

**NEUTROPENIC FEVER IN PATIENTS ADMITTED TO AL-MOUASAT UNIVERSITY HOSPITAL**Nizar Daher¹, Moustafa Othman², Omar Almkmel² and Mhd. Nezar Alsharif^{2*}^{1,2}Faculty of medicine, Syrian Private University. Damascus, Syrian Arab Republic.¹Dean of Faculty of Medicine, Syrian Private University.***Corresponding Author: Dr. Mhd Nezar Alsharif**

Faculty of medicine, Syrian Private University. Damascus, Syrian Arab Republic.

Article Received on 19/10/2018

Article Revised on 08/11/2018

Article Accepted on 29/11/2018

ABSTRACT

Objective: This study aimed to study neutropenic fever in patients admitted to the Infectious disease department at AL-Mouasat University Hospital. **Materials and Methods:** This study is a retrospective cross-sectional study of the patients who reviewed the infections disease department at AL-Mouasat University Hospital with neutropenic fever. This study included 50 patients who reviewed between 13/11/2016 and 24/6/2018. **Results:** The mean age of participants was 27 years old. We had 52% female participants. We had 25 cases with ALL, 11 with AML, 1 with CLL and 5 cases with lymphoma. The mean hospitalization period was 9 days. We found 21 culture results were sterile (9 blood, 12 urine). Blood culture results had 3 cases (20%) of Klebsiella (Most common. Urine culture results were 2 (12.5%) Enterobacter (most common). 49 patients (98% of all sample) were treated with dual antibiotics therapy. **Conclusion:** The mean age of participants was 27 years old. the mean hospitalization period was 9 days. Most culture results were sterile (9 blood, 12 urine). 49 patients (98% of all sample) were treated with dual antibiotics therapy.

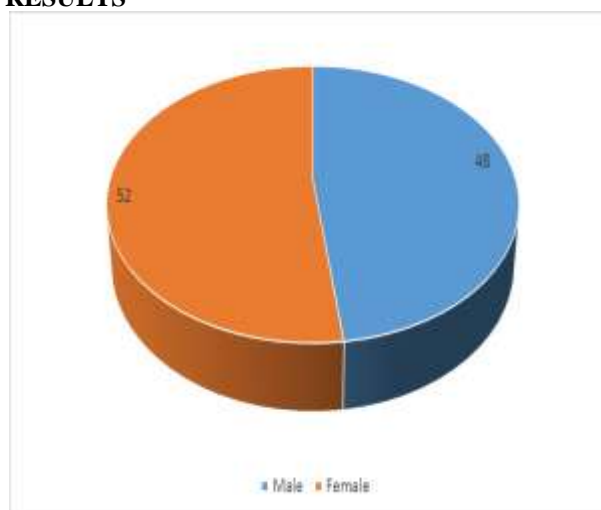
KEYWORDS: Enterobacter, Klebsiella, Neutropenic.**INTRODUCTION**

Neutropenia is considered one of the most serious and common complications of oncological treatment. Chemotherapy affects neutrophil production and therefore, these patients are at a higher risk for infections. The problem in decreased neutrophils count is that it increases the body susceptibility to infection.^[1] The treatment of neutropenia has been based on using antibiotics empirically. This method was proven to reduce mortality.^[1] Similar studies shows that neutropenia is a common complication of the chemotherapy; neutropenia has high morbidity and mortality.^[1, 2] Incidence of hospitalization for neutropenia is 6000 cases in the U.S.

MATERIALS AND METHODS

This study is a retrospective cross-sectional study of the patients who reviewed the infections disease department at AL-Mouasat University Hospital with neutropenic fever. This study included 50 patients who reviewed between 13/11/2016 and 24/6/2018. All the data were collected only by the authors to ensure privacy and all

personal data was blind statistical analysis was done using SPSS 23.0.

RESULTS**Figure 1: Distribution of sample according to gender.**

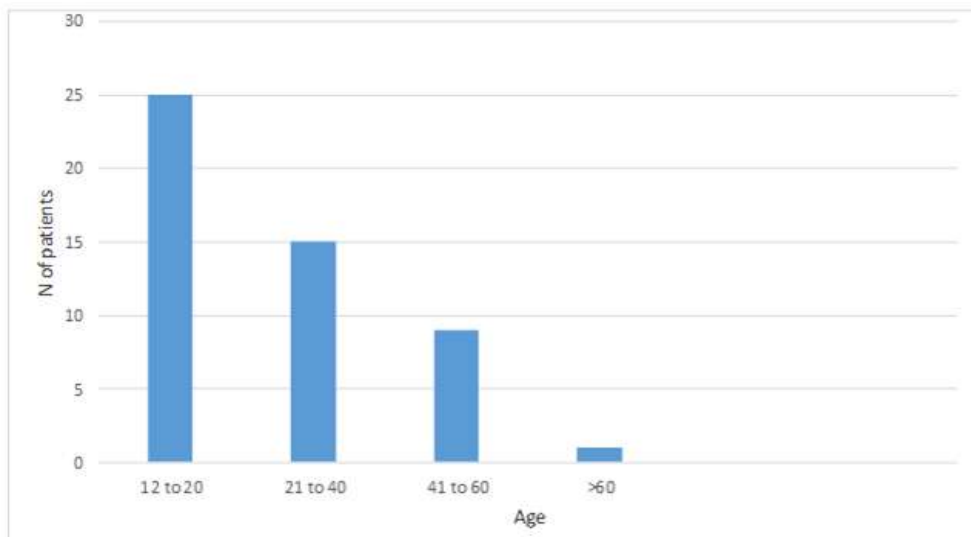


Figure 2: Distribution of sample according to age.

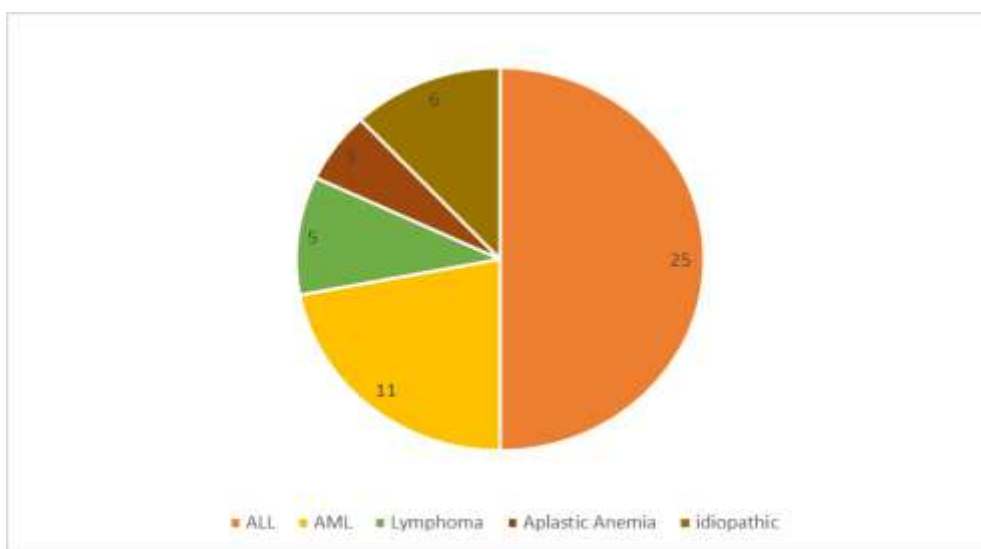


Figure 3: Medical history of patients in our study.

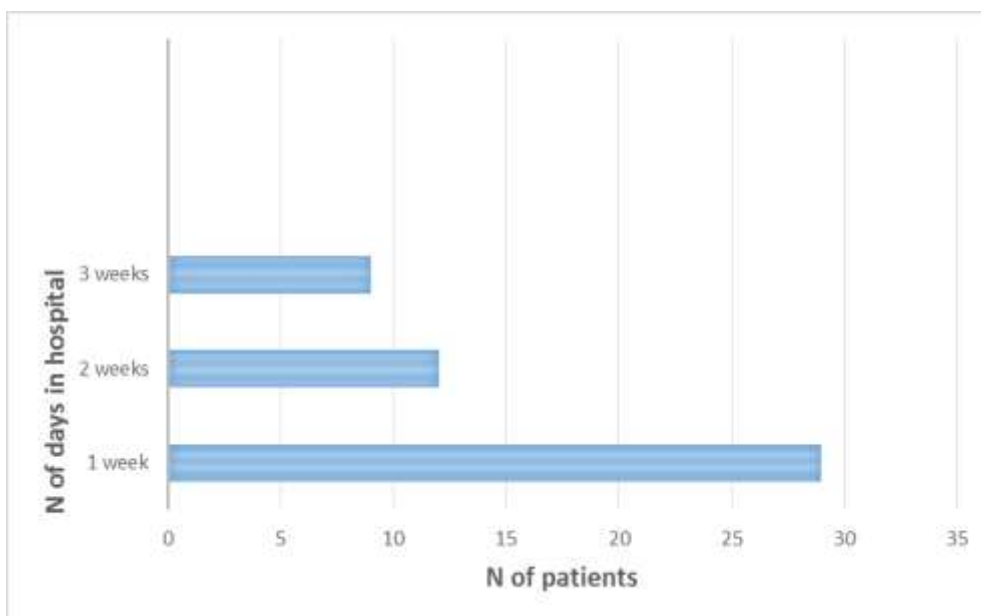


Figure 4: Number of days spent in hospital for all patients.

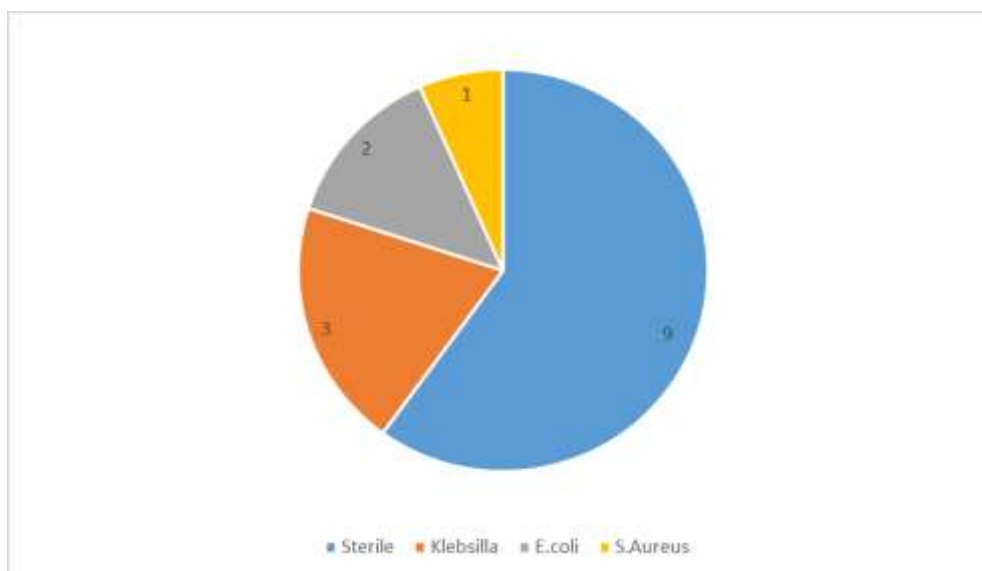


Figure 5: Culture results in our study.

DISCUSSION

Neutropenia is defined as an absolute neutrophil count (ANC) of less than 500/ μ L, or less than 1000/ μ L with an anticipated decline to less than 500/ μ L in the next 48-hour period. Neutropenic fever is a single oral temperature of 38.3° C (101° F) or a temperature of greater than 38.0° C (100.4° F) sustained for more than 1 hour in a patient with neutropenia.^[3]

During the study period, we had 50 admissions with neutropenic fever. The age of participants was between twelve to sixty-four years old with a mean of 27 years old. (Figure 1). A similar study^[4] had 55.2% male participants, while in our study; we had 52% female participants. (Figure 2). Chemotherapy is a major risk factor of neutropenic fever. Malignancy treatment in most cases needs chemotherapy particularly leukemia (ALL, AML, CLL) and lymphoma. In our study, we had 25 cases with ALL, 11 with AML, 1 with CLL and 5 cases with lymphoma. (Figure 3).

In our study, the hospitalization period was between 2 and 23 days with a mean of 9 days. 40% of patients stayed between 1-5 days compared to only 3 patients who stayed for more than 20 days. (Figure 4).

Fever is a very important sign in patients with neutropenia because it could be the only sign of infection in neutropenic patients.^[5, 6] In a similar study, fever was present in 75.2% of 97 patients, while in our study it was found in 76% of 50 patients.

We had 31 culture results (15 blood, and 16 urine). In a similar study, Most common microorganisms in neutropenic patients were E.coli 28.5%, P aeruginosa 17.9% and Klebsiella pneumonia 0.3% followed by S.epidermidis and S.aureus which are mainly related to the use of invasive devices.^[7, 8]

In our study, 21 culture results were sterile (9 blood, 12 urine). Blood culture results had 3 cases (20%) of Klebsiella (Most common, 2 E.coli and 1 (7%) S.aureus.

Urine culture results were 2 (12.5%) Enterobacter (most common), one Streptococcus and one culture was contaminated. (Figure 5).

Upon initial evaluation, each patient should be assessed for risk of complications from severe infection. Appropriate risk assessment may determine the type of empiric therapy (oral vs IV), duration of antibiotic therapy, and determination of inpatient versus outpatient management. Patients are classified into high-risk and low-risk groups.^[3]

High-risk patients should be admitted to the hospital for empiric therapy and close observation.^[3]

Low-risk patients may be candidates for oral empiric therapy and may qualify for outpatient management. However, these patients require very close outpatient monitoring and assessment.

Empiric regimens for neutropenic fever are shown below.^[9-14]

Regimens include the following: Amoxicillin-Clavulanate, Ciprofloxacin, Moxifloxacin, Clindamycin, Quinolones, Cefepime, Aminoglycosides, Piperacillin-Tazobactam, Meropenem, Imipenem and Cilastatin.

Second-line dual therapy: include one of the following with aminoglycoside: Piperacillin-Tazobactam, Cefepime, Meropenem or Imipenem.

In our study, we found that dual antibiotics specifically amikacin plus ceftazidime (52% of all sample) were the most common used first line treatment with a cure rate of 77%. The second most used dual therapy was

ceftazidime plus ciprofloxacin (16% of all sample) with a cure rate of 75%.

Furthermore, 49 patients (98% of all sample) were treated with dual antibiotics therapy. It should be noted that in one case, the first line treatment was monotherapy with Bactrim and it was sufficient.

CONCLUSION

The mean age of participants was 27 years old. We had 52% female participants. We had 25 cases with ALL, 11 with AML, 1 with CLL and 5 cases with lymphoma. The mean hospitalization period was 9 days. We found 21 culture results were sterile (9 blood, 12 urine). Blood culture results had 3 cases (20%) of *Klebsiella* (Most common. Urine culture results were 2 (12.5%) *Enterobacter* (most common). 49 patients (98% of all sample) were treated with dual antibiotics therapy.

Compliance with Ethical Standards

Funding: This study was not funded by any institution.

Conflict of Interest: The authors of this study have no conflict of interests regarding the publication of this article.

Ethical approval: The names and personal details of the participants were blinded to ensure privacy.

ACKNOWLEDGMENTS

We would like to thank Al-Mouasat University Hospital staff and management for their help.

REFERENCES

1. Antoniadou A, Giamarellou H. Fever of unknown origin in febrile leukopenia. *Infect Dis Clin North Am*, 2007; 21(4): 1055–1090. [PubMed]
2. Friese CR. Chemotherapy-induced neutropenia: important new data to guide nursing assessment and management. *Cancer Ther Support Care*, 2006; 4(2): 21–25.
3. <https://emedicine.medscape.com/article/2012185-overview>.
4. Lima SS, França MS, Godoi CC, et al. Neutropenic patients and their infectious complications at a University Hospital. *Rev Bras Hematol Hemoter*, 2013; 35(1): 18-22.
5. Crawford J, Dale DC, Lyman GH. Chemotherapy-induced neutropenia: risks, consequences, and new directions for its management. *Cancer*, 2004; 100(2): 228–237. [PubMed] Erratum in: *Cancer*, 2004; 100(9): 1993-1994.
6. Bodey GP. The changing face of febrile neutropenia-from monotherapy to moulds to mucosites. Fever and neutropenia: the early years. *J Antimicrob Chemother*, 2009; 63(1): i3–i13. [PubMed].
7. Freifeld AG, Bow EJ, Sepkowitz KA, Boeckh MJ, Ito JI, Mullen CA, Raad II, Rolston KV, Young JA, Wingard JR, Infectious Diseases Society of America Clinical practice guideline for the use of antimicrobial agents in neutropenic patients with cancer: 2010 update by the Infectious Diseases Society of America. *Clin Infect Dis*, 2011; 52(4).[PubMed]
8. Ramphal R. Changes in the etiology of bacteremia in febrile neutropenic patients and the susceptibilities of the currently isolated pathogens. *Clin Infect Dis*, 2004; 39(1): S25–S31. [PubMed]
9. Alison G, Freifeld Eric J, Bow Kent A, Sepkowitz Michael J, Boeckh James I, Ito Craig A, Mullen Issam I, Raad Kenneth V, Rolston Jo-Anne H, Young John R, Wingard. *Clinical Infectious Diseases*, 15 February 2011; 52(4): e56–e93.
10. *Clin Infect Dis*, 2006; 43(4): 447-59 (ISSN: 1537-6591).
11. Bow EJ; Rotstein C; Noskin GA; Laverdiere M; Schwarzer AP; Segal BH; Seymour JF; Szer J; Sanche S J *Clin Oncol*, 2013; 31(6): 794-810 (ISSN: 1527-7755).
12. Flowers CR; Seidenfeld J; Bow EJ; Karten C; Gleason C; Hawley DK; Kuderer NM; Langston AA; Marr KA; Rolston KV; Ramsey SD *J Clin Oncol*. 2013; 31(9):1149-56 (ISSN: 1527-7755).
13. Kern WV; Marchetti O; Drgona L; Akan H; Aoun M; Akova M; de Bock R; Paesmans M; Viscoli C; Calandra T *Onkologie*, 2007; 30(4): 185-91 (ISSN: 0378-584X).
14. Schuler U; Bammer S; Aulitzky WE; Binder C; Böhme A; Egerer G; Sandherr M; Schwerdtfeger R; Silling G; Wandt H; Glasmacher A; Ehniger G *Support Care Cancer*, 2015; 23(7): 2079-87 (ISSN: 1433-7339).
15. Vedi A; Pennington V; O'Meara M; Stark K; Senner A; Hunstead P; Adnum K; Londall W; Maurice L; Wakefield C; Cohn RJ.