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Mast Cell Profile in Pigmentary Cutaneous Disorders -A Study of 53 Cases in a Teritiary Care Centre

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Introduction: *Mast cell is a connective tissue element which is found throughout the body, particularly in association with blood vessels and nerves. Though the mast cells are distributed throughout the body, increased proportion of mast cells are present in the skin, respiratory tract, gastrointestinal tract, uterus and urinary bladder. An attempt is made in the present study to investigate the mast cell profile through histological study of some of the disorders of skin pigmentation from the biopsies received in the Department of Pathology in Siddartha Medical College, Vijayawada .*

Materials and methods:

The present study of "Mast cells profile in disorders of skin pigmentation" included a total cases of 53.Sections were stained with Hematoxylin and eosin stain and 1% aqueous toluidine blue (pH 4) for mast cell with typical metachromatic granules. The mast cell count was performed per 10 HPF, analysed tabulated and statistically evaluated.

Results:*.The present study of "" included a total cases of 53.Out of these; 6 cases of albinism,6 cases of vitiligo 6 cases of leucoderma, 6 cases of urticaria pigmentosa, 6 cases of chronic eczema, 7 cases of intradermal nevus, 6 cases of junctional nevus and 10 cases of malignant melanoma.*

Conclusion: *Mast cells with their large battery of mediators and substances are known to play a vital role in health as well as in various disease states in human beings*

Mast cell changes do occur in the disorders of skin pigmentation.Significant alterations of mast cells were noted in albinism vitiligo, leucoderma, urticaria pigmentosa, chronic eczema, intradermal nevus,junctional nevus and malignant melanoma as compared with normal skin. Mast cell profile may be an additional or supplementary diagnostic/ prognostic parameter in these lesions.Possible explanations for the variability of mast cells in these disorders of skin pigmentation have been suggested

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I. Introduction

Mast cell is a connective tissue element which is found throughout the body, particularly in association with blood vessels and nerves. Though the mast cells are distributed throughout the body, increased proportion of mast cells are present in the skin, respiratory tract, gastrointestinal tract, uterus and urinary bladder Mast cells are bone marrow derived cells that occur in normal dermis in small numbers as oval to spindle shaped cells with centrally located granules in the cytoplasm that do not stain with H & E stainMost of the conventional staining methods fail to visualize mast cell on light microscopy. With toluidine blue staining the mast cells under light microscope appear as large, rounded, ovoid or spindle shaped cells. They lack a basal lamina and may have short pseudopodia, because they are wandering cells . The mast cells vary in size from 5-15 m in diameter

SPECIAL STAINS:

Three methods of staining mast cells are in use:
a) Metachromatic staining of their granules
b) Histochemical demonstration of enzymes
c) Immunoperoxidase stain using monoclonal antibodies

IMMUNOPHENOTYPING:

As assessed by the combined toluidine blue/immunofluorescence staining procedure using monoclonal antibodies, mast cells express the following cell surface antigens (Sphere WR et al, 1992). 2. Receptor for stem cell factor (CD117/C-kit receptor)
3. p24 Antigen (CD9).
4. Pgp-1 housing receptor (CD44)

5. Pan leukocyte antigen (CD45)
6. ICAM-1 antigen (CD 54).
7. CD 33
8. CD 43
9. HLA Class-1

II. Aims and objectives

This study is conducted to evaluate the mast cell profile in the following disorders of skin pigmentation i.e.,
i) Chronic eczema
ii) Urticaria pigmentosa
iii) Junctional nevus
iv) Intradermal nevus
v) Malignant melanoma vi) Vitiligo
vii) Leucoderma
vii) Albinism

III. Observations

In the present study, an attempt has been made to study the distribution of mast cells in various disorders of skin pigmentation The study included 6 cases of albinism, 6 cases of vitiligo, 6 cases of leucoderma, 6cases of urticaria pigmentosa, 6 cases of chronic eczema, 7 cases of intradermal nevus, 6 cases of Junctional nevus and 10 cases of malignant melanoma.

Age of the patients: In patients of albinism the age range was 14 to 60 years, with a mean of 33 years. In vitiligo, the age range was 17 to 39 years, with a mean of 26.16 years. In leucoderma, the age ranged from14 to 30 years, with a mean age of 23.16 years. In urticaria pigmentosa the age range was 18 to 36 years, with a mean age of 26.83 years. In chronic eczema, the age ranged from 14 to 46 years, with a mean age of 24 years. In intradermal nevus, the age ranged from 26 to 65 years, with mean age of 37.42 years. In junctional nevus, the age range was 28 to 58 years, with a mean age of 39.3 years. And in malignant melanoma the age ranged from 48 to 65 years, with a mean age of 53.2 years.

Mast cell count in Disorders of skin pigmentation: i.e., in Albinism the range was 56-80 cells per 10 HPF (average-67/10 HPF), in vitiligo the range was 60-101 cells per 10 HPF (average-78,50 cells 10 HPF), in leucoderma the range was 68-91 cells per 10 HPF (average-78.83). In urticaria pigmentosa the range was 161-202 cells per 10 HPF (average 183/10 HPF), in chronic eczema the range was 139-184 cells per 10 HPF(average-163/10 HPF), in intradermal nevus the range was 128-161 cells per 10 HPF (average-143/10 HPF), in junctional nevus the range was 139-184 cells per 10 HPF (average-152/10 HPF) and in malignant melanoma the range was 151-187 cells per 10 HPF (average 171.7/10 HPF).

On statistical analysis: A significant increase of mast cell count was observed in all the above disorders of skin pigmentation when compared with normal skin. The mast cell count was significantly increased in leucoderma as compared to albinism. The mast cells count was significantly increased in urticaria pigmentosa, chronic eczema and malignant melanoma than compared with intradermal and junctional nevus. The mast cell count was significantly increased in malignant melanoma as compared to benign nevi. The mast cells were more in the margin of the tumour than compared to within the lesion. The mast cell count was more in hyperpigmented skin lesions compared to hypopigmented skin lesions as a whole.

Table-1 Age Distribution In Hypopigmented Skin Disorders

Age of patients	Albinism	Vitiligo	Leucoderma
Range (in years)	14 - 60	17 - 39	14 - 30
Average (in years)	33	26.16	23.16

Table-2distribution of Mast Cells In Albinism Versus Normal Skin

Mast cells / 10HPF	Albinism(A)	Normal skin(N)
Range	56 - 80	32 - 45
Average	67	39.40

Table-3: Distribution of Mast Cells In Malignantmelanoma Versus Normal Skin

Mast cells / 10HPF	Malignant Melanoma(M)	Normal skin(N)
Range	158 – 187	32 - 45
Average	171.7	39.40

TABLE-4: Distribution of Mast Cells In Junctional Nevus Versus Normal Skin

Mast cells / 10HPF	Junctional Nevus(J)	Normal skin(N)
Range	139 – 164	32 - 45
Average	152	39.40

IV. Discussion

Mast cells with their large battery of mediators and substances are known to play a vital role in health as well as in various disease states in human beings.The present study of mast cell profile in disorders of skin pigmentation is a preliminary effort to probe into the mast cell distribution in Albinism, Vitiligo, Leucoderma, Urticaria Pigmentosa, Chronic eczema, Intradermal Nevus, Junctional Nevus and Malignant melanoma. Although the number of cases in the present study are not very large, it appears to be adequate to draw certain logical conclusions.The present observation is similar to that of Bohac, 1906; Woringer 955 and Marney SR Jr. 1992.It is postulated that the mast cell is responsible for interactions with inhaled, ingested and injected antigens that comprise IgE-mediated allergic reactions. Abnormally high numbers of mast cells in a localized area of skin result in urticaria pigmentosa.In chronic eczema cases, the mast cell count ranged between 139-184 cells/10 HPF with a mean of 163 cells. The mast cell count was significantly increased in chronic eczema ($p<0.001$) when compared with the count in normal skin.The present observation is similar to that of Wiedmann and Niebauer, 1959. It is stated that considerable alterations in the mast cells density occur as a consequence of inflammation, and the direction of the change appears depend mainly upon the intensity and chronicity of the lesions (Sylvia Weber et al,1995).

V. Summary And Conclusions

The present study included a total cases of 53.Out of these; 6 cases of albinism,6 cases of vitiligo 6 cases of leucoderma, 6 cases of urticaria pigmentosa, 6 cases of chronic eczema, 7 cases of intradermal nevus, 6 cases of junctional nevus and 10 cases of malignant melanoma.

Sections were stained with Hematoxylin and eosin stain and 1% aqueous toluidine blue (pH 4) for mast cell with typical metachromatic granules. The mast cell count was performed per 10 HPF, analysed tabulated and statistically evaluated. A comparative evaluation of mast cells in disorders on skin pigmentation was performed.

Mast cell changes do occur in the disorders of skin pigmentation.Significant alterations of mast cells were noted in albinism vitiligo, leucoderma, urticaria pigmentosa, chronic eczema, intradermal nevus,junctional nevus and malignant melanoma as compared with normal skin. High mast cell concentrations were observed in urticaria pigmentosa, chronic eczema and malignant melanoma as compared to other hyperpigmented skin lesions. Mast cells were more in malignant melanoma as compared to benign nevi.

Mast cell profile may be an additional or supplementary diagnostic/ prognostic parameter in these lesions.

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