

BONE MARROW ASPIRATION (BMA) IN ZARIA: A THREE-YEAR RETROSPECTIVE REVIEW.

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ABSTRACT

Background: BMA is a clinical procedure that exploits microscopy and lends itself to specialized biochemical and molecular assays for diagnosis, staging, prognostication and determining choice of therapy. Eligibility for BMA is determined following review of a patient's history, physical examination findings, Complete Blood Count and other relevant investigations. Bone marrow aspirates may be obtained from different sites of the body such as iliac crest, sternum etc. This study was to determine some patient characteristics, sites, indications and outcomes of all BMAs done between January 2002 and December 2004. It is hoped that this study will help haematologists and other physicians to understand the utility of BMA and some of its limitations.

Material And Methods: It was a three-year retrospective, analytic review of all BMAs done in the Department of Haematology, Ahmadu Bello University Teaching Hospital Zaria. Records from 1st January 2002 to 31st of December 2004 were retrieved, collated and analyzed using SPSS version 16.

Results: A total of One hundred and thirty five (135) BMAs were done in the period under review. There was a male preponderance 77 (57.00%) with females constituting 58 (43.00%). The mean age was 31.78±20.76 years with a mode of 45 years. The minimum and maximum ages were 1 and 78 years respectively. The commonest site for BMA was the RPSIS 97(71.9%). Anaemia was the commonest indication for BMA 56(41.5%) followed by Splenomegaly 15(11.1%) and Lymphadenopathy 14(10.4%). The commonest diagnosis was combined deficiency anaemia 21(15.6%) followed by Megaloblastic anaemia 19(14.1%). Whereas 9(6.7%) were inconclusive, 14(10.4%) were normal. The complication rate was 0% and lymphadenopathy was the commonest indication that turned up with a normal BMA 5/14 (35.7%).

Conclusion: BMA is important in the evaluation of several conditions. However, there is a need to ensure proper consultation to ensure only patients that require BMA do so due to its invasive nature.

KEYWORDS: Bone marrow, aspiration, combined deficiency anaemia

INTRODUCTION

Bone Marrow Aspiration (BMA) has evolved into an important tool in the arsenal of the Haematologist. The preferred anatomical site

for obtaining an aspirate is the Posterior Superior Iliac Spine.¹ This is in contrast to the sternal approach which requires experience and care due to the possibility of cardiac tamponade. A recommended Turn-Around-Time (TAT) of 24 hours makes BMA a powerful tool in situations where an early diagnosis may be life saving.² BMA is a relatively safe procedure with few complications. With an average complication rate of 0.05%, pain, haemorrhage and infections are usually not life threatening. Rare complications such as arterio-venous fistulae have been reported.³

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MATERIALS AND METHODS

This was a retrospective study involving the review of bone marrow aspiration records



done in the department of haematology of Ahmadu Bello University Teaching Hospital Zaria Nigeria, from 1st January 2002 to 31st December 2004. Records were retrieved and the following variables were collated: age, sex, indication for bone marrow aspiration, anatomical site where aspirate was obtained and final bone marrow diagnosis. The data was analyzed using SPSS Version 16 software.

RESULTS

A total of One hundred and thirty five (135) BMAs were done in the period under review. There was a male preponderance 77 (57.00%) with females constituting 58 (43.00%). The mean age was 31.78±20.76 years with a mode of

45 years. The minimum and maximum ages were 1 and 78 years respectively.

The commonest site for BMA was the RPSIS 97(71.9%) (FIGURE 1). No complications were encountered in the period under review. Anaemia was the commonest indication for BMA 56(41.5%) followed by Splenomegaly 15(11.1%) and Lymphadenopathy 14(10.4%) (Table 1).

The commonest diagnosis was combined deficiency anaemia 21(15.6%) followed by Megaloblastic anaemia 19(14.1%). Whereas 9(6.7%) were inconclusive, 14(10.4%) were normal (Table 2).

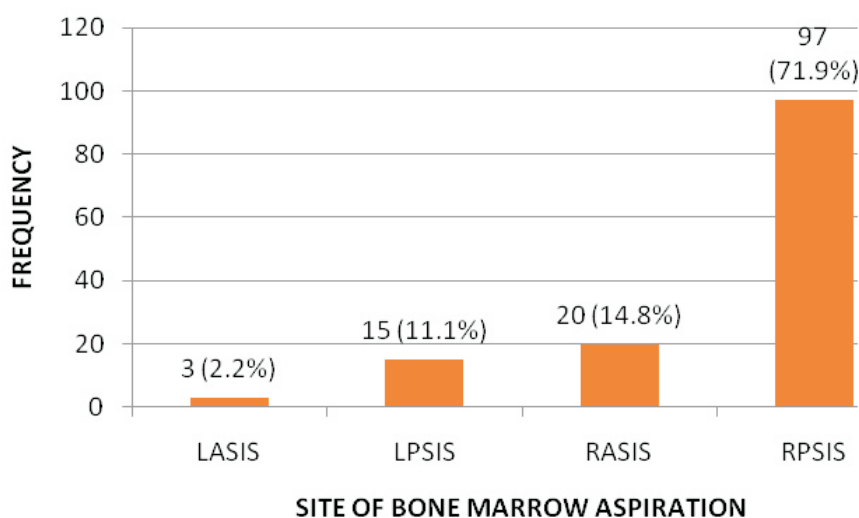


Figure 1: Sites of BMA Aspiration

LASIS - Left anterior superior iliac spine LPSIS - Left posterior superior iliac spine
 RASIS - Right anterior superior iliac spine RPSIS - Right posterior superior iliac spine



Bone Marrow Aspiration

Table 1: Indication For BMA By Age Group

INDICATION	AGE GROUPS(YEARS)			TOTAL
	1-18	19-40	>40	
ABDOMINAL MASS	7(5.2%)	1(.7%)	0(.0%)	8(5.9%)
ALL ON TREATMENT	0(.0%)	0(.0%)	1(.7%)	1(0.7%)
AML ON CYTOTOXICS	0(.0%)	1(.7%)	0(.0%)	1(0.7%)
ANAEMIA	14(10.4%)	17(12.6%)	25(18.5%)	56(41.5%)
LYMPHOCYTOSIS	0(.0%)	1(.7%)	1(.7%)	2(1.5%)
BACK PAIN	0(0.0%)	0(0.0%)	1(0.7%)	1(0.7%)
BLEEDING	4(3.0%)	0(0.0%)	0(0.0%)	4(3.0%)
BONE PAIN	3(2.2%)	0(0.0%)	4(3.0%)	7(5.2%)
CA PROSTATE	0(0.0%)	0(0.0%)	1(0.7%)	1(0.7%)
HEPATOMEGALY	2(1.5%)	0(0.0%)	1(0.7%)	3(2.2%)
HEPATOSPLENOMEGALY	5(3.7%)	2(1.5%)	1(0.7%)	8(5.9%)
LYMPHADENOPATHY	5(3.7%)	7(5.2%)	2(1.5%)	14(10.4%)
HODGKIN LYMPHOMA	0(0.0%)	2(1.5%)	0(0.0%)	2(1.5%)
NECK SWELLING	1(0.7%)	0(0.0%)	0(0.0%)	1(0.7%)
NEUROBLASTOMA	2(1.5%)	0(0.0%)	0(0.0%)	2(1.5%)
NHL	0(0.0%)	1(0.7%)	0(0.0%)	1(0.7%)
PANCYTOPAENIA	0(0.0%)	2(1.5%)	0(0.0%)	2(1.5%)
POST CYTOTOXICS	0(0.0%)	1(0.7%)	4(3.0%)	5(3.7%)
SPLENOMEGALY	3(2.2%)	6(4.4%)	6(4.4%)	15(11.1%)
WEIGHT LOSS FEVER	1(0.7%)	0(0.0%)	0(0.0%)	1(0.7%)
TOTAL	47(34.8%)	41(30.4)	47(34.8)	135(100.0%)



Table 2: Diagnosis By Age Group

DIAGNOSIS	AGE GROUPS(YEARS)			TOTAL
	1-18	19-40	>40	
APLASTIC ANAEMIA	1(0.7%)	3(2.2%)	1(0.7%)	5(3.7%)
ANAEMIA OF CHRONIC DISORDER	2(1.5%)	0(0.0%)	0(0.0%)	2(1.5%)
ALL	6(4.4%)	1(0.7%)	2(1.5%)	9(6.7%)
AML	4(3.0%)	1(0.7%)	0(0.0%)	5(3.7%)
CLL	0(0.0%)	0(0.0%)	4(3.0%)	4(3.0%)
CML AP	0(0.0%)	3(2.2%)	1(0.7%)	4(3.0%)
CML BP	0(0.0%)	2(1.5%)	0(0.0%)	2(1.5%)
CML CP	1(0.7%)	3(2.2%)	3(2.2%)	7(5.2%)
COMBINED DEFICIENCY ANAEMIA	9(6.7%)	6(4.4%)	6(4.4%)	21(15.6%)
IRON DEFICIENCY ANAEMIA	0(0.0%)	5(3.7%)	1(0.7%)	6(4.4%)
INCONCLUSIVE	2(1.5%)	0(0.0%)	7(5.2%)	9(6.7%)
ITP	2(1.5%)	0(0.0%)	0(0.0%)	2(1.5%)
LEUKAEMIC PHASE OF A LYMPHOMA	4(3.0%)	2(1.5%)	5(3.7%)	11(8.1%)
MEGALOBLASTIC ANAEMIA	6(4.4%)	7(5.2%)	6(4.4%)	19(14.1%)
MDS	2(1.5%)	2(1.5%)	3(2.2%)	7(5.2%)
METASTASIS	1(0.7%)	1(0.7%)	0(0.0%)	2(1.5%)
MULTIPLE MYELOMA	0(0.0%)	1(0.7%)	5(3.7%)	6(4.4%)
NORMAL BONE MARROW	7(5.2%)	4(3.0%)	3(2.2%)	14(10.4%)
TOTAL	47(34.8%)	41(30.4%)	47(34.8)	135(100.0%)



Table 3: Indications With Normal BMA

INDICATIONS	FREQUENCY	(%)
HODGKIN LYMPHOMA	1	7.1
LYMPHADENOPATHY	5	35.7
HEPATOSPLENOMEGALY	1	7.1
NEUROBLASTOMA	2	14.3
ABDOMINAL MASS	1	7.1
CA PROSTATE	1	7.1
ANAEMIA	3	21.4
TOTAL	14	100.0

DISCUSSION

Although BMA is an invasive procedure, its versatility transcends age barriers. Hence this study reveals that patients as young as 1 year and as old as 78 years had this procedure during the period under review. This further corroborates reports by different authors. Ahmad QS and colleagues report an age range of 8 months to 106 years in a review of 84 patients who had BMA in India.⁴ This is similar to the age range of 6 months to 89 years reported by Syed NN in Pakistan.⁵ Although the age range reported from Kenya is similar to the above, a study done in Ghana by Bedu-Addo G. and colleagues revealed a narrower age range of 10 years to 75 years.^{6,7}

In Jos, Nigeria, Egesie OJ and colleagues reported an age range of 4 years to 80 years in patients who had BMA done on account of anaemia.⁸ This is similar to another study done in Jos with an age range of 1 year to 82 years.⁹ Age therefore is not a barrier when a patient requires BMA. This is particularly important since some disorders are more common in the aged.

The most common site in this study was the RPSIS (71.9%), this is most likely connected to the teaching in medicine that encourages patients to be examined from the right side. Therefore patients are most likely to assume the left lateral positions permitting access to

the RPSIS. Other sites are only resorted to when access to this preferred site is hindered or limited.

Indications for BMA may be primarily haematological or due to other non haematological factors. The most common indication in this review was evaluation of anaemia (41.5%). This is similar to findings in Jos (Nigeria)^{8, 9}, Ghana⁷, Kenya⁶, India⁴ and Pakistan⁵. Also the most common diagnosis in this review was that of nutritional deficiency anaemias which collectively make up 46(34.1%) of all diagnoses. Possible reasons for this may be due to socio-cultural factors, the prevalent low economic status and infestations.

The frequency of normal marrows (10.37%) in this study although similar to those reported in Ghana (8.75%)⁷ and India (9%)⁴ is still high. Additionally, lymphadenopathy constituted the most common indication (35.7%) that turned up with normal BMAs. This may be a pointer to the need for lymphnode biopsy before a BMA is contemplated in carefully selected cases. Suggestions that may reduce this high rate include strict compliance with pre-bone marrow aspiration review of clinical history, physical examination and other investigations. Inconclusive BMA results in this study of 6.67% further highlight the need

for additional investigations which either increase the sensitivity or support this procedure. These include cytochemistry, flow cytometry, Fluorescence in-situ hybridization, Polymerase Chain reactions and numerous molecular investigations.

It is therefore important to note that although BMA may be essential in the evaluation of patients there is a need to ensure proper consultation to ensure only patients that require BMA do so due to its invasive nature.

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