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Editorial

The Haemocytic Haversack- Myospherulosis

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Preface

Myospherulosis is an exceptional disorder with distinctive histological features comprised of a granulomatous reaction to aggregates of denatured erythrocytes interacting with endogenous and exogenous lipid-rich substances. Myospherulosis was initially scripted by McClatchie in 1969 as an uncommon, chronic inflammatory disorder demonstrating soft tissue nodules appearing as fungi-like spherules composed of red cell extravasation delineated upon sites of preceding intramuscular injections [1].

Preliminary and predominant implication of skeletal muscle with nodules of degenerated red cells contributes to the terminology of "myospherulosis".

As an infrequent condition, myospherulosis denominates configuration of cystic spaces imbued with degenerated red cells and a circumscribing, intense inflammatory infiltrate composed of lymphocytes, histiocytes, plasma cells and multinucleated, foreign body giant cells.

Collagenous spherulosis is a nomenclature subsequently adopted for benign lesions with identical histology situated within the breast parenchyma.

Myospherulosis or spherulocytosis is a commonly adopted designation as the lesions are distributed at various sites in addition to skeletal muscle. Aforesaid conditions can frequently be misinterpreted as a malignant neoplasm.

Disease characteristics

Myospherulosis is engendered on account of reaction between endogenous or exogenous lipids and red blood cells which are injured and perceived as foreign body by the host immune system. The interacting exogenous lipids commonly arise from an iatrogenic exposure to petroleum based substances employed for postoperative management following diverse surgical procedures [2,3].

Initially contemplated to be of obscure aetiology, singular risk factor for engendering myospherulosis is impregnation of surgical wounds with petrolatum based ointments or lipid rich constituents [2,3].

Myospherulosis is an iatrogenic process wherein egressed erythrocytes are engulfed within a lipid membrane generated by petrolatum-based substances. Spherules of denatured red cells are subsequently ingested by histiocytes and a lipogranulomatous inflammatory reaction is evoked [2,3].

Wound packing is achieved by petrolatum impregnated gauzes or employs an oil-based carrier as adopted with hormonal or intramuscular antibiotic injections [2,3].

Petrolatum based ointments are frequently applicable, postoperative accompaniment which augment wound healing. Therefore, employment of petrolatum- impregnated dressing can enhance possible emergence of myospherulosis [2,3].

Also, endogenous, membrano-cystic degeneration of adipose tissue observed in conditions such as lupus erythematosus or membranous lipodystrophy with concurrent dermal atrophy secondary to localized steroid application can engender myospherulosis [2,3].

Spherules are configured of erythrocytes denatured due to interaction with exogenous and endogenous lipid rich substances. Wall of spherules are composed of physical emulsion engendered due to concurrence of lipid rich material and blood [2,3].

Degenerated erythrocytes are enveloped within a lipid rich membrane and subsequently phagocytosed by histiocytes, thereby

evoking a lipogranulomatous reaction confined to circumscribing mature adipose tissue [3].

Subsequently, an inflammatory response is triggered by implicated immune competent individual. Certain instances of myospherulosis devoid of concurrent exposure to petrolatum or emulsified human lipids are also observed [2,3].

The benign lipogranuloma is encountered within diverse tissues such as skeletal muscle, paranasal sinus, jaw, mastoid area, oral cavity, cerebrum, breast, prostate, salivary glands, cutaneous surfaces, ocular tissue, ear, nose or throat, hepatic parenchyma or peritoneum. Besides, myospherulosis is associated with soft tissue tumours and neoplasms of respiratory or gynaecological tract [2,3].

An equivalent gender distribution is observed with males and females being equally incriminated. No age of disease emergence is exempt [2].

Clinical elucidation

Although myospherulosis is designated as a reaction between degenerated erythrocytes imbued within open, surgical wounds and exogenous lipid rich substances with the generation of multinucleated, foreign body giant cell reaction, generally it is an asymptomatic disorder and lesions may be devoid of functional complaints [4,5].

Symptomatic lesions are accompanied by pain and swelling of incriminated sites along with localized disfigurement. Involvement of gluteal region occurs concomitant to previous intramuscular injections of petrolatum based hormones or antibiotics such as penicillin [4,5].

Myospherulosis incriminates the skeletal muscle and appears as significant nodules confined to upper and lower extremities or subcutaneous tissue of gluteal region. Paranasal sinuses, nasal cavity and middle ear is generally implicated in non-Africans subjected to impregnation of surgical wounds with petrolatum or tetracycline ointment [4,5].

Myospherulosis may concur with aspergillosis of the maxillary sinus [4].

Histological elucidation

Myospherulosis depicts a distinctive morphological pattern. Therefore, cogent tissue sampling is efficacious and recommended for appropriate disease discernment which can also be achieved by aspiration cytology and cell blocks [4,5].

Macroscopically, an enlarged, saccular, cyst- like lesion is encompassed by mature adipose tissue. Saccular articulations may incorporate yellowish, lipid rich substances. The lesion is firm, non tender and fixed to subjacent bone or soft tissue [4,5].

Characteristically, degenerated red blood cells are circumscribed by a lipid membrane and appear as spheres of variable magnitude between 4 micrometres to 7 micrometres. Subsequently, spheres of denatured red blood cells are phagocytosed by histiocytes and ingested within multinucleated, foreign body giant cells. Thus, typical morphology of "bag of marbles" is engendered [4,5].

Aggregates of histiocytes and multinucleated giant cells with foamy macrophages are admixed with clear, micro-cystic spaces along with degenerated erythrocytes [5].

The nodule demonstrates cystic tissue spaces layered with histiocytes and multinucleated, foreign body giant cells embedded within a fibrous tissue stroma. Tissue spaces are incorporated with disseminated debris and sac- like articulations or circular spherules of aggregated, denatured erythrocytes. Additionally, erosion of adjacent bone or soft tissue can be observed [4,5].

Cyst-like articulations are composed of spherules impacted with damaged erythrocytes. Fibrous tissue configures the cyst wall with an accompanying lipogranulomatous reaction. Eosinophilic spherules with impacted erythrocytes are intermixed with accumulated histiocytes within the cyst wall. Enlarged spherules simulate a "bag of marbles" appearance [4,5].

Dermal nodules are articulated cystic cavities layered with fibrous tissue and commingled with histiocytes along with multinucleated, foreign body giant cells thus engendering a lipogranulomatous inflammation within abutting mature adipose tissue [4,5].

Myospherulosis can be highlighted by Giemsa stain, Alizarin red S for entrapped red cell haemoglobin and Papanicolaou stain. Additionally, immunohistochemistry with concurrent glycophorin A and C, agglutinin-1 and carbonic anhydrase is beneficial in discerning the condition [4,5].

Differential diagnosis

Albeit an infrequent condition, myospherulosis mandates a demarcation from nodular lesions where lipid rich products are employed postoperatively.

Myospherulosis requires a segregation from infiltrating carcinoma, metastatic deposits and infection with fungi or algae as aforesaid lesions recapitulate radiographic and histopathologic features of myospherulosis. Thus, cogent tissue sampling with histological evaluation, special stains and immunohistochemistry is crucial for appropriate categorization [2,4].

Investigative assay

The lesion necessitates a prompt surgical excision and precise histological assessment. Myospherulosis is devoid of staining with periodic acid Schiff's (PAS) or Grocott-Gomori methenamine silver stain which highlights diverse fungal organisms [2]. Damaged erythrocytes are amenable to haemoglobin specific immune stains [2].

Endobronchial ultrasound guided trans-bronchial needle aspiration (EBUS-TBNA) can be beneficially adopted to detect myospherulosis of the pulmonary parenchyma [5,6].

Therapeutic options

Asymptomatic lesions of myospherulosis mandate no specific treatment. However, symptomatic instances necessitate cogent therapy including surgical extermination of the lesions. Generally, the benign process mandates treatment for alleviation of associated clinical symptoms. Myospherulosis is amenable to comprehensive surgical eradication with excision of the capsule. Lesion reoccurrence is extremely exceptional [5,6].

Inappropriate discernment of the essentially benign myospherulosis can engender excessive and exuberant therapeutic intervention an account of misrepresentation as an invasive carcinoma [5,6].

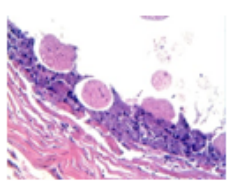

Figure 1: Myospherulosis depicting a sac of denatured erythrocytes admixed with stromal reaction of foreign body giant cells and encompassing fibrous matrix [7].

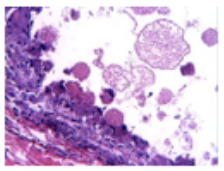

Figure 2: Myospherulosis delineating clumps of degenerated red cells intermixed with multinucleated giant cells and an enveloping fibrotic stroma [7].

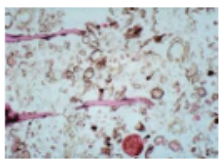

Figure 3: Myospherulosis demonstrating denatured red cells intermingled within a fibrotic stroma and minimal giant cell reaction [8].

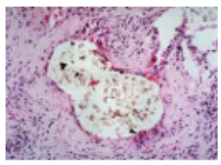

Figure 4: Myospherulosis exemplifying a sac of disrupted erythrocytes commingled within a fibrous tissue stroma and mild multinucleated giant cell reaction [8].

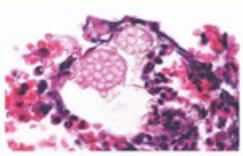

Figure 5: Myospherulosis exhibiting degenerated red cells enveloped within a fibrotic tissue stroma and commingled histocytes, lymphocytes and plasma cells [9].

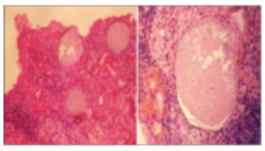

Figure 6: Myospherulosis enunciating sac like configuration of damaged red blood cells surrounded by a fibrotic stroma imbued with lymphocytes, histiocytes and plasma cells [10].

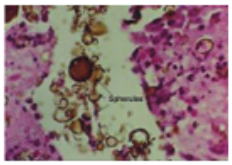

Figure 7: Myospherulosis delineating denatured red blood cells enveloped by an abundant fibrous tissue stroma intermixed with multinucleated giant cells [11].

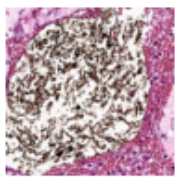

Figure 8: Myospherulosis exemplifying accumulates of disintegrated red blood cells encompassed by a fibrotic stroma and several multinucleated, foreign body giant cells [12].

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7. Image 1 and 2 Courtesy: Pathology outlines.

8. Image 3 and 4 Courtesy: Wiley online library.

9. Image 5 Courtesy: Basic medical key.

10. Image 6 Courtesy: Indian Journal of Pathology and Microbiology.

11. Image 7 Courtesy: Research gate.

12. Image 8 Courtesy: Twitter.