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BONE MARROW METASTASIS IN SOLID TUMORS: A RETROSPECTIVE STUDY

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ABSTRACT

This procedure is also used for determining the bone marrow metastasis in patients with solid tumors. The aim of this study was to observe clinical, laboratory, and pathological findings in patients with bone marrow metastases of solid tumours (n = 10).Bone marrow metastasis were found in 10 cases. 4 patients were in paediatric age group and 6 were adults. All the 4 paediatric cases had metastatic deposits from neuroblastoma. In the adult patients 3 cases had metastatic deposits from carcinoma lung , 1 each from carcinoma breast , carcinoma prostate and carcinoma colon . Anemia was the commonest clinical presentation seen in 4 out of 10 cases. Associated complaint of fever was present in 5 out of 10 patients, low backache in 2 patients and malaise in 3 patients.

KEYWORDS : Bone Marrow, Metastasis, Solid Tumors

Solid tumors may spread to the bone marrow by haematogenous route. The prognosis of cases of solid tumors with marrow metastasis is dismal. (Kilickap et al; 2007) Bone marrow metastasis have been reported from non haematological malignancies mostly including carcinoma prostate, breast, lung , gastric cancer and neuroblastoma.(Anner and Drewinko; 1977) (Singh, Krause and Breitfeld ;1977)

Bone marrow aspiration and biopsy is done in solid tumors for staging and prognosis. (Kanhere, Sharma and Kalra ;1988)(Landys K ;1982) It is the fastest, easiest and cheapest method to search for metastatic foci in bone marrow. The haematological features suggestive of bone marrow metastasis are anemia, leukopenia or cytopenias.

The aim of our study was to observe clinical characterstics and haematological findings in 10 cases of bone marrow metastasis.

MATERIALS AND METHODS

The study was done in Department of Clinical Pathology, Pt. B. D. Sharma, PGIMS, Rohtak. We reviewed the results of 900 bone marrow aspirations/imprint smears received over a period of 2 years. Ten cases were found to have bone marrow metastasis by solid tumors. Trephine biopsy specimens were available in 8 out of those 10 patients. Cases having bone marrow infiltration by lymphoma were not included. Complete clinical details of patients as well as primary site of carcinoma were recorded. Peripheral blood counts and blood films were also reviewed.

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RESULTS

A total of 900 patients underwent bone marrow aspiration in our institution in 2 years for diagnosis of various diseases. Bone marrow metastasis were found in 10 cases. Trephine biopsy was also done in 8 out of those 10 patients. Dry tap was obtained in one patient on aspiration and secondary deposits were reported on imprint smears.

Of these 10 patients, 4 were in paediatric age group and 6 were adults. Male to female ratio was 4:1. All the four paediatric cases had metastatic deposits from small round cell tumor (Figure 2) (all were histopathologically confirmed cases of neuroblastoma) . Out of 6 adult patients , 3 had metastatic deposits from carcinoma lung(Figure 3) , 1 from carcinoma breast , 1 from carcinoma prostate (Figure 1) and carcinoma colon in one patient(primary site of malignancy was histologically proven).

Associated complaint of fever was present in 5 out of 10 patients, low backache in 2 patients, malaise in 3 patients.

Table 1. shows the haematological profile of the cases of solid tumors with metastasis to bone marrow. Anemia was the commonest clinical presentation with 4 out of 10 patients .Other haematological manifestations were thrombocytopenia in 2(20%), pancytopenia in 2(20%), and leukoerythroblastic picture in 2(20%).

In one patient primary site was detected subsequent to bone marrow examination. Bone marrow examination in this case revealed metastatic deposits from small cell carcinoma lung. X ray and CT chest was advised.

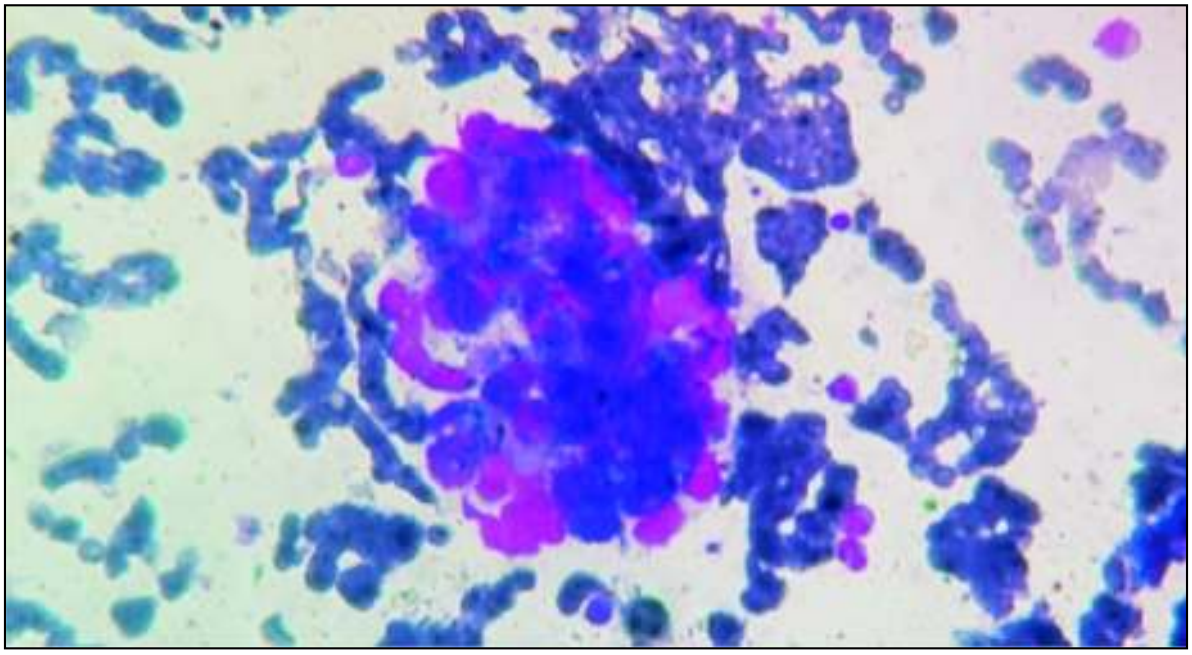

Figure 1 : Metastatic Cells in Bone Marrow Aspiration Smear From Adenocarcinoma Prostate (200x)

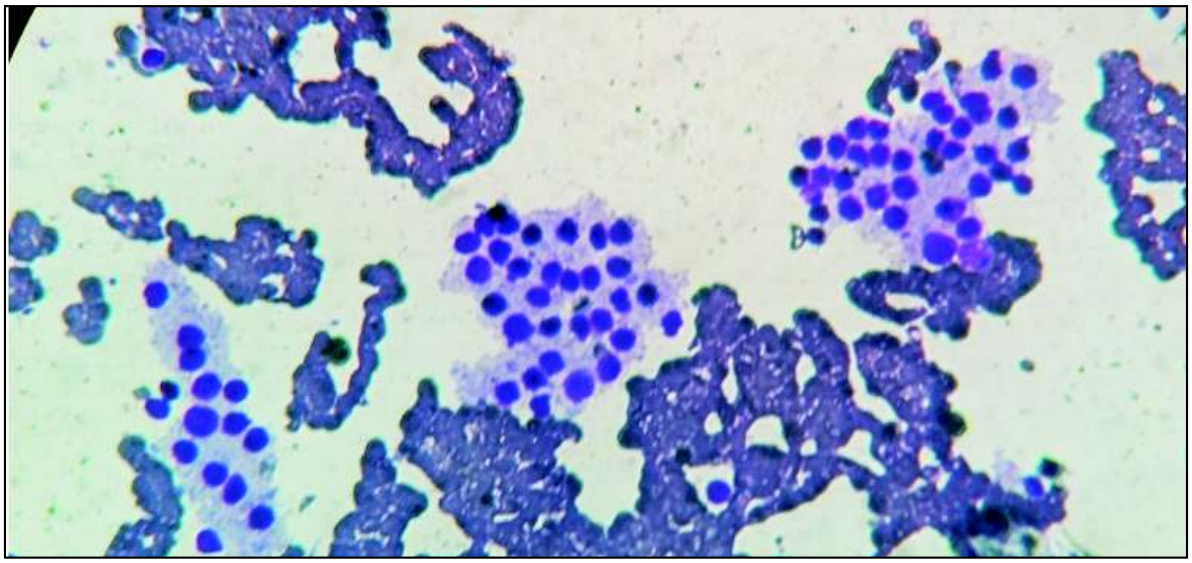

Figure 2 : Bone Marrow Aspiration Smear Showing Metastatic Tumor Cells From Neuroblastoma. (200x)

Table 1 : Hematological Profile of Solid Tumors With Bone Marrow Metastasis

Blood Picture	Number of Cases	Percentage
Anemia	4	40%
Thrombocytopenia	2	20%
Pancytopenia	2	20%
Leukoerythroblastic picture	2	20%

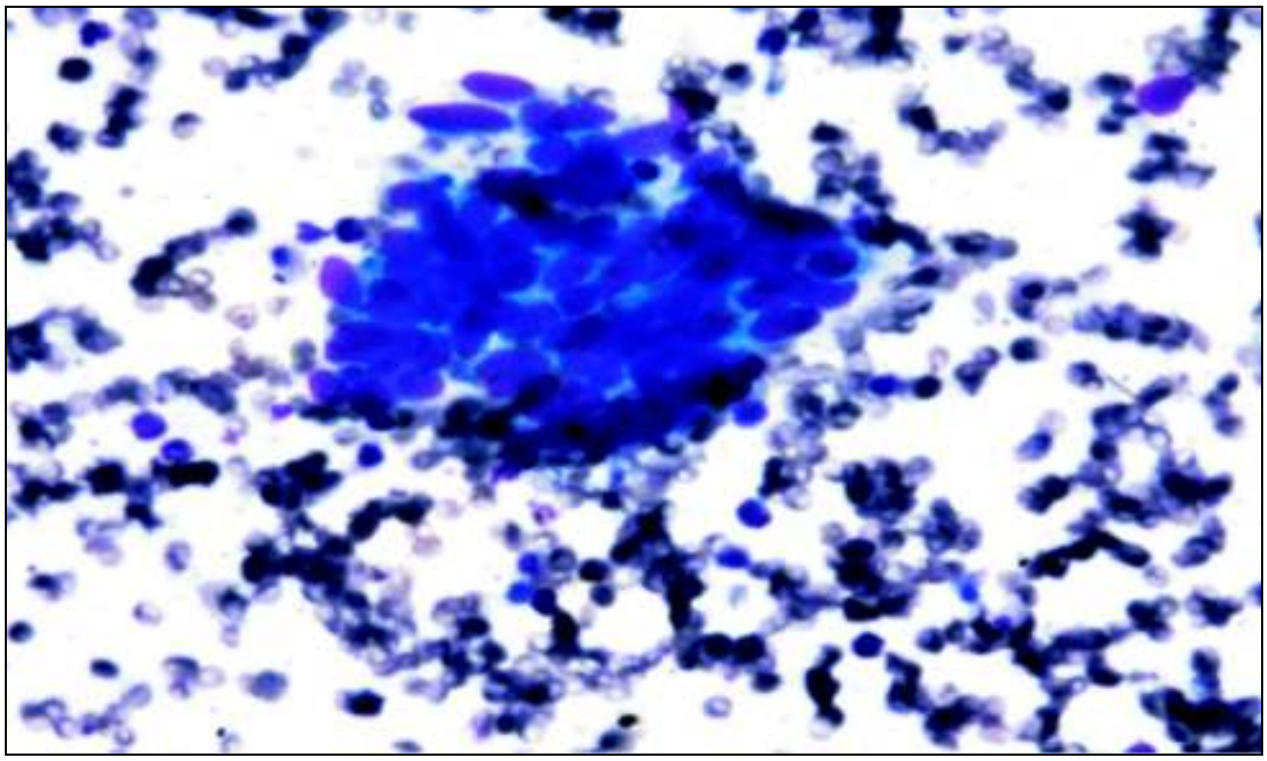

Figure 3 : Metastatic Tumor Cells From Small Cell Carcinoma Lung. (200x)

On CT chest and CT guided biopsy lung, diagnosis of small cell carcinoma was confirmed.

DISCUSSION

Bone marrow aspiration and biopsy are easily applicable and accessible method in diagnosing metastatic solid tumors . Although magnetic resonance imaging and bone scintigraphy can give information about the spread of the disease; bone marrow aspiration and biopsy is more widely used in determining bone marrow metastasis because of the compatibility of histopathological and immunohistochemical examination. (Kucukzeybek et al.; 2014).

Disseminated cells from primary solid tumors are considered to be the cause of metastases formation and relapse of disease. Consequently, their detection is of high importance for staging, prognosis and decisions about adjuvant therapy (Zehentner ; 2002).

Theoretically, all tumors can metastasize to the bone marrow, however, cancers of the breast, prostate and lung are the most frequently encountered ones in adults. (Kilickap et al., 2007) In pediatric cases, neuroblastoma is responsible for the majority of cases. In a retrospective study, Mohanty et al. showed that prostate cancer (47.8%) was the most common tumor among adults, followed by breast cancer (28.2%).(Mohanty and Dash, 2003)

In our study, we reviewed the results of 900 patients who had a bone marrow aspiration. We found 10 cases with BM metastasis of solid tumors. Lung cancer was the most commonly encountered tumor. In our study, all pediatric cases had neuroblastoma.

Patients with BM involvement could have normal blood counts, some disturbances in one or more series or they could be pancytopenic. Though severe anemia can be life threatening, the complications of neutropenia and thrombocytopenia result in more morbidity and mortality. Pancytopenic patients are known to have a higher complication risk than the others(Kilickap et al; 2007). In our study anemia was the most common finding on haematological examination.

The haematological abnormality most suggestive of marrow infiltration, though not specific for it is

peripheral leukoerythroblastic picture, which may be present in less than half of patients. (Mohanty and Dash; 2003. In the present study leukoerythroblastic picture was seen in 20% cases.

The demonstration of marrow involvement in early stage disease by the application of newer techniques is of interest. Immunohistochemistry, clonal growth, flow cytometry and PCR techniques will indicate a greater frequency of tumor infiltration than has been evident from standard histologic methods.(Reid et al., 1991).

CONCLUSION

The examination of bone marrow smear and biopsy has always been a good modality for staging and monitoring the prognosis and treatment in cases of malignant.solid tumors. Such investigations are indicated when there is significant probability of bone marrow metastases and when knowledge of their presence would affect the choice of primary treatment. Moreover a clue to the primary site can also be suggested if the primary is unknown and metastatic lesions are detected in the bone marrow.

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