Editorial

BIOMEDICAL Journal of Scientific & Technical Research

ISSN: 2574 -1241

DOI: 10.26717/BJSTR.2022.46.007402

Orbed and Corrosive-Ewing's Sarcoma

Anubha Bajaj*

Consultant Histopathology, A.B. Diagnostics, India

***Corresponding author:** Anubha Bajaj, Consultant Histopathology, A.B. Diagnostics, New Delhi, India

ARTICLE INFO

Received: October 08, 2022

Published: October 21, 2022

ABSTRACT

Citation: Anubha Bajaj. Orbed and Corrosive-Ewing's Sarcoma. Biomed J Sci & Tech Res 46(5)-2022. BJSTR. MS.ID.007402.

Editorial

Ewing's sarcoma is a commonly discerned, malignant, paediatric bone tumour expounding as a small round cell sarcoma. Tumefaction exhibits genetic fusions of FET family of genes, generally EWSR1 along with E26 transformation specific (ETS) family of transcription factors. Initially scripted by James Ewing as a diffuse endothelioma of bone, Ewing's sarcoma exhibits diffuse membranous expression of CD99 and predominant genetic fusion of EWSR1-FLI1. Following osteosarcoma in frequency, Ewing's sarcoma is additionally designated as Ewing's sarcoma of bone, extra-skeletal Ewing's sarcoma, or adamantinoma-like Ewing's sarcoma. Terminology of primitive neuro-ectodermal tumour (PNET) or Askin tumour denominating Ewing's sarcoma of chest wall remains obsolete [1,2]. Ewing's sarcoma is predominantly discerned within Caucasian population. Children or young adults are commonly incriminated. Majority of incriminated subjects appear <20 years and peak disease incidence occurs within second decade. Ewing's sarcoma is uncommonly observed < 5 years and > 30 years. A male preponderance is observed with male to female proportion of 1.5:1 [1,2]. Ewing's sarcoma preponderantly incriminates diaphysis or metaphyseal - diaphyseal region of long bones. Lower limbs, upper limbs, ribs or pelvic bones are implicated in decreasing order of frequency. In contrast to soft tissue, bones are commonly incriminated. Extra-skeletal neoplasms may emerge [1,2]. Ewing's sarcoma frequently depicts primary chromosomal mutations which engender fusion genes between FET and ETS coterie, features associated with modified genetic expression and enhancement of tumorigenesis [1,2].

Additionally, secondary genomic mutations within STAG2, CDKN2A or TP53 may be discerned. Majority of chromosomal mutations are sporadic wherein germline mutations may ensue. Ewing's sarcoma is possibly engendered from mesenchymal stem cell commonly associated with chromosomal translocations of EWSR1 and ETS partner genes [1,2]. Neoplastic cells frequently demonstrate a genomic translocation t (11;22) (q24; q12) with consequent emergence of EWSR1-FLI1 genetic fusion. Also, translocation t (21;22) (q22; q12) with EWSR1-ERG genetic fusion may be discerned. Genomic fusions of ETV1 (7p22), ETV4 (17q21) and FEV (2q35-36) are exceptional. Infrequently discerned translocations emerge as ERG or FEV with FUS, t (16;21) (p11;q22) FUS-ERG and t(2;16)(q35;p11) FUS-FEV. Incriminated individuals exhibit localized pain and bony swelling. A painful, enlarging tumefaction may be discerned with occasional pathological fracture [1,2]. Systemic features such as fever, weight loss, anaemia, leucocytosis and elevated erythrocyte sedimentation rate may occur [1,2]. Upon gross examination, a grey to tan tumour mass with infiltrative perimeter is observed. Intramedullary tumefaction may exhibit incrimination of soft tissue. Focal necrosis and hemorrhage is frequent. 'Chemotherapy induced necrosis' requires assessment and differentiation [1,2]. Upon frozen section, neoplasm composed of small, round blue cells is observed. Cytological evaluation of

Ewing's sarcoma exhibits uniform, small round cells imbued with scanty, indistinct cytoplasm, finely dispersed nuclear chromatin and occasional nucleoli. Rosette-like configurations are infrequent [1,2]. Upon microscopy, Ewing's sarcoma defines diverse variants as

- Classical Ewing's sarcoma exhibits a sheet-like tumour configuration or islands of tumour cells segregated by dense, fibrous tissue septa. Tumefaction is constituted of uniform small round cells incorporated with spherical nuclei, finely stippled chromatin, inconspicuous nucleoli and scanty, clear to eosinophilic cytoplasm with indistinct cytoplasmic boundaries [1,2].
- Ewing's sarcoma with neuro-ectodermal differentiation demonstrates Homer-Wright pseudo-rosettes.
- Atypical Ewing's sarcoma delineates tumour cells with enlarged nuclei, irregular nuclear contour, vesicular or coarse chromatin and prominent nucleoli.
- Adamantinoma-like Ewing's sarcoma is a high-grade neoplasm which enunciates nests of basaloid cells with minimal pleomorphism, peripheral nuclear palisading and cording. Surrounding stroma is predominantly myxoid, fibro myxoid or hyalinized. Foci of keratinous pearls are discerned [1,2] (Figures 1 & 2).

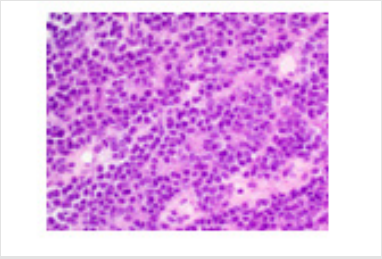

Figure 1: Ewing's sarcoma composed of small round cells with minimal cytoplasm and enlarged nuclei, delicate intervening stroma with congested vascular articulations [5].

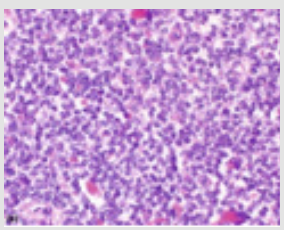

Figure 2: Ewing's sarcoma delineating small round cells with scanty cytoplasm, enlarged, basophilic nuclei and vascularized intervening stroma [6].

TNM Staging of Ewing's Sarcoma, Contingent to American Joint Committee on Cancer, Eight Edition Is Denominated As

- Stage I remains non applicable as Ewing's sarcoma is a high-grade tumefaction of Grade II or Grade III category.
- Stage II is subdivided into

i. ~stage IIA demonstrates a high grade, intra-compartmental tumour ≤ 8 centimeters diameter. Regional lymph node or distant metastasis is absent.

ii. ~stage IIB demonstrates a high-grade tumour > 8 centimetre magnitude devoid of regional lymph node or distant metastasis.

- Stage III demonstrates a high grade, extra-compartmental or a multi-centric tumour incriminating a singular bone. Neoplasm is devoid of regional lymph node or distant metastasis.
- Stage IV is subdivided into

i. ~stage IVA delineates a tumefaction of variable magnitude with pulmonary metastasis. Metastasis to regional lymph nodes or diverse organs is absent.

- Stage IVB exhibits a tumefaction of variable magnitude with tumour metastasis into regional lymph nodes. Distant metastasis may or may not be observed. Pulmonary metastasis is absent [2,3].

Additional Categories Are Denominated As

- TX: Primary tumour cannot be assessed.
- T0: No evidence of primary tumour.
- NX: Regional lymph nodes cannot be assessed.

Tumour Grading Is Expounded As

- Grade 1: Gradually progressive tumour simulates normal cells.
- Grade 2: Tumour cells appear malignant and abnormal.
- Grade 3: Tumour cells appear extremely anomalous, malignant and disseminate rapidly [2,3].

Ewing's Sarcoma May Manifest As a

- Localized tumefaction wherein tumour is confined to singular tissue of tumour induction as bone or skeletal muscle. Regional lymph nodes may be implicated. Distant metastases are absent although miniature aggregates of neoplastic cells may disseminate to diverse organs [2,3].
- Metastatic tumefaction depicting tumour dissemination

into diverse organs or viscera as lungs, various bones, or bone marrow. Metastasis into regional lymph nodes or hepatic parenchyma is infrequent [2,3].

- Low grade, localized neoplasm delineates stage I
- High grade, localized neoplasm exemplifies stage II
- Metastatic neoplasm enunciates grade III, irrespective of tumour grade.

Aforesaid staging is not applicable to neoplasms emerging with pelvic bones or vertebral column [2,3]. Ewing's sarcoma is immune reactive to CD99, NKX2.2, vimentin, FLI1, ERG, cytokeratin, NSE, p63 or p40. Glycogen rich tumour cells can be stained with Periodic acid- Schiff's stain with sensitivity to diastase. Ewing's sarcoma is immune non-reactive to LCA or CD45, desman, myogenic, MyoD1, WT1, ETV6, CIC, BCOR, CCNB3, SATB2, SOX9, NUT1, TTF1, chromogranin, TdT, S100 protein, synaptophysin, NCAM, or cytokeratin [3,4]. Ewing's sarcoma requires segregation from neoplasms such as mesenchymal chondrosarcoma, metastatic neoplasms composed of small round cell morphology as neuroblastoma, alveolar rhabdomyosarcoma, primary lymphoma of bone, small cell osteosarcoma, poorly differentiated synovial sarcoma, neuro-ectodermal tumours, CIC rearranged sarcoma, BCOR rearranged sarcoma, round cell sarcoma with EWSR1-non ETS fusion, desmoplastic small round cell tumour, basaloid squamous cell carcinoma or high grade neuroendocrine carcinoma (adamantinoma-like variant). Besides, osteomyelitis or eosinophilic granuloma necessitates demarcation. Ewing's sarcoma can be appropriately discerned with amalgamation of clinical, radiographic, and molecular characterization along with pertinent immunohistochemistry. Features of a small, round cell tumefaction with diffuse, membranous CD99 expression and genomic fusion of FET-ETS genes is diagnostic [3,4]. Incriminated subjects depict anemia, leukocytosis and elevated erythrocyte sedimentation rate [3,4]. Plain radiographs manifest an osteolytic lesion with bone permeation, inadequately defined lesion perimeter, foci of 'moth eaten' bone destruction, aggressive periosteal reaction with occurrence of 'onion skin' appearance or a 'sunburst' periosteal reaction and saucerization or extra-osseous tumour extension and bone erosion [3,4]. Configuration of tumour osteoid or matrix is absent. Ascertainment of tumour extent upon plain radiography can be challenging [3,4]. Computerized tomography, magnetic resonance imaging or positron emission computerized tomography can be adopted to appropriately define primary lesion, assess tumour extension into surrounding soft tissue and metastatic disease [3,4].

T1 weighted magnetic resonance imaging depicts minimal to intermediate signal intensity. T2 weighted imaging delineates a heterogeneous, predominantly enhanced signal intensity. Ewing's sarcoma can be optimally treated with neoadjuvant chemotherapy followed by surgical intervention [3,4]. Pertinent chemotherapeutic protocol for Ewing's sarcoma is alternating vincristine / doxorubicin / cyclophosphamide and ifosfamide / etoposide which ameliorates prognostic outcomes [3,4]. Radiotherapy is preferably adopted for treating surgically inaccessible neoplasms, unsatisfactory tumour eradication from excised tissue perimeter and as a palliative therapy. Immunotherapy exhibits limited efficacy [3,4]. Prognostic outcomes are contingent to appearance of regional lymph node or distant metastases. Localized disease subjected to cogent surgical resection exhibits favourable 5-year disease survival. Neoplasms associated with distant metastasis enunciate inferior 5-year disease survival [3,4]. Surgical extermination of pulmonary metastases ameliorates individual survival [3,4]. Factors associated with favourable prognostic outcomes are comprehensive pathologic response to neoadjuvant chemotherapy, miniature neoplasms confined to superficial sites and tumour confined to sites accessible to surgical extermination [3,4]. Factors associated with unfavorable prognostic outcomes are preliminary tumour relapse, occurrence of distant metastasis and neoplasms confined to anatomical sites as trunk or pelvis [3-6].

References

1. Durer S, Shaikh H (2022) Ewing Sarcoma. Stat Pearls International, Treasure Island, Florida.
2. Jan Van Mater D, Wagner L (2019) Management of recurrent Ewing sarcoma: challenges and approaches. Onco Targets Ther 12: 2279-2288.
3. Zhong D, Chen D (2022) Screening of Potential Key Biomarkers for Ewing Sarcoma: Evidence from Gene Array Analysis. Int J Gen Med 15: 2575-2588.
4. Yang C, Chen W (2022) Congenital soft tissue Ewing's sarcoma: A case report of pre- and postnatal magnetic resonance imaging findings. Medicine (Baltimore) 101(2): e28587.
5. Image 1 Courtesy: Pathology Outlines.
6. Image 2 Courtesy: Science direct.

ISSN: 2574-1241

DOI: 10.26717/BJSTR.2022.46.007402

Anubha Bajaj. Biomed J Sci & Tech Res

Submission Link: https://biomedres.us/submit-manuscript.php