Multiple Mott Cells in Periapical Lesion of the Oral Cavity

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ABSTRACT

An entity of bizarre plasma cells has been observed, containing spherical inclusions of immunoglobulins within the cytoplasm. These cells are termed as Mott cells and are believed to occur commonly in cases of chronic inflammation. Until now, they were reported to occur in systemic diseases, various hematolymphoid malignancies and in some syndromes; but their occurrence in chronic periapical infections of the oral cavity, given the paucity of available literature, raises questions about their obscure nature. In the present case report, a 24-year male presented with a draining sinus and periapical lesion involving the maxillary right incisors. After clinical and radiographic examination, an excisional biopsy sample of the periapical lesion was obtained. Histopathological examination revealed multiple bizarre Mott cells in the connective tissue stroma. The significance, nature or fate of these Mott cells is still unknown. Frequently overlooked or a chance occurrence, the presence of these multiple Mott cells in chronic inflammatory lesions of the oral cavity could be of some significance and demand increased awareness and further research.


INTRODUCTION

Routine histopathological examination of commonly encountered periapical infections reveals an array of inflammatory cells. Amidst the inflammatory infiltrate of lymphocytes and plasma cells, there exists some bizarre cells which generally go unnoticed while being important entities.

In the present case of periapical granuloma, we observed numerous round to ovoid clusters of cells which were refractile. An observation on a high-power view disclosed that these cells not only occurred in clusters but also appeared like a single cell containing numerous round inclusions within it. These entities were Mott cells. The term Mott cell derives its name from surgeon, F. W. Mott, who was the first to identify these cells in the brain of monkeys with trypanosomiasis. He also coined the term morular cells (Latin morus, mulberry) for these cells, as these cells occurred in clusters. Mott cells have been described as Russell body inclusions that are immunoglobulins stored in the dilated endoplasmic reticulum of plasma cells. It is suggested that these inclusions can possibly be due to somatic hypermutations of immunoglobulin genes. These cells have been encountered in plasma cell tumors, lymphomas and some syndromes. Observation of such bizarre cells in a commonly encountered periapical lesion was not less exciting. We believe that the occurrence of these cells in periapical lesion is much more than just a coincidence and therefore, through this literature, we attempt to accrue the limited evidence regarding these cells and report their presence in a case of periapical pathology.

CASE REPORT

A 24-year male presented with a history of discharging sinus in the maxillary anterior region for 15 days. The patient gave a history of trauma in the similar region occurring 10 years back. On intraoral examination, there was a diffuse swelling associated with teeth 11 and 12. The swelling was soft to firm in consistency, adherent to overlying mucosa and was accompanying a draining sinus. Radiographically, an ovoid radiolucency was seen in relation to periapex of teeth 11 and 12. Based on these features, it was provisionally diagnosed as a periapical cyst. An excisional biopsy was performed and after routine processing and staining, the sections were evaluated histopathologically in the Department of Oral Pathology and Microbiology, KLE VK Institute of Dental Science, Belgaum, India. The microscopic analysis revealed dense inflammatory infiltrate in the connective tissue stroma, composed predominantly of plasma cells and lymphocytes, suggesting chronicity of the lesion. Few foamy macrophages and siderophages were also seen. To our surprise, at a higher magnification, we observed
numerous spherical eosinophilic bodies in the connective tissue stroma scattered amidst these inflammatory cells. On close observation, we found them to be clusters and singly arranged well defined spherical eosinophilic, refractile cells which appeared like inclusion bodies or a group of Russel Bodies (Figures 1 and 2). On shuffling through limited available literature, we could identify these bizarre cells as “Mott cells”. These Mott cells were viewed and counted at higher magnification (40x) and were found to be present singly or in clusters of 3 to 17 cells or one large cell with numerous inclusions (Figures 1 and 2). Based on the histopathological features and the absence of a cystic lining, the lesion was diagnosed as periapical granuloma. It was because of this intriguing finding of Mott cells, that a case of routinely occurring periapical pathology became worth reporting.

**DISCUSSION**

In 1890, the first description of Mott cells was attributed to William Russell. He reported certain intracellular inclusions in the peripheral regions of cancers and claimed these bodies to be fungal in nature and responsible for carcinogenesis.\(^1\) Although, sparse literature is present describing their synthesis and pathogenesis, a few authors explain these cells to be lymphocytes that produce large amounts of immunoglobulin contained mainly in large vesicles, the so-called Russell Bodies. When viewed under the microscope, Mott cells often appear to consist solely of aggregation of Russell Bodies. These cells are considered to represent an altered state of plasma cells at the end-stage of B-lymphocyte development, which have a distorted endoplasmic reticulum. Therefore, when plasma cells produce immunoglobulin at a significantly faster rate then it can be secreted. There will be accumulation of these immunoglobulins in the lumen of endoplasmic reticulum, which will form large vesicles to give rise to the peculiar Mott cell phenotype. Therefore, it can be assumed that the inability of endoplasmic reticulum to degrade the misfolded and unassembled polypeptides of mutated IgM results in the conception of these bizarre cells, which because of their relative stability, are retained in the cell and are not discarded.\(^2\) Maldonado et al. proposed the involvement of the endoplasmic reticulum and a similitude between Russel Bodies and pancreatic secretory granules. He also suspected Russel Bodies to be similar to the cells described by Mott. Even though it has been accepted that “Mott” cells (or Morula cells) and “Russell” cells are essentially the same entities, their being is still under perlustration. Also, the possibility of these cells to be intermediate stages of normal secretion is no longer credible as the Mott cells associated with hybridomas or the hybridoma cells with Russel Bodies secrete minimal immunoglobulus or no immunoglobulus at all.\(^3\) Therefore, questions regarding the origin and occurrence of these bizarre Russell Bodies have been raised.

Another school of thought explains their formation to be associated with a genetic locus-microsatellite marker (D4Mit70 & D4 Mit 48). Mott-1, in close proximity to the locus lmh-1, is associated with hypergammaglobulinemia. Mott cells express B220, CD5, CD43, CD11b.\(^4\) Observational studies regarding Mott cell formation have been done in animals. It has been found that formation of Russel Bodies is seen in mice and rabbits as a result of antigenic stimulus, the nature of which is unexplainable.\(^5\) Very recently, Cotter by examination peripheral blood obtained from poultry, reported Mott type plasmacytes in them. He associated the presence of these Mott cells with inefficient immunity and stated that these cells indicate an anomalous immune response and are an indicator of stress.\(^6\)

By far, reports have suggested the presence of Mott cells in systemic and syndromic conditions such as reactive plasmacytosis and neoplasms like large B-cell lymphoma, Burkitts lymphoma, lymphoplasmablastic lymphoma, multiple myeloma, Wiscott-Aldrich syndrome and Von-Recklinghausen neurofibromatosis.\(^7\) Tazawa and Tsutsumi in 1998 reported a case which, besides showing inflammatory cells, also exhibited polyclonal Russell Bodies. This was named for the first time as “Russell body gastritis”.\(^8\) Also, the presence of a high number of plasma cells with Russell Bodies in a patient with Barrett’s esophagitis has received an appellation of Mott cell Barrett’s oesophagitis.\(^9\)

We came across the presence of these multiple bizarre Mott cells in chronic, localized, periapical lesion of the oral cavity reported in our department. Although this entity has been brought to light by Giardino et al. in pulpitis, but our case is the first to be reported in periapical lesion in the literature.\(^10\) To our astonishment, the presence of Mott cells was not confined to periapical infections only. We observed such cells in cases of osteomyelitis, lichen planus and cases of radicular cyst, thereafter. Its association with such lesions suggest its ambiguous relationship to chronicity of these diseases. This raised more suspicion regarding the unusual presence of Mott cells in these cases, and further aroused our interest in it. The available literature
explains their nature and pathogenesis but fails to explain their implication in lesions and the obscure fate. Whether the presence of these cells is overlooked out of ignorance or actually their existence holds a relationship with the genesis of the lesion, are the questions which still remain unanswered.

In the light of limited literature and meagre evidence, further research is required to unveil the significance and nature of these bizarre Mott cells in various lesions of the oral cavity.

REFERENCES


