COMPARATIVE STUDY BETWEEN PROADRENOMEDULLIN AND PROCALCITONIN, IN DIAGNOSING BACTERIAL INFECTIONS DURING FEBRILE NEUTROPENIA, IN ADULT ACUTE LEUKEMIC PATIENTS

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Introduction

Sepsis is an extreme response from the body to fight against infection. Leukemic patients are highly prone to bacterial infection and without prompt treatment, severe tissue damage can occur.

Febrile neutropenia is defined as a single oral temperature 38.3°C or a sustained temperature 38°C for 1 hour, with an absolute neutrophil count < 500 cells/mm3 or an expected decline to < 500 cells/mm3 within 48 hours.

Mid-regional proadrenomedullin (MR-proADM) is a 48 amino acid fragment that is split from proadrenomedullin.MR-proADM has a longer half-life and is a useful marker to detect sepsis. It synthesized in a wide variety of tissues and has many physiological effects once produced.

Normally, procalcitoninis synthesized in the thyroid and is converted to calcitonin. During inflammation, an alternative pathway results in the release of procalcitonin into the blood stream. Therefore it is considered as a useful biomarker for detecting bacterial infection.

Aim of the Work

The aim of this study was to compare between proadrenomedullin and procalcitonin, to detect their sensitivity and specificity in diagnosing infections during febrile neutropenia, in acute leukemia patients.

Patients and Methods

Patients:

88 patients with acute leukemia were selected from the Hematology Unit, Internal Medicine Department, Alexandria Main University Hospital. Those who developed febrile neutropenia during admission were tested.

Methods:

Patients were diagnosed as acute leukemia after performing a complete blood count, bone marrow aspiration and immnunophenotyping. Thorough physical examination was doneto assess vital signs and various body parts, to identify a possible source of infection. On the first day of febrile neutropenia, proadrenomedullin and procalcitonin were sampled via a venipuncture. Cultures and swabs were taken from possible sites of infection, to confirm the presence of bacterial infection. Appropriate radiological tools, as computed tomography scans of the chest, were also used to identify possible infection.

Results

Table 1: Sensitivity, specificity and accuracy of procalcitonin and proadrenomedullin in diagnosing bacterial infection

	Bacterial Infection				Sensitivity	Specificity	Accuracy
	Negative (n = 40)		Positive (n = 48)				
	No.	%	No.	%			
Procalcitonin							
≤0.5	12	30.0	10	20.8	79.2	30.0	56.8
>0.5	28	70.0	38	79.2			
χ^2 (p)	0.978 (0.323)						
Proadrenomedullin							
≤1.1	10	25.0	3	6.3	93.8	25.0	62.5
>1.1	30	75.0	45	93.8			
χ^2 (p)	6.092* (0.014*)						

Table 2: Sensitivity, specificity and accuracy of procalcitonin and proadrenomedullin in identifying a localized infection

	Localized Infection		Sensitivity	Specificity	Accuracy
	Positive (n = 64)	Negative (n = 24)			
	No.	No.			
Procalcitonin					
≤0.5	50	19	74.0%	20.8%	57.6%
>0.5	14	5			
χ^2 (p)	0.011 (0.915)				
Proadrenomedullin					
≤1.1	54	21	84.3%	12.5%	64.7%
>1.1	10	3			
χ^2 (p)	0.1354* (0.712*)				

Table 3: Descriptive analysis of the studied cases according to the day of fever

	Min. – Max.	Mean ± SD.	Median (IQR)
Day of Fever	1.0 – 23.0	9.60 ± 5.24	10.0 (6.0 – 13.50)

Conclusion

- Proadrenomedullin and procalcitonin are both useful biomarkers to detect bacterial infection. Proadrenomedullin was more sensitive in diagnosing bacterial infection, localized infections and identifying possible CT Chest findings.
- Cultures and swabs taken from the study revealed that *Klebsiella pneumoniae* was the most common organism detected and the most common source of infection was respiratory tract infections.