

Tumor Associated Tissue Eosinophilia - A Prognostic Marker in Malignant Tumors

Dr. Rana K. Sherwani MD Professor

***Dr. Nadia Shirazi** MD, Asst Professor

Dr. Kafil Akhtar MD,DMRT, Associate Professor

Dr. Anjum Ara Junior Resident

From the: Department of Pathology, Jawaharlal Nehru Medical College, A.M.U., Aligarh and *Himalayan Institute of Medical Sciences, Dehradun, India.

Address for Correspondence: Dr. Kafil Akhtar, Associate Professor, Department of Pathology, Jawaharlal Nehru Medical College, Aligarh Muslim University, Aligarh.(U.P)-India.

ABSTRACT

Tumor associated tissue eosinophilia (TATE), is characterized by the presence of eosinophils as a component of peri and intra tumoral inflammatory response. The present study on 92 cases of diagnosed malignant tumors was undertaken to assess the role of tissue eosinophilia as a prognostic factor in malignant tumors; to verify the association between tumor associated tissue eosinophilia, microscopic neoplastic characteristics as well as tumor tissue inflammatory response and to evaluate the role of blood eosinophilia on the prognosis of malignant tumors. The study concluded that tumor associated tissue eosinophilia is associated with absence of metastasis and has a protective role in the spread of squamous cell carcinomas, with a high grade TATE being a favourable prognostic indicator in squamous cell carcinomas.

KEY WORDS: Malignant Tumors, Tissue Eosinophilia, Prognosis.

INTRODUCTION

The idea that a tumor may induce a protective reaction in its host, antedated by many years the modern concept of immune surveillance of tumors.¹ Many types of human cancer are associated with extensive eosinophilia either within the tumor itself or in the peripheral blood or in both locations. Tumor associated tissue eosinophilia is characterized by the presence of eosinophils as a component of peri and intra tumoral inflammatory infiltrate.

Although the exact role of eosinophils in tumors is not yet defined, it has been related to a good,² to a poor prognosis,³ or having no influence on patients outcome.⁴ One possible explanation for this controversy, is the fact that the definition and measurement of tumor associated tissue eosinophilia is not uniform among authors, precluding the comparison of results obtained from different studies.⁵

Although the presence or absence of eosinophilia, within the tumors does not appear to have a major influence on the prognosis of the patient, eosinophils may play an important role in the host interaction with the tumor, perhaps by promoting angiogenesis and connective tissue formation adjacent to the tumor. In addition, tumor related tissue eosinophilia provides some interesting clues into tumor biology, particularly with regards to the production of cytokines by the tumor cells. Cellular and molecular interactions of eosinophils in tumor sites may contribute to the treatment and establishment of prognosis for these tumors in the future.⁶

The present study was undertaken to assess the role of tissue eosinophilia as a prognostic factor in malignant tumors; to verify the association between tumor associated tissue eosinophilia (TATE), microscopic neoplastic characteristics as well as tumor tissue (acute or chronic) inflammatory response and to evaluate the role of blood eosinophilia on the prognosis of malignant tumors.

MATERIAL AND METHODS

The present study included 132 cases of diagnosed malignant tumors in the Department of Pathology, JN Medical College, AMU, Aligarh. A thorough clinical history and detailed examination of each patient was obtained. Surgically resected specimens were processed, cut into 3-5 μ m thick sections and stained with Haematoxylin and Eosin stain. Histopathological variables (Goldsmith et al)² studied were- (i) **Broder's scale:** tumors were graded 1 to 4 on the basis on increasing percentage of undifferentiated epithelium (ii) **Bauer's scale:** tumors were designated as keratinizing or non-keratinizing (iii) Pattern of spread at the periphery of tumor (borders) - either pushing or infiltrative (iv) Percentage of tumor composed of pleomorphic cells. Grades 1, 2, 3 and 4 corresponded to 10%, 30%, 50% and 75% respectively of the tumors cells being pleomorphic (v) Presence or absence of perineural, vascular involvement and koilocytosis (vi) Amount of desmoplasia in the adjacent connective tissue was graded 1+ to 4+ (vii) Post inflammatory response was subjectively graded as mild, moderate and intense and the cells of inflammation whether lymphocytes, polymorphs or mast cells were identified (viii) Finally, the prominence of eosinophilia within the inflammatory infiltrate was graded 1+ to 4+; '0' = none to 2/HPF, '1+' = 2-10/HPF, '2+' = 10-20/HPF, '3+' = 20-30/HPF and '4+' = >30/HPF. Ten high power fields were assessed for each specimen and the average number of eosinophils/HPF represented the assigned value, for which grades of eosinophilia were determined.

Peripheral blood smears prepared by finger prick for assessment of differential eosinophil count and absolute eosinophil count using Dunger's fluid was also performed.

RESULTS

Out of the total of 92 cases, 70 were males (53.0%) and 62 females (46.9%), with a mean age of 49 years and 47 years respectively. Majority of the cases were of head and neck tumors, 50 cases (54.3%), followed by female genital tract tumors, 28 cases (30.4%) and Gastrointestinal tract, 14 cases(15.2%).

Head and Neck tumors: Out of a total of 50 cases, 39 (78%) were males and 11 (22%) were females, with a sex ratio of 3.5: 1. Microscopically, 42 cases (84%) were squamous cell carcinoma, 3 (6%) mucoepidermoid carcinoma, 2 (4%) adenocarcinoma and 1 (2%) each acinic cell carcinoma, undifferentiated chondrosarcoma and adenoid cystic carcinoma.

Twenty of the 50 tumors studied were in Broder's grade 1, of which 17 (85%) were well differentiated and 3 (15%) moderately differentiated. (Table-I)

Thirteen of the grade 1 tumors (65%) exhibited moderate or marked tissue eosinophilia, while 7 cases (35%) showed absent or mild tissue eosinophilia. This feature was of equal incidence in grade 2 tumors. Blood eosinophilia was low (< 6%) in 15 cases (75%) of Broder's grade 1 tumor whereas 5 cases (25%) exhibited a high blood eosinophilia. (Table-II) Mean AEC in Broder's grade 1 tumor was 740 cells/ cu mm and it was 510, 890 and 830 cells/ cu mm in tumor grade 2, 3 and 4 respectively.

The pattern of tumor spread at periphery (borders) with tissue eosinophilia was evaluated in 47 cases (94%) of head and neck tumors. In 3 cases (6%) borders could not be commented upon due to extensive tissue necrosis or inadequacy of surgically resected specimens. Sixteen out of 25 cases (72.7%) with absent to mild tissue eosinophilia exhibited infiltrating borders in contrast to 9 cases (27.2%) with marked tissue eosinophilia. Pushing borders were observed in 19 (76%) cases with marked eosinophilia. (Figure-1)

Ten out of 13 cases (76.9%) of 1 + TATE were associated with marked pleomorphism whereas 71 cases with 4+ TATE were associated with mild to moderate pleomorphism. Four out of 13 cases (30.7%) of 1+TATE were associated with low grade of desmoplasia whereas 5 out of 7 (71.0%) of 4+ TATE were associated with high grade of desmoplasia (Figure -2). Inflammatory infiltrate was mild to moderate in 12 out of 13 cases (92.3%) with 1+ TATE and intense in 55.5% of 3+ TATE and 71.4% of 4+ TATE.