

Original Research Article

Epidemiologic study of chronic osteomyelitis in Paktya and Kabul, Afghanistan

Oryakhil Walikhan^{1*}, Nejrabi Bismellah²

¹Department of Surgery, Faculty of medicine, Paktya University, Paktya, Afghanistan

²Department of Orthopedics, Faculty of medicine, Kabul University of Medical Science, Kabul, Afghanistan

Received: 02 July 2020

Accepted: 31 July 2020

*Correspondence:

Oryakhil Walikhan,

E-mail: walioryakhil1979@gmail.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Background: Osteomyelitis is an infection of the bone that can occur from direct or indirect invasion by a pathogens, both of these types can potentially progress to subacute and chronic osteomyelitis that lasts longer than 4 weeks. This disease has important characteristics such as long-term clinical course, long periods of silence, the treatment of the recurrence of serious complications of the disease is difficult financially and it takes a lot of money epidemiology of chronic osteomyelitis in the Afghanistan is largely unknown. The aim of this study was epidemiologic study of chronic osteomyelitis in adult clients of Paktya city regional hospital and Wazir Akbar Khan Hospital in Kabul city of Afghanistan.

Methods: This descriptive cross-sectional study was performed in patients' with chronic osteomyelitis who referred in this two hospitals in Paktya city regional hospital and the Wazir Akbar Khan hospital in Kabul During the March 2019 to March 2020, 70 patients were identified with chronic osteomyelitis. The information required for the study, such as general information, underlying diseases of the patients collected from these two medical centers. After encoding, the necessary information was entered into the computer and analyzed.

Results: According to the findings of this study the prevalence of chronic bone infections in male were 64% (n=45) in female were 36% (n=25), current findings showed 44.3% of all patient involved with tibial (n=31) chronic osteomyelitis and the most common underlying disease causing chronic osteomyelitis is the direct entry of infection as a result of trauma.

Conclusions: Our study showed the chronic osteomyelitis is higher in the male population than in the female population and highest incidence of chronic osteomyelitis site was tibia result of trauma because of humid climate, poor personal and hospital environmental health status and relatively poor medical facilities in Afghanistan may contribute to higher morbidity.

Keywords: Afghanistan, Chronic osteomyelitis, Direct trauma, *Staphylococcus aureus*

INTRODUCTION

Long bone osteomyelitis presents a variety of challenges to the physician. The severity of the disease is staged depending upon the infection's features, including its etiology, pathogenesis, extent of bone involvement, duration, and host factors particular to the individual patient (infant, child, adult, or immune-compromised). Developing countries have a higher incidence of the

disease than developed ones, likely caused by differences in economic foundation, lifestyle and healthcare level.^{1,2}

Long bone osteomyelitis may be either hematogenous or caused by a contiguous spread of infection.³ Over time, a shift has occurred from predominately hematogenous osteomyelitis several decades ago, to a predominance of chronic osteomyelitis that results from trauma, implant infection, and diabetes.^{4,5}

Development and progression of the disease can be summarized in bacterial contamination and adhesion followed by infection and subsequent chronicity. Patient predisposing factors intervene at various levels. Persistence of bone infection will result in chronic osteomyelitis (Figure 1). The main factors responsible for the development of chronicity are listed in Figure 2.

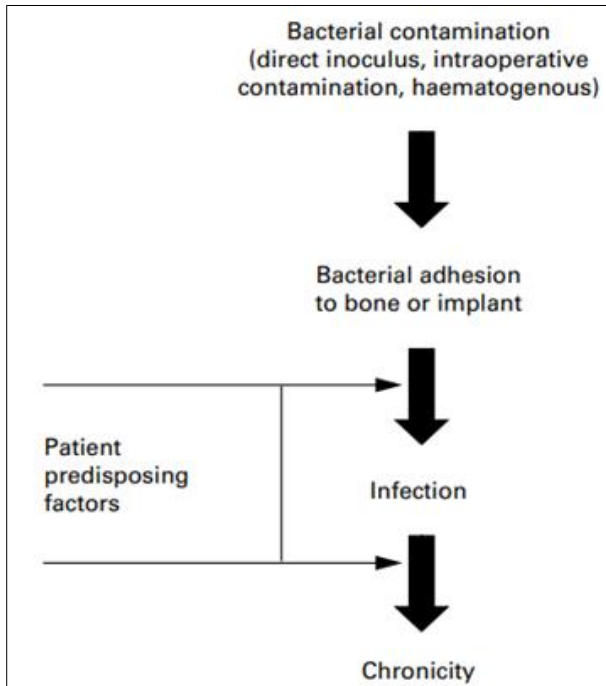


Figure 1: Pathogenesis of chronic bacterial osteomyelitis.

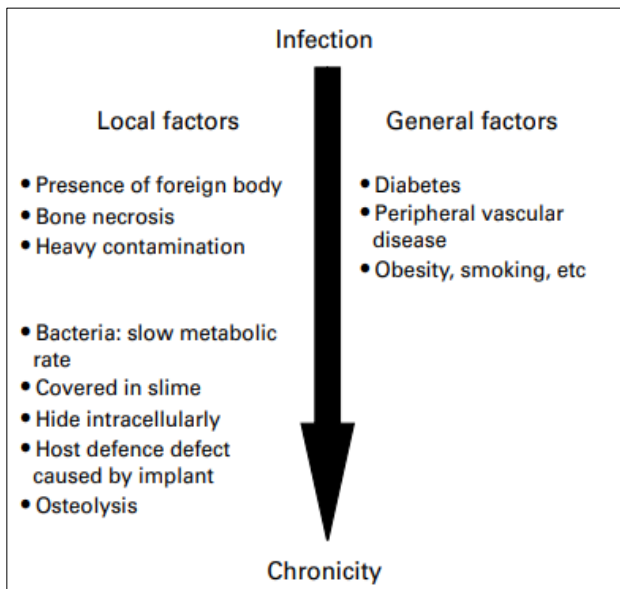


Figure 2: Pathogenetic factors behind the chronicity of a bone infection.

In recent years, the number of patients with open wounds and fractures from road and bomber suicide has increased

in Afghanistan in any case the disease has important features such as long-term clinical course, long periods of silence, recurrences and serious complications, also Afghanistan economy is poor and it is very difficult to treat and frequently lead to infection; thus, treatment exerts great pressures on government and patients, both economically and psychologically. It also poses great challenges for orthopedists.^{6,7}

Therefore, in this study, an epidemiologic study was made on chronic osteomyelitis in Paktya and Kabul, Afghanistan.

METHODS

This descriptive cross-sectional study was performed in adult patients' with chronic osteomyelitis who referred in these two hospitals in Paktya regional hospital and the Wazir Akbar Khan hospital in Kabul during March 2019 to March 2020. Patients with chronic osteomyelitis duration of <6 weeks, patients under 18 age of old and patients with background disease were excluded from this study.

All patients who were referred during this period of time were 70 patient with final diagnosis of chronic osteomyelitis were included in the study. The information required for the study, such as general information underlying diseases, gender of patients from these two medical centers collected and. After encoding, the necessary information was entered into the computer and analyzed. The study protocol was submitted and approved by the Paktya University research center and ethics review board.

RESULTS

70 adult patients with chronic osteomyelitis were identified in this study. Patients with chronic osteomyelitis which include according to sex group were 45 male patients (64%) and 25 female patients (36%) with average age of male patients 48.2 ± 5.4 ($x \pm SD$) years and the mean age of female patients was 52 ± 2.48 ($x \pm SD$) (Table 1).

Table 1: Frequency of the chronic osteomyelitis patient according to sex.

Frequency	%	Sex
64	45	Male
36	25	Female

In this study underlying diseases causing chronic osteomyelitis can be seen in Table 2. According to the data obtained from this research, the most common underlying disease causing chronic osteomyelitis is the direct entry of infection as a result of penetrating trauma with a frequency of 35 people (50%) and direct entry of infection as a result of open fracture surgery with an abundance of 18 people (25.71%) and secondary agent to an infectious center (that is, cases that gives a bacterium such as pneumonia and

chronic sinusitis and gastrointestinal infections) with a frequency of 12 people (17.14%); other cases with an abundance of 5 people (7.14%).

Table 2: Abundance of various underlying diseases causing chronic osteomyelitis.

Underlying disease	Frequency	%
Secondary agent to an infectious centre	12	17.14
Direct entry of infection as a result of surgery	18	25.71
Direct entry of infection as a result of trauma	35	50
Other items	5	7.14

Chronic osteomyelitis site in the patient

According to the results of Table 3, it can be seen that the highest incidence of chronic osteomyelitis in the studied patients is in high frequency; tibia with a frequency of 31 people (44.3%), femur with a frequency of 22 people (31.4%), ankle with a frequency of 6 people (8.57%), arm with an abundance of 4 people (5.71%), the palm of the hand with a frequency of 4 people (4.29%) and toes with a frequency of 2 people (2.86%). In this study, a conflict was observed in the knee and sternal areas of 1 person each (1.43%).

Table 3: Frequency of chronic osteomyelitis in the patient.

Place of conflict	Frequency	%
Knee	1	1.43
Arm	4	5.71
Toes	2	2.86
Tibia	31	44.3
Femur	22	31.4
Palm	3	4.29
Ankle	6	8.57
Sternum	1	1.43

DISCUSSION

Chronic osteomyelitis is a difficult entity to treat. Its diagnosis is based on clinical suspicion (history and clinical signs) and aided by laboratory and imaging studies. The incidence of osteomyelitis has changed significantly in recent decades. The etiology and morbidity of osteomyelitis is linked to many factors, including ethnicity, lifestyle and economic conditions.⁸ For typical osteomyelitis, diagnosis following a patient history and physical examination is not difficult.⁹

However, for some atypical cases, preoperative auxiliary examinations are needed to obtain a preliminary diagnosis, and the value of serum inflammation markers is limited by many factors (cold, pain, surgery and other factors). Afghanistan has a large population and diverse landscapes,

climates and customs (lifestyles), which may contribute to the incidence and severity of disease. The current study focused on patients living in Afghanistan, where humid climate and poor personal and hospital environmental health status and relatively poor medical facilities may contribute to higher morbidity.

The aim of the study was epidemiologic study of chronic osteomyelitis in Paktya and Kabul, Afghanistan. The findings of this study showed prevalence of chronic bone infections is higher in the male population than in the female population and the most common underlying disease causing chronic osteomyelitis was the direct entry of infection as a result of penetrating trauma and then direct entry of infection as a result of open fracture surgery and secondary agent to an infectious center (that is, cases that gives a bacterium such as pneumonia and chronic sinusitis and gastrointestinal infections).

Study of Kremers and colleagues in 2015 showed among patients with chronic osteomyelitis, the male:female ratio was 4:1.¹⁰ This is consistent with other clinical reports consequent on increasing road and work accidents contributed to the greater number of male patients, since males are more likely to engage in heavy physical labor or high risk activities.

The top infection sites of chronic osteomyelitis in this study was tibia differ from Xianzhi study with top infection sites of femur (30.2%) and similar with study of Wang et al reports in southwest China.¹¹

In the present study the most common underlying disease causing chronic osteomyelitis is the direct entry of infection as a result of penetrating trauma similar with Xianzhi study probably because road accidents and specially wounded people in war and bomber suicide attack frequently occur among adult men in Afghanistan.¹²

Result of our study about the common site of chronic infection was similar with Kubwimana study that reported tibia with frequency 35% because tibia is subcutaneous anteriorly and not fully covered by muscles and thus more prone to open fractures.^{13,14}

This study had certain limitations, for example, diabetic foot infection cases were not treated at the departments, and complete follow-up data was not available, which impacted the observation of the overall distribution of osteomyelitis. Information about the influential factors was incomplete.

CONCLUSION

Our study showed the chronic osteomyelitis is higher in the male population than in the female population and most common site of chronic infection was tibia with most common underlying disease causing chronic osteomyelitis was the direct entry of infection as a result of penetrating trauma. The current study focused on patients living in

Afghanistan, where personal and environmental health status and relatively poor medical facilities may contribute to higher morbidity. To provide practical suggestions More detailed studies should be done that include more clinical and paraclinical findings.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

- Geurts J, Hohnen A, Vranken T, Moh P. Treatment strategies for chronic osteomyelitis in low- and middle income countries: systematic review. Trop Med Int Health. 2017;22:1054-62.
- Wirbel RHK. Surgical treatment of chronic osteomyelitis in children admitted from developing countries. Afr J Paediatr Surg. 2014;11:297.
- Calhoun JH, Manring MM, Shirliff M. Osteomyelitis of the long bones. Seminars Plastic Surg. 2009;23(2):59-72.
- Sagray BA, Malhotra S, Steinberg JS. Current therapies for diabetic foot infections and osteomyelitis. Clin Padiatr Med Surg. 2014;31:57-70.
- Zimmerli W. Clinical presentation and treatment of orthopaedic implant-associated infection. J Intern Med. 2014;276:111-9.
- Izadi MMSA, Araqizadeh H, Forutran KS. Clinical and paraclinical features of chronic osteomyelitis in war handicapped patients in Sasan hospital in 1385-1387. J Mil Med. 2008;10(1):63-8.
- Zhou J, Li Y, Wang QK, Pollak AN, Slobogean. Status of road safety and injury burden: china. J Orthop Trauma. 2014;28.
- York B, Cha J, Dao A, Gane S, Policinski I, Rahman M. Diagnosis: chronic osteomyelitis. Eplasty. 2014;14.
- Fritz JM, McDonald JR. Osteomyelitis: approach to diagnosis and treatment. The Physician and sportsmedicine. Nihpa1. 2008;36(1).
- Kremers HM, Nwojo ME, Ransom JE, Wood W. Trends in the epidemiology of osteomyelitis: a population-based study, 1969 to 2009. J Bone Joint Surg Am. 2015;97:837-45.
- Wang, X, Yu S, Sun D, Fu J, Wang S, Huang K, et al. Current data on extremities chronic osteomyelitis in southwest China: epidemiology, microbiology and therapeutic consequences. Sci Rep. 2017;7,16251.
- Xianzhi SH, Ma J, Chen X, Bai W, Yan W, Wang K. Epidemiology, microbiology and therapeutic consequences of chronic osteomyelitis in northern China: a retrospective analysis of 255 Patients. Sci Rep. 2018;8:14895.
- Ali AM, Lakhoo K. Challenges in managing paediatric osteomyelitis in the developing world: Analysis of cases presenting to a tertiary referral centre in Tanzania. Afr J Paediatr Surg. 2014;11:308-11.
- Kubwimana O, Lynn L, Eliseo LPD. (2019). Chronic osteomyelitis in Sub-Saharan Africa-a review. Glob Surg. 2019;5:1-5.

Cite this article as: Walikhan O, Bismellah N. Epidemiologic study of chronic osteomyelitis in Paktya and Kabul, Afghanistan. Int J Res Med Sci 2020;8:3183-6.