

SIGNIFICANCE OF MAST CELL COUNT IN ENDOMETRIUM AND HEMOSTATIC PARAMETERS IN DYSFUNCTIONAL UTERINE BLEEDING

by

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Introduction

Abnormal uterine bleeding is one of the frequent gynaecological disorders, the exact etiopathogenesis of which still remains obscured. Since the discovery of mast cells by Ehrlich in 1877 and its components (heparin, oistamine, hyaluronic acid etc) has attracted the attention of scientists to find out the possible existing correlation between mast cells and the menstrual disorders.

Quick in 1966 discussed the relation between menorrhagia and coagulation and bleeding disorders and that the latter could be associated with lack of blood clotting factors like V, VII, X and platelet deficiency.

Therefore, it was considered relevant to evaluate mast cell count alongwith histomorphological changes in endometrium and also the hemostatic status of the dysfunctional uterine bleeding (FUB) cases

simultaneously. This can find answer to effective therapeutic control of abnormal uterine bleeding.

Material and Methods

Twenty-five females with history of abnormal uterine bleeding and in whom inflammatory or neoplastic basis for FUB was clinically ruled out and 15 healthy females of sterility with normal periods and having no hematological disorders, serving as control, were the subjects of study.

Parameters

I. Routine formalin fixed hematoxylin-eosin stained sections if premenstrual endometrial curettage were studied for phase of cycle and/or any pathology.

II. Mast cell study.

Fixation—Part of the endometrial curettage obtained was immediately put in Carnoy's fluid for 2-8 hours and then transferred to 10% formalin (Jain, 1977) and tissue was processed for paraffin sections. Sections were cut at 5 μ thickness.

Staining—Sections were stained with 0.2% toluidine blue in sodium acetate buffer (pH 3.6) for 10 seconds followed by washing in tap water for 3 minutes (Mehra *et al* 1970).

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Counting—Five intermittent serial sections from each biopsy were subjected to mast cell counting. Twenty random high power fields per sections were scanned for mast cells and average count of mast cells per 20 high power fields was calculated.

III. Hemostatic parameters.

		Normal values
1. Bleeding time (BT)—IvY		2- 7 minutes
2. Whole blood coagulation time (CT)	Lee and White	4- 9 minutes
3. Prothrombin time (PT)	Modified quick one stage method	10-14 seconds
4. Partial thromboplastin time with Kaolin (PTTK)	Dacie, 1977	35-45 seconds
5. Platelet count	Phase contrast microscopy-Miale, 1972	2- 4 lac/cumm.

Results and Discussion

Clinicopathological analysis of the observations revealed that clinically FUB patients largely (76%) fell into age group 36-50 years and had menorrhagia (68%) as well as polymenorrhoea (28%) as presenting complaints. Anovulatory cycles with proliferative phase were commonest (76%) among FUB patients; one third of the proliferative endometria showed hyperplasia. Like earlier observations (Von Numer, 1943; Saigal and Balasubramanyam, 1963; Gupta and Schuller, 1967 and Hingrani *et al* 1971), the mast cells showed phasic increase from 0-1 cells/20 HPF during proliferative phase to 1-4 cells/20 HPF in secretory phase among majority of control females.

Functional uterine bleeding states, irrespective of clinical type of histological phase of endometrium, were invariably associated with an increase in mast cell population when compared with control subjects, endometria in corresponding phase. This observation was in contrast to

that of Mehra *et al* (1970) who found nil to slight increase in the mast cell count in their FUB cases. One of the highest populations of mast cells, (averaging 9 cels/20 HPF) was observed in a case of menorrhagia on sex hormone therapy. Besides, the mast cells not only increased

in number but also became more prominent in FUB endometria. They had a tendency to localise in close vicinity of blood vessels and endometrial glands in FUB cases unlike even distribution in the stroma of controls.

FUB is largely attributed to disturbances of sex hormone levels. The latter directly influence the morpho-physiology of the endometrium through their trophic effects. Fluctuating mast cell populations in FUB subjects and also during normal menstrual cycle may also be due to these hormonal changes. The biochemical secretions, of mast cells like histamine and heparin, available in close proximity to endometrial blood vessels may contribute towards the excessive blood loss in FUB states through their direct effect on the local microcirculation (by histamine) and poor coagulability of menstrual blood (by heparin).

Therefore, the mast cells as such, when increased may contribute towards excessive or even continuous blood loss during

TABLE I
Shows Mast Cell Count Range (No. of Cells per 20High Power Fields) in Dysfunctional Uterine Bleeding Group and Control Group as Per Clinico Histomorphology Status of Cases

Endometrium picture	CLINICAL DIAGNOSIS											
	Dysfunctional group (25 cases)						Control group (15 cases)					
	Oligomenorrhoea			Menorrhagia			Polymenorrhoea			Control group (15 cases)		
	No.	%	Mast cell range	No.	%	Mast cell range	No.	%	Mast cell range	No.	%	Mast cell range
1. Proliferative phase	—	—	—	7	28	1-3	4	16	1-10	4	26.6	0-1
2. Proliferative phase with hyperplasia	1	4	2	6	24	1-2	1	4	1	1	6.6	1
3. Secretory phase	—	—	—	3	12	3-4	2	8	4-8	10	66.6	1-4
4. Miscellaneous (Hormone therapy)	—	—	—	1	4	9	—	—	—	—	—	—

various clinical dysfunctional uterine bleeding states and may have lead to adoption of antiheparin therapy with toluidine blue and protamine sulphate in selected cases of menorrhagia associated with ovulation or secretory endometrium (Bickers and Richmond, 1963).

Routine hemostatic investigations like BT and CT showed no abnormal values in FUB cases, except for a marginally upper range of values was observed (BT 1.5g-6.55, minutes, CT 3-7.35 minutes), as compared to control (BT 2.46-5.15 minutes, CT 3.23-6.16 minutes). Similarly out of 25 FUB cases abnormal values for PT and PTTK were detected in 1 and 3 cases respectively as compared with only 1 control case, who showed abnormal values of P.T. and P.T.T.K. The lower limit of platelet count in F.U.B. group was 1 lac/cumm while in control it was 1.6 lac/cumm. Upper limit recorded was 3.5 lac/cumm in both FUB and control cases. It suggests a tendency for relative thrombocytopenia during FUB.

Thus it is obvious that both routine as well as elaborate hemostatic parameter studies in FUB subjects are of very little importance either in assessing their severity or their management. Platelets, like mast cells, being the source of many vasoactive chemicals (like serotorin, histamine, thromboxane etc), could complement the mast cells in exercising local control over uterine blood flow and its loss during menstruation.

Summary and Conclusions

The significance of mast cell count increase in endometria of FUB subjects in general with non significant change in usual hemostatic spectra, have been dis-

cussed and emphasised for adopting therapeutic measures to neutralise their biochemical products.

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See Fig. on Art Paper III