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Oncology

# CLINICAL PROFILE OF FEBRILE NEUTROPENIA IN CHILDREN WITH CANCER

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**ABSTRACT** **Introduction:** Febrile neutropenia is a known complication of childhood cancers. It is associated with considerable mortality and morbidity. It also results in dose reduction and delays in chemotherapy which can have detrimental effects on the outcome of cancers.

**Objective:** To determine the clinical profile of febrile neutropenia in childhood cancer patients treated at a tertiary care hospital.

**Materials and methods:** This is a descriptive study. All children diagnosed with malignancy and receiving treatment at Goa medical college and presenting with febrile neutropenia were enrolled over a period of twelve months. Results and conclusions: Cough and vomiting were the most common presenting features and most common infection was upper respiratory tract infection..Younger age group(<5 years ), female sex, and hematological malignancies were found to be more prone to develop febrile neutropenia and may be considered as predictors for increased risk of febrile neutropenia.

**KEYWORDS :** Febrile neutropenia, , Fever, Upper Respiratory Tract Infection, Malignancy, Chemotherapy

## INTRODUCTION

Cancer in children and adolescents is rare and biologically different from cancer in adults [1] .Approximately 148000 cancer cases were reported amongst children 0-14 years,in less developed regions.[2] In India cancer is the ninth common cause of deaths among children between 5 to 14 years of age [3]. Leukemias and lymphomas comprise nearly half of pediatric cancers worldwide, followed by tumors of CNS, soft tissue, kidney, bone, eye, liver and germ cells [4] .

Neutropenia is a decreased absolute number of neutrophils in blood cells <1000cells/mm3 and is common adverse effect of chemotherapy. Apart from being associated with considerable mortality and morbidity, neutropenia may also result in dose reduction or delay in chemotherapy. In addition to economic burden this will also result in detrimental effects on overall outcomes of the disease. {5}

Febrile neutropenia commonly affects gastrointestinal tract where chemotherapy induced mucosal damage causes blood stream invasion by gut flora. Invasive devices such as central venous catheters become a source for blood stream infection {6}. Other affected sites include respiratory tract and skin. Patients with FN often present with fever without an identifiable focus.

Outcomes in FN have improved with advent of newer antibiotics and improved supportive therapy in the form of growth factors and blood components.

Despite being a resource limited centre, wide variety of pediatric cancers are managed in our centre.FN is thus a common occurrence in these patients. This study was undertaken to determine the clinical profile, predictors for risk of developing FN and rate of mortality in FN episodes.

## Materials and methods:

A prospective observational study was conducted in the Department of Pediatrics Goa Medical College over a period of 12 months from July 2011 to July 2012.

### Inclusion criteria:

1. All Children diagnosed to have malignancy and undergoing chemotherapy and presenting to the Department of Pediatrics during the study period.
2. Fever (Single oral temperature record of 38.30C (101 degree F) or axillary temp =380C (100.4 degree F) or more for atleast 1 hour.(7)
3. Neutropenia (Absolute Neutrophil count ANC <1000cells/mm3 with predicted fall to <500cells/mm3 in the next few days) [7]
4. Those who gave consent to participate in the study.

A detail history as to the diagnosis, presenting complaints and demography were recorded in addition to a thorough clinical examination in a predesigned proforma. Blood sample was collected for CBC and culture from peripheral site; appropriate treatment was instituted as per the standard department protocols. Urine, CSF and other cultures were sent when required.Other appropriate investigations like chest radiograph, USG of kidneys, abdomen were done as and when indicated.

Outcome was measured in terms of rate of mortality and duration of hospital stay.

Institutional ethics committee approval was obtained prior to commencement of research.

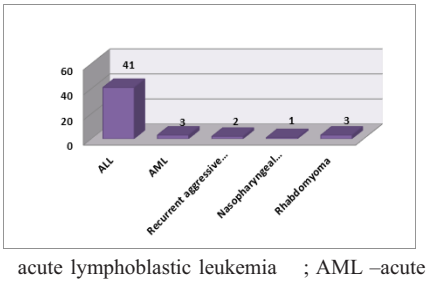
## Results and Discussion:

Over the 1 year period total of 240 admissions were made in the chemotherapy unit of the pediatric ward of Goa Medical College for administration of therapy including routine chemotherapy for various pediatric malignancies. Of these 53 admissions were for febrile neutropenia. Three admissions ( 1%) did not meet the predetermined inclusion criteria hence were excluded.

Twenty two ( 44%) of the admissions (Table 1) of febrile neutropenia were from the age group of less than 5years old and 21 (42%) were between 5 to 10 years of age. The majority were girls 32 (64%) Considering the demographic profile of our study we found that febrile neutropenia admissions were more common in the younger age group of children(<5yrs) as compared to the older ones. (Table1) Similar results were also found in A study done by Wolff *et al*. (2005) {10}, and AL-Ahwal (2005) {11}

Out of all the admissions with febrile neutropenia 26 (52%) were in the intensive phase of therapy and 24 (48%) were in maintenance phase of the chemotherapy cycle. 44.(88% )of admissions of febrile neutropenia were seen in children with haematological malignancy. Remaining 6 (12%) were associated with solid tumors all of whom were in the maintenance cycles. A study done by Koasak *et al*. (2002) in USA showed significant association between cancer type and neutropenia duration.

**FIGURE 1.: Type of cancers associated with Febrile Neutropenia**




ALL ---- acute lymphoblastic leukemia ; AML –acute myeloid leukemia

Recurrent aggressive fibromatosis, NAasopharyngeal carcinoma; Rhabdomyosarcoma

**Table2: Clinical presentation of patients with febrile neutropenia**

| Symptoms | Number of Cases | % |
|---|---|---|
| Vomiting | 17 | 34 |
| Cough | 25 | 50 |
| Rashes( maculopapular exanthem ) | 9 | 18 |
| Pallor | 19 | 38 |
| Diarrhoea | 6 | 12 |
| Abdominal pain | 13 | 26 |
| Bleeding from skin/mucus membrane | 1 | 2 |
| Convulsions | 1 | 2 |
| Dysuria | 3 | 6 |
| Oral ulcer | 3 | 6 |
| Lymphadenitis | 4 | 8 |

**Table 3: Common Infections Associated With Febrile Neutropenia Episodes**

| Infections | Subjects | % |
|---|---|---|
| URTI | 25 | 50 |
| PNEUMONIA | 2 | 4 |
| UTI | 3 | 6 |
| AGE | 6 | 12 |
| LYMPHADENITIS | 1 | 2 |
| PARONYCHIA | 1 | 2 |
| THROMBOPHLEBITIS | 2 | 2 |

Pneumonia was diagnosed based on clinical features and radiological findings. Urinary tract infection was detected in 3 admissions based on urine examination though urine cultures in all were sterile. Any acute swelling of the lymph nodes with tenderness in a child with no persistent swelling prior was noted as lymphadenitis,while paronychia was seen as an acute swelling of the nail bed.

Most common presentation of febrile neutropenia was cough, seen in 25 admissions ( 50%), followed by pallor in 19 (38%) and vomiting in 17 (34%) . Upper Respiratory Tract Infection 25 (50%) was the commonest infection noted followed by Acute gastroenteritis 6 (12%). A study from Journal of Supportive Care in Cancer, March 2006, Volume 14, Issue 3, pp 277-284. 86 also reports viral upper respiratory tract infection as most common infection in children with ALL. s

Microbiological cultures were positive in 10% of the admissions (all from blood) of which 40% were *staphylococcus aureus* and *Escherichia Coli* and 20% were *pseudomonas*. There was no mortality and average hospital stay was 7 days.

**Conclusions:** FN was more common in younger age groups and in children with hematological malignancies as compared to solid tumors. Female predilection was also noted . Thus female sex, younger age and hematological malignancy could be considered as predictors . Respiratory tract infections were the most common followed by acute gastroenteritis. *Staphylococcus aureus, E.coli* followed by *Pseudomonas* were the organisms isolated (from blood) from the patients in these admissions of FN.

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**Abbreviations:** FN( Febrile Neutropenia),CBC ( complete blood count) , USG ( ultrasonography)

## References

[1] Magrath I, Steliarova-Foucher E, Epelman S, Ribeiro RC, Harif M, Li CK, et al. Paediatric cancer in low-income and middle-income countries. Lancet Oncol 2013;
[2] Ferlay J, Shin HR, Bray F, Forman D, Mathers C, Parkin DM. Globocan 2008 v2.0- Cancer Incidence and Mortality Worldwide: IARC CancerBase No 10. Lyon: International Agency for Research on Cancer, 2010.
[3] Summary- Report on Causes of Death: 2001-03 in India. Available from: URL:http://censusindia.gov.in/Vital_Statistics/ Summary_Report_Death_01_03.pdf.
[4] Pizzo PA, Robichaud KJ, Wesley R, Commers JA. Fever in paediatric and the young adult patient with cancer, prospective study of 1001 episodes. Med (Baltimore) 1982; 61:153
[5] Klastersky J, Paesmans M, Rubinstein EB, et al. The Multinational Association for Supportive Care Cancer risk index. A multinational scoring system for identifying low risk febrile neutropenic cancer patients. J Clin Oncol 2000; 18:3038-51
[6] Hughes WT, Armstrong D, Bodey GP, Bow EJ, et al. 2002 guidelines for the use of antimicrobial agents in neutropenic patients with cancer. Clin Infect Dis. 2002; 34:730-51.
[7] Freifeld Ag, Bow EJ, Sepkowitz KA, et al. Clinical practice guidelines for the use of antimicrobial agents in neutropenic patients with cancer; 2010 update by the infectious diseases society of America. Clin Infect Dis 2011; e56-93
[8] S. Schelenz, D. Giles, S. Abdallah . Epidemiology, management and economic impact of febrile neutropenia in oncology patients receiving routine care at a regional UK cancer centre. Annals of Oncology23 2012; 1889-1893.
[9] K.C Lakshmaiah, A S Malabagi et al. J Lab Physicians. Febrile Neutropenia in Hematological Malignancies; Clinical and Microbiological profile and outcome in High Risk Patients 2015 jul-Dec : 7(2):116-120
[10] Schmidt –Wolf IGH, Mey U , Strehl J et al. Eur J Hematol 2005, Neutropenic enterocolitis in adults: systematic analysis of evidence quality 2005; 75, 1-13
[11] Al Ahwal MS, Abdo-Al-Ghamdi A. Saudi J Gastroenterol 2005. Pattern of colorectal cancer at two hospitals in western region of Saudi Arabia. 2005 sep 11(3); 164-9