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# Monitoring of patients undergoing examination of bone marrow aspiration and biopsy

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## Abstract:

**Background:** Monitoring of the patient is to improve the outcome of the bone marrow aspiration and biopsy procedure by decreasing the risk of the procedure itself

**Objective:** 1-To monitor the heart rate, and blood pressure of the patient before, during, and until 6 minutes after the needle of bone marrow biopsy and aspiration has been withdrawn, 2- Early detection of any signs and symptoms of distress 3-to monitor the ECG abnormalities that might occur during the bone marrow aspiration and biopsy

**Methods:** The study consisted of 33 patients referred consecutively to the Baghdad teaching hospital 7<sup>th</sup> floor (bone marrow aspiration and biopsy clinic) Before bone marrow aspiration and biopsy, baseline 12 leads ECG, blood pressure, and heart rate were recorded. Lead II ECG, heart rate, blood pressure were continuously recorded during the procedure until 6 minutes after the needle had been withdrawn and 12 lead ECG, blood pressure and heart rate were recorded at the time.

**Results:** Heart rate, systolic, diastolic blood pressure before the procedure were significantly increased in comparison with during period of the bone marrow aspiration and biopsy and decreases in number of patients suffering from nausea, vomiting, pallor, chest pain, dyspnea, general pain when comparing to non suffering from signs and symptoms

**Conclusion:** Electrocardiographic changes are rarely found in patients undergoing bone marrow aspiration. According to the results the investigator recommended to preparing and training of bone marrow aspiration and biopsy clinic staff for patient care before, during and after bone marrow aspiration and biopsy

**Keywords:** bone marrow aspiration, bone marrow biopsy monitoring patients

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## Introduction

**B**one marrow aspiration is an old and well-established test procedure, the use of which may rest more on diagnostic tradition than on scientific documentation<sup>[1]</sup> Examination of bone marrow is the most valuable test to evaluate blood disorders. Bone marrow aspiration and biopsy also is used to stage certain types of cancers such as lymphomas and has also been used to as a diagnostic tool for fevers of unknown origin<sup>[2]</sup>. Nurses who work with patients undergoing bone marrow aspiration and biopsy have an important role to play in promoting present and future adjustment through deeper knowledge and understanding about the procedure<sup>[3]</sup>

The purpose of patient monitoring is to improve the outcome of the bone marrow aspiration and biopsy procedure by decreasing the risk of parenteral sedation as well as the procedure itself. The early detection of patient distress or compromise of vital functions indicating the patients need for assistance such as use of anarcotic antagonist, termination of the procedure, or alteration in the patient's post procedure follow up may improve procedure safety<sup>[1]</sup> The bone marrow biopsy and aspiration record should include the blood pressure, heart rate and respiratory rate as

well as a statement describing any particular problems encountered during the procedure<sup>[3]</sup>

The objective of this study is to<sup>[1]</sup>To monitor the heart rate, and blood pressure of the patient before, during, and until 6 minutes after the needle of bone marrow biopsy and aspiration has been withdrawn,<sup>[2]</sup> Early detection of any signs and symptoms of distress<sup>[3]</sup> to monitor the ECG abnormalities that might occur during the bone marrow aspiration and biopsy

## Patient & Methods

For the purpose of achieving the aims quasi experimental design which introduces some control over potential problems, and which is considered in good deal of nursing research that occurs in the natural setting was used to carry out this study (4) that was conducted during 15<sup>th</sup> of Dec 2005 to 15<sup>th</sup> of May 2006

Bone marrow aspiration and biopsy was performed as part of routine staging in 33 patients referred consecutively to Baghdad teaching hospital 7<sup>th</sup> floor (bone marrow aspiration and biopsy clinic)

The patients were chosen according to following criteria

- 1-The bone marrow aspiration and biopsy that was only diagnostic and for the first time
- 2-Adult patients whose ages between (21-70) years are included

3- Adult patients who are not having any other chronic disease

4- Consent to participate in this study after explaining its purpose. Cases with evidence of cardiovascular disease or with evidence of any other disease that might affect the cardiovascular at any stage during the procedure such as respiratory disease, diabetic mellitus, and hyperthyroidism were excluded from the study

The validity of the instrument was determined through the use of panel <sup>[10]</sup> experts , internal consistency reliability was employed for the determination of the questionnaires ,reliability Alpha correlation coefficient was computed and indicated that (r=0.96) which was adequately reliable.

One hour before the scheduled bone marrow aspiration and biopsy given to the patients full explanation of the research protocol and having an opportunity to ask questions or to refuse participation.

Before the procedure, baseline 12 leads ECG, blood pressure, and heart rate were recorded, Lead II ECG, heart rate, blood pressure were continuously recorded during the procedure until 6 minutes after the needle

had been with drawn of bone marrow biopsy and aspiration and 12 leads ECG, blood pressure and heart rate gain recorded at that time

Minor changes whether regarded as a normal physiological response or a normal individual variations were considered if such changes were found in the ECG was repeated till the recording come back to the normal

Statistical analysis

Percentage was used to calculate the description of the sample; Mean, standard deviation and t-test value were computed to estimate the differences before and after the procedure. Kolmogorve smirnov determine the significant difference between the findings

**Results:-**

Table-1- shows that 23(69.69%) of the patients were males while 10(30.30%) of them were females .Mean age of it (39.43) years and the range is (21-70) years

Table –2- shows that there is a significant increase in heart rate, systolic blood pressure during procedure when analyzed by t-test

**Table -1- Demographic characteristics of patients undergoing bone marrow aspiration and biopsy**

Characteristics	Patients	
	N.O	%
<b>Sex</b>		
<b>Male</b>	23	69.69
<b>Female</b>	10	30.30
<b>Total</b>	33	100
<b>Age</b>		
<b>21-30</b>	15	45.45
<b>31-40</b>	4	12.12
<b>41-50</b>	4	12.12
<b>51-60</b>	6	18.18
<b>61-70</b>	4	12.12
<b>Total</b>	33	100
<b>Mean</b>	39.43	10.51

**Table-2- comparison of hemodynamic measurements (Heart rate, blood pressure) before and during bone marrow aspiration and biopsy procedure**

Hemodynamic	Before procedure		during procedure		t-test	C.S
	mean	SD	mean	SD		
Heart rate	88.93	10.51	95.21	12.38	2.22	S
Systolic blood pressure	99.78	13.72	110.75	16.38	3.89	S
Diastolic blood pressure	61.06	7.95	64.69	10.07	1.62	N.S

Table-3- revealed that there is significant between before and after the procedure in systolic blood pressure when analyzed by t-test.

Table -4- shows that there are highly percentage of patients suffering from pallor, dyspnea and the lower percentage of patients suffering from chest pain, general pain ,and abdominal pain

Table -5- revealed that the most frequent arrhythmias was sinus tachycardia,

Table -5- also showed. One patient presented T wave changes in the form of T inversion which occurred during the manipulation and the same number presented ST-changes during manipulation of soft tissue

**Table-3- comparison of hemodynamic measurements (Heart rate blood pressure) before and after bone marrow aspiration and biopsy procedure**

Hemodynamic	Before procedure		After procedure		T-test	C.S
	Mean	SD	Mean	SD		
Heart rate	88.93	10.51	91	3.73	1.07	N.S
Systolic blood pressure	99.78	13.72	105.90	13.84	1.80	S
Diastolic blood pressure	61.06	7.95	64.54	9.07	0.70	N.S

**Table –4-Clinical Findings during bone marrow aspiration and biopsy**

Clinical finding	Suffering from signs and symptoms	
	No	%
Nausea	2	6.06
Vomiting	2	6.06
Pallor	5	15.15
Chest pain	1	3.03
Irritable	3	9.09
Dyspnea	4	12.12
Sweating	3	9.09
General pain	1	3.03
Abdominal pain	1	3.03

**Table -5- electrocardiographic abnormalities before, during and after bone marrow aspiration and biopsy**

Electrocardiographic abnormalities	Manipulation of soft tissue t			New abnormalities electrocardiographic during bone marrow aspiration and biopsy
	before	during	after	
Sinus tachy cardia >110	10	12	7	2
T wave changes	0	1	0	1
ST-changes	0	1	0	1

needs; such individualization can help the

**Discussion**

Implications for practice and education include the importance of individualizing the information and follow –up care to a couples identified informational

m to better cope with the cancer diagnosis and its’ implications for their lives.Assessment and documentation of informational needs and their

interventions would provide a baseline record on couples that could be retrieved for future care, evaluation of care, and research<sup>[5]</sup>

In this study it has been shown that a correlation between the systolic blood pressure before and immediately after bone marrow aspiration and biopsy, statistically significant (table 3). Changes in blood pressure and pulse rate before and immediately after the procedure were attributed to physiologic and psychologic factors<sup>[7]</sup>

A diagnosis of cancer can be regarded as a threatening experience that evokes a variety of emotions for the patient and the family. The person with cancer faces one of the more arduous stressors known, for this diagnosis forces an individual into a series of crises that affect his or her entire well-being<sup>[5]</sup>

Period immediately following a cancer diagnosis is particularly stressful for the patient and family. During this period, it is critically important for the patient to obtain a factual understanding of the disease, treatment and the immediate and eventual physical and psychosocial implications for both partners, particularly if they desire such information<sup>[3]</sup>.

our study revealed that there are highly percentage of patients suffering from pallor, dyspnea, and the lower percentage of patients suffering from chest pain, general pain, and abdominal pain, supported of this study<sup>[3,8]</sup>.

who reported that comprehensive research on symptoms is sorely lacking. Even focus on a single symptoms as prevalent as cancer pain has been fragmented, and there has been no large-scale epidemiologic data base on its incidence or severity

Our study demonstrated that ECG changes are of not frequent occurrence in patients undergoing bone marrow aspiration and biopsy (Table 5), supported of this study<sup>[10]</sup> who reported myocarditis is rarely found in patients undergoing bone marrow aspiration and biopsy, symptoms related to it may be minor or even absent in most patients and the only indication of myocardial involvement can be non specific changes in the ECG

The results of our study also showed that the most frequent arrhythmias was sinus tachycardia, this developed before any manipulation of soft tissue in 10 patients and seem to be related to emotional factor (table 5)

Although bone marrow aspiration and biopsy a relatively safe more observation are needed to establish the cardiac risk<sup>[9,10]</sup>

We observed that the correlation between the systolic blood pressure, heart rate before and during bone marrow aspiration and biopsy is statistically significant and the incidence of chest pain decreases in patients undergoing bone marrow aspiration and biopsy

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