruction of advanced osteomyelitis, but can miss nascent or indolent diagnoses.

Confirmation is most often by MRI. The presence of edema, diagnosed as increased signal on T2 sequences, is sensitive, but not specific, as edema can occur in reaction to adjacent cellulitis. Confirmation of bony marrow and cortical destruction by viewing the T1 sequences significantly increases specificity. The administration of intravenous gadolinium based contrast enhances specificity further. In certain situations, such as severe Charcot arthropathy, diagnosis with MRI is still difficult. Similarly, it is limited in distinguishing bone infarcts from osteomyelitis in sickle cell anemia.

TREATMENT

Osteomyelitis often requires prolonged antibiotic therapy for weeks or months. A PICC line or central venous catheter can be placed for long-term intravenous medication administration. It may require surgical debridement in severe cases, or even amputation.

Initial first-line antibiotic choice is determined by the patient's history and regional differences in common infective organisms. A treatment lasting 42 days is practiced in a number of facilities. Local and sustained availability of drugs have proven to be more effective in achieving prophylactic and therapeutic outcomes. Open surgery is needed for chronic osteomyelitis, whereby the involucrum is opened and the sequestrum is removed or sometimes saucerization can be done. Hyperbaric oxygen therapy has been shown to be a useful adjunct to the treatment of refractory osteomyelitis.

COMPLICATIONS

Although osteomyelitis is usually treated successfully with antibiotics, chronic and severe cases can lead to other problems.

Recurring osteomyelitis

If you've had a previous episode of osteomyelitis, there's a chance of it returning. This is because underlying conditions that often cause osteomyelitis, such as poor circulation or a weakened immune system, can be difficult to treat.

Gangrene

If the blood supply to the bone is severely reduced, this can cause the tissue to die (gangrene). Amputation may be used as a last resort if gangrene develops.However, the condition can usually be treated before it reaches this stage[1-10].

PREVENTING OSTEOMYELITIS

It's not always possible to avoid getting osteomyelitis. But there are steps you can take to reduce your chances.Cleaning wounds thoroughly with water and dressing them in a clean bandage will reduce your

chances of getting an infection from an injury. Improving your general health will help reduce the risk of developing conditions that can lead to osteomyelitis [1-10].

REFERENCES

[1] Kumar, Vinay; Abbas, Abul K. Fausto, Nelson and Mitchell, Richard N. Robbins Basic Pathology (8th ed.). Saunders Elsevier 2007; 810–811.
[2] Burnett MW, JW Bass, BA Cook. Pediatrics 1998;101(2):296–297.
[3] Haggerty, Maureen The Gale Group. Retrieved 2008.
[4] Carek PJ, LM Dickerson, JL Sack. Am Fam Physician 2001; 63 (12): 2413–20.
[5] Weinstein, Lenny Knowlton, Christin A, Smith, Miriam A 2007; 2 (1): 76–77.
[6] Luqmani, Raashid Robb, James Daniel, Porter Benjamin, Joseph Orthopaedics Trauma and Rheumatology 2013.
[7] King MD, Randall W David Johnson, MD FACEP Osteomyelitis eMedicine. WebMD. Retrieved 2007;11-11.
[8] Howe, B. M Wenger, D E Mandrekar, J Collins, M S. Academic Radiology 2013;20 (1): 108–14.
[9] Delgado, J Bedoya, M A, Green A M, Jaramillo, D Ho-Fung V. Pediatric Radiology 2015;45 (13).
[10] Termaat, M F Raijmakers, PG Scholten, H J Bakker, F C Patka, P Haarman, H J. The Journal of Bone and Joint Surgery (American) 2005; 87 (11): 2464–71.