Volume-6, Issue-2, February - 2017 • ISSN No 2277 - 8160 IF : 3.62 | IC Value 80.26

Original Research Paper Pathology

CYTODIAGNOSIS OF EWING'S SARCOMA : A CASE REPORT

Anshu Jamaiyar Assistant Professor , Department of Pathology, Rajendra Institute Of Medical Sciences, Ranchi(Jharkhand)

Sulekha Swarnkar Junior Resident, Department of Pathology, Rajendra Institute Of Medical Sciences, Ranchi(Jharkhand)

ABSTRACT *Ewing's sarcoma is a small round blue cell tumour characterized by the pathognomonic recurrent balanced translocation involving the chromosome 22 and 11. Ewing's sarcoma is the second most frequent bone sarcoma in children and young adults and has a slight male predominance; 80% of patients are younger than 20 years of age and only a few cases of ES are diagnosed in adults. Fine needle aspiration has a definitive role in the early diagnosis & hence better prognosis of this disease. Histopathogically, undifferentiated monotonous small round cells with uniform nuclei and fine chromatin are seen. The cytoplasm is scanty and contains glycogen, which can be demonstrated using periodic acid-Schiff (PAS). We report here a case in adult, which was diagnosed as Ewing's sarcoma in Fine needle aspiration (FNA) & confirmed by histopathology.*

KEYWORDS : Ewing's sarcoma, fine needle aspiration cytology, primitive peripheral neuroectodermal tumour (PNET), Histopathology.

INTRODUCTION

Ewing's sarcoma of bone (ES), extraskeletal Ewing's sarcoma (EES) and primitive peripheral neuroectodermal tumour (pPNET) are now considered to be the same tumour with variable differentiation and no significant biological or therapeutic distinction[1]. Ewing's sarcoma is rare primary neoplasm of bone representing approximately 6 to 8% of all malignant bone tumours. The tumour is slightly more prevalent in males than females. Any portion of the skeleton may be involved, but more than half of the tumours involve the long bones, usually the diaphysis or metadiaphysis. The flat bones also may be involved, especially the ilium and the ribs[2]. Clinically the tumour may simulate osteomyelitis because of pain, fever, and leukocytosis. The Ewing's sarcoma and peripheral neuroectodermal tumour(PNET) are "Small round blue cells tumour".The majority of cases share the cytogenetic translocation t(11;22) (q24;q12), with occasional variations, and characteristics immunohistochemical staining profile[3]. Most patients with ES/PNET are usually seen between the ages of 5 and 20 years, with only a minority of the cases presenting in infancy or adulthood4. Ewing's sarcoma has marked propensity for systemic spread, and therefore multiagent chemotherapy is mainstay of treatment. Adult patients with ES/PNET at highest risk of death are those who are older than 26 year, metastatic disease or an extraosseous primary tumour.

CASE REPORT

A 26yrs-old-male presented to the orthopedic OPD with complaints of painful swelling over the right arm. It was a diffuse, hard swelling and fixed to the bone over shaft of humerus, including shoulder joint. There was a history of loss of appetite, mild fever and malaise. The patient was thin built. On general examination, there was a mild pallor. Systemic examination did not reveal any abnormalities, except weakness (power 3/5) in the right limb. The routine blood investigation was within normal limit except ESR which was 58mm at the end of 1 hour. X-ray AP and Lateral view showed a periosteal reaction with old pathological fracture of shaft of humerus. An area of bone destruction was predominantly in mid diaphysis. The tumour extends into surrounding soft tissue with radiating streaks of ossification and reactive periosteal reaction.

A Fine Needle Aspiration of the lesion was performed using a 21 G needle with a 10 ml syringe. Both alcohol fixed smears and air dried smear were prepared and stained with Papinicolaou and May-Grünwald Giemsa stain. Smears showed good cellularity consisting of mixture of cells with large pale-staining nuclei and cells with smaller, darker nuclei. Rossette-like structure and prominent nucleoli in cells could be seen.

A Cytological diagnosis of Small round cell tumour (ES/PNET) was offered. For histological evaluation biopsies were processed by routine paraffin embedding and stained with Hematoxylin & Eosin (H&E). There was diffuse positivity for PAS (diastase sensitivity). The diagnosis was confirmed to be ES/PNET

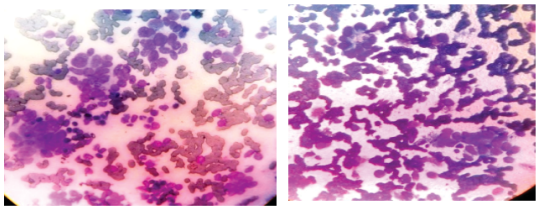

Fig.1 Left (LGxHP): Double cell population with large pale cells and small dark staining cells seen.Right (LGxHP) : Small round cells forming acinar and rosette- like structure.

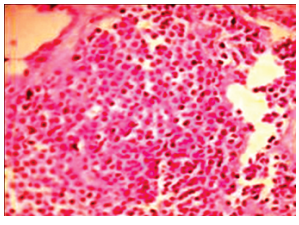

Fig.2: (H&ExHP) Tumour cells arranged in sheets showing monotonous round to oval cells with high NC ratio, inconspicuous nucleoli and scant cytoplasm with indistinct cytoplasmic boundries

DISCUSSION

Ewing's sarcoma, initially regarded as an undifferentiated type of bone sarcoma of children, is now linked with the neoplasm originally described in the soft tissues as primitive neuroectodermal tumour (PNET), and term Ewing sarcoma/PNET is currently favoured for this family5. ES is a primary non osteogenic malignant tumour of bone with peak incidence in second decade of life. James Ewing first described ES/PNET in 1921 and believed it to be a variant of diffuse endothelioma. Histologic classification of Ewing's sarcoma includes three major subtypes: classic or conventional (typical) Ewing's sarcoma, primitive neuroectodermal tumour (PNET), and atypical Ewing sarcoma. The tumours share the same immunohistochemical and molecular features, differing only in the extent of neural differentiation. Each subtype is considered a high-grade tumour. Most patients with ES/PNET are adolescents or young adults. The patients usually presents with localized pain and swelling. Pathologic fracture may occur. It occurs most often in long bones

(femur, tibia, humerus, and fibula) and in bones of the pelvis, rib, vertebrae, mandible, and clavicle[6]. It generally arises in the medullary canal of the shaft (hence its traditional inclusion among the 'marrow tumours'), from which it permeates the cortex and invades the soft tissues. Rarely, it is predominantly periosteal in location[7]. As already indicated, tumours with the appearance of ES/PNET can present clinically as a soft tissue neoplasm with a normal appearance of the underlying bone on plain x-ray films. Most tumours are associated with a soft tissue mass, a feature best appreciated by MRI and CT. Typically, ES give rise to prominent periosteal new bone formation in the form of multiple layers, producing an onion skin appearance.

There seems to be no known risk factors or prevention measures available for ES. However, researchers have discovered chromosomal changes in a cell's DNA that can lead to ES. In most cases, the change involved the fusion of genetic material between chromosome #11 and #22. . A translocation involving the EWS gene on chromosome band 22q12 & other partners, most frequently the FI1 gene on chromosome band 11q24, is typical for EWS/PNET and there are several different subtypes of the EWS/FLI1 fusion transcript.

The main differential diagnosis of "small blue round cell tumour" include lymphoma or leukemia, rhabdomyosarcoma, neuroblastoma, Small cell carcinoma, (poorly differentiated) synovial sarcoma, desmoplastic small round cell tumour and melanoma, in addition to Ewing's sarcoma. Lymphoblastic Lymphoma is composed of smaller, more uniform round cells and frequently contains benign, infiltrating lymphocyte. Cells in large cell lymphoma are frequently larger than those of ES/PNET, have almost no cytoplasm and their nuclei are irregular, cleaved and hyperlobated. Neuroblastoma is difficult to distinguish from ES/PNET based on only strict histological grounds, helpful findings include the presence of neuropil and the the evidence of ganglion cell differentiation. Typical IHC findings in ES/PNET include positivity for Vimentin, CD99. Neuroblastoma is negative for CD99, however it shows varying positivity for NSE.

The following are considered as poor prognostic indicators: age >26, extraosseous primary tumour, soft tissue extension, metastasis, therapy induced necrosis, filigree type microscopic pattern, TP53 overexpression, MYC amplification[8]. Tumours with EWS-FL1 fusion-type seems to have lower proliferation rate hence better prognosis[9].

CONCLUSION

FNAC is a very useful, economic and quick procedure in the diagnosis of Ewing's sarcoma family of tumours. Accurate diagnosis can be made even in deep seated tumours as in our case, if one gets adequate material under radiological guidance. FNAC is also useful in long-term follow-up of these cases for diagnosis of recurrence or rarely intercurrent second malignancy[10]. Ewing's sarcoma is childhood tumour but even occur in adults. So the case is reported for its rarity.

REFERENCES

1. Kilpatrick SE, Giesinger KR. Soft tissue sarcomas: the usefulness and limitations of fine-needle aspiration biopsy. Am J Clin Pathol. 1998;110:50–68. [PubMed]
2. Diagnostic histopathology of tumours, Fletcher, volume 2 tumour of osteoarticular system, page no.1876.
3. ParijaT,ShirleyS,UmaS,RajaKR,AyyapanS,Rajkumar T. Type 1(11:22)(q24:q12) translocation is common in ES/PNET.
4. Verrill MW, Judson IR, Harmer CL, Fisher C, Thomas JM, Wiltshaw E: Ewing's sarcoma and primitive neuroectodermal tumor in adults: are they different from Ewing's sarcoma and primitive neuroectodermal tumor in children? J Clin Oncol 1997; 15:2611-2621. EWs/PNET.
5. Askin FB, Perlman EJ: Neuroblastoma and peripheral neuroectodermal tumors. Am J Clin Pathol 1998; 109:S23-S30.
6. Siegal GP, Oliver WR, Reinus WR, Gilula LA, Foulkes MA, Kissane JM, Askin FB: Primary Ewing's sarcoma involving the bones of the head and neck. Cancer 1987; 60:2829-2840.
7. Bator SM, Bauer TW, Marks KE, Norris DG: Periosteal Ewing's sarcoma. Cancer 1986; 58:1781-1784.
8. Rosai & Ackerman's, Surgical pathology, volume 2, chapter bone and joints, page no.2048.
9. Bator SM, Bauer TW, Marks KE, Norris DG: Periosteal Ewing's sarcoma. Cancer 1986; 58:1781-1784.
10. Kuttesch JF, Jr, Wexler LH, Marcus RB, Fairclough D, Weaver-McClure L, White M, et al. Second malignancy in Ewing's sarcoma: radiation dose-dependency of secondary sarcomas.J Clin Oncol. 1996;14:2818–25. [PubMed]