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Original research article

Role of bone marrow trephine biopsy in non haematological disorders a study conducted in tertiary care hospital south India

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Abstract

Introduction: Since time immemorial, the diagnosis of haematological disorders were mainly done by using bone marrow aspiration.

The available statistics show that the diagnosis of haematological disorders and non haematological disorders involves, taking complete clinical history, careful physical examination, complete hemogram and bone marrow examination by either aspiration or biopsy. The biopsy is more superior to aspiration.

Material and Methods: 19 patients of non-hematological disorders who listed the Government hospital, Kakinada between March 2001 to Feb 2003 were included in this study. Before the biopsy procedure was done relevant clinical history, detailed clinical examination of the patient and complete hemogram Examination were done for all patients. The patients were than subjected to bone morrow biopsy and bone morrow aspiration.

Results: In the present study bone marrow aspiration and biopsy were done at 19 patients who has come with non haematological disorders.

Keywords: Haematological disorders, bone morrow biopsy and bone morrow aspiration

Introduction

Since time immemorial, the diagnosis of haematological disorders were mainly done by using bone morrow aspiration. The available statics shows that the diagnosis of a haematological disorders and some non haematological disorders involves, taking complete clinical history, careful physical examination, complete hemogram and bone marrow examination by either aspiration or biopsy Even though aspiration is diagnostic, biopsy is more superior than aspiration.

The biopsy is of 2 types

1) Open surgical biopsy.

2) Trephine biopsy.

Open surgical biopsy has proven to be an important procedure to classify the various disorders and to determine the prognosis. However this method is invasive, traumatic and requires anesthesia, which makes this technique difficult to use as a routine method. So people are relying more on bone marrow aspiration.

Jamshidi introduced a biopsy needle that way easier to use, and which provided similar intact biopsy specimens. There are virtual no contraindications to needle biopsy, hence it is a safe procedure The concurrent use of both biopsy and aspiration provides better diagnosis and is cost effective.

Aims of the study

1. To study the history of bone marrow in various non haematological disorder.
2. To know the advantage of bone marrow trephine biopsy over the aspirate smear.
3. To study the cellularity of bone marrow with intact architecture in trephine biopsies and its comparison with aspirate smear.
4. To know the utility of bone marrow study in case of malignant deposit from various lesions mainly from carcinoma Breast, as a part of staging procedure.
5. To evaluate the diagnostic efficacy of trephine biopsies over the aspirate smears.

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Result: A total number of 19 non haematology conditions were included in the present day. Out of 19 cases 3 (15.78%) nonmalignant non haematological conditions and 16 (84.21%) were Malignant non haematological conditions.

Table 1: Non Haematological Non Malignant Conditions

Cases	Total	Percentage	No. of adequate aspiration	No. of adequate Biopsies
Storage Cases	1	2%	1	1
PUO	2	4%	2	1
Total	3	6%	3	2

In this study one case of storage disorder was encountered as aspiration this showed normo cellularity and biopsy showed hyper cellularity two cases of PUO were studied. In which one case yielded inadequate biopsy. No granulomas (or) any inclusions were identified.

Non-haematological malignant Conditions

In this study 15 cases of carcinoma breast and in one case of alveolar rhabdomyosarcoma were included as a part of staging procedure.

In all these cases both aspiration and biopsy were performed are case of carcinomas breast showed metastasis on both aspiration and biopsy, but one case was normal on aspiration and biopsy showed metastasis. Both the cases showed grade II fibrosis with reticulin stain.

In alveolar rhabdomyosarcoma aspiration was failed as there was bleeding from site. Biopsy showed metastesis.

Table 2

Cases	Total	Percentage	No. of pointing aspiration	Percentage	No. of adequate biopsies	Percentage
Bone marrow in carcinoma breast patients	15	30%	1	6.25	2	12.5
Alveolar rhabdomyosarcoma	1	2%	0	0	1	6.25

Table 3: Reticulin content of bone marrow

Cases	Total	Reticulin content	
		Normal	Increased
Metastasis in carcinoma breast	15	13	2
Alveolar Rhabdomyo sarcoma	1	1	0

The non-malignant haematological conditions did not show any significant increase in the bone marrow reticulin content. Increased reticulin content was noted in two cases of metastatic carcinoma from carcinoma breast.

Table 4: Bone Marrow Iron Stores

Cases	Total	Iron stores		
		Normal	Increased	Decreased
Metastasis in carcinoma breast	15	13	1	1
Alveolar Rhabdomyosarcoma	1	1	0	0

The bone marrow iron stores were decreased in 1 case of metastatic carcinoma from Carcinoma breast. Bone marrow iron stores were increased in 1 case of metastatic carcinoma from carcinoma of breast.

Table 5: Presentation of pancytopenia and leukoerythroblastic blood picture on Bone marrow biopsy.

Condition	Nonmalignant non haematological disorders		Malignant non haematological disorders	
	SD	PUO	CB	ARMS
Pancytopenia	1	0	0	0
Leukoerythroblastic blood picture	0	0	0	0
Total cases	1			

Table 6: Correlation between aspiration and Biopsy

Disorders	Total	BM ASP	BMBx	Inadequate Material		Inadequate Material	Correlated	Not correlated
	Cases			ASP	Bx	Bx & ASP	Bx &ASP	Bx &ASP

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non haematological nonmalignant disorder								
SD	1	1	1	0	0	1	1	0
PUO	2	2	1	0	1	1	1	0
non haematological malignant disorder								
Ca Breast	15	15	15	0	0	15	14(13)	1
Alveolar Rhabdomyosarcoma	1	0	1	1	0	0	0	0
Total	19	18	18	1	1	17	16	1

13-Normal Study, 1 +ve for metastic. SD-Storage Disorders.
PUO-Pyrexia of unknown origin
ARMS-Alveolar Rhabdomyosarcoma (99.5%) metastasis.
Out of 19 cases 18 (99.5%) cases were correlated on both aspiration and biopsy. 1 case was not correlated.

Discussion

Evaluation of bone marrow is essential in many haematological and non halmatological disorders. A good marrow aspirate must have multiple fragments and adequate cell trails for proper Evaluation. At times marrow aspirate is diluted is a dry tap is unsatisfactory.

Moreover, in certain diseases, marrow involvement is focal E.g.: granulomata, metastatic deposits focal myeloma, Hodgkin's disease associated with fibrosis and therefore marrow aspirate fails to demonstrate the disease process to arrive a diagnosis. Therefore a marrow biopsy is necessary, which may be obtained surgically from iliac crest or a trephine biopsy under local anesthesia.

In the present study 19 cases with non haematological disorders were subjected to bone marrow aspiration and trephine biopsy.

The maximum number of patients presented were between 21-51 years. The major clinical presentations were with anemia, and hepatosplenomegaly.

One case was presented with epilepsy, early onset cataract and stunted growth and on bone marrow biopsy turned out to be a storage disorder.

Male to female ratio was 1:3

Bone marrow often fails to be aspirated in aplastic anemia, packed marrow (Leukemia's) and conditions associated with myelofibrosis. (Hyon *et al*, 1988, Neelam verm 1993).

The comparative study of inadequate aspirations in various studies and present study is mentioned in the table below.

Table 7: Comparison of Inadequate Aspirations in various studies & present study

Studies	Total cases studies	Adequate Aspirations	Inadequate Aspirations
Hyun *et al*	1357	92	6.8%
Neelam Verma	535	283	36%
Present study	19	18	99.5%

In the present study adequate biopsies were obtained in 18/19 (99.5%) cases and in one case it was inadequate.

Some authors believe that a trephine biopsy is superior to aspirate smears in the assessment of cellularity (Crause, hyun *et al*). However others have found a good correlation between aspirate smears and trephine biopsies. (pau et 1989).In the present 18/19 (99.5%) showed correlation between aspiration and biopsy with respect to cellularity i.e one case did not show correlation This variability Could be due to tapping different areas of the bone marrow. One case of storage disorder showed discrepancies in the cellularity. This could be explained due to packed marrow, which yields low cellularity on aspiration (Ref hyun *et al* 1988, Neelam Verme 1993).

The non haematological disorders are divided in to a) non malignant and b) malignant disorders

a) Non haematological and non-malignant disorders
1. Storage disorder 1/19 (5.26%) 2) PUO2/19 (10.52%).

b) Non haematological malignant disorders 16/19.
1. Carcinoma breast 15/19 (78.94%).
2. Alveolar Rhabdomyosarcoma 1/19 (5.26%).

Large number of cases in the non-haematological disorders belonged to Carcinoma breast as a part of staging Procedure.

Reticulin content was increased in 2/19 (10.52%) of metastasis in Carcinoma breast.

Bone marrow Iron stores load increased in 1/19 (5.26%) metastasis in carcinoma breast. Bone marrow from store was decreased in 1/19 (5.26%) metastasis in Carcinoma breast.

Out 19 cases 1 (15.26%) case PUO Inadequate material was observed in bone marrow biopsy.

1 (5.26%) case of Carcinoma breast metastasis was not correlated in bone marrow aspiration and biopsy.

Bone marrow biopsy should be performed whenever bone morrow aspiration is indicated, because bone

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morrow biopsy is diagnostic in cases where aspiration is negative or equivocal. Also it is nearly impossible to predict in advance, which aspiration attempt will be technically difficult.
The complications are nil and cost benefit analysis is in favor of combined approach. It is a safe outpatient Procedure.

Summary

Bone marrow examination was done in 19 patients, majority belonged to the age group 20-50 years. Trephine biopsy is superior to aspirate smears with respect to adequacy and cellularity. Even through morphology is better appreciated in aspiration. In this study the adequacy was 99.5% in trephine biopsy and aspiration. The Correlation between biopsies and aspirate with respect to cellularity was 99.5%. Bone marrow trephine biopsy is a useful tool for staging of patients with cancers which has high like hood of bone metastasis. The Correlation between aspiration and biopsy was 99.5%.

Conclusion

Bone marrow aspiration and trephine biopsies are complimentary to one another and the combined approach increases the diagnostic value. In this study the Correlation between biopsy and aspiration was 99.5%.
Bone marrow biopsy should be performed whenever bone marrow of Aspiration is indicated because bone marrow biopsy is diagnostic in cases where aspiration is negative or equivocal.
The complications are nil and cost benefit analysis favor the combined approach, it is safe outpatient Procedure.

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