

Association of Degranulated Mast Cell Count with Burning Sensation of Oral Cavity in Oral Submucous Fibrosis

Dr Sabu Paul¹, Dr Pramod P Mathews²

¹Assistant Professor, Department of Oral Pathology and Microbiology, Government Dental College, Kottayam, India

²Professor, Department of Oral Pathology, Indira Gandhi Institute of Dental Sciences, Nellikuzhi, Kothamangalam, India

Abstract: ***Aim:** To assess the possible role of degranulated mast cell count in oral submucous fibrosis patients with burning sensation. **Materials and methods:** The degranulated mast cell count was performed with microscope fitted with a calibrated mechanical stage in the histologically diagnosed specimens of oral submucous fibrosis. It was compared with burning sensation recorded using a self assessment descriptive rating. **Statistics:** ANOVA was used to test the equality of means between degranulated mast cell count and burning sensation. **Results:** Degranulated mast cell count showed a significant increase in early cases of oral submucous fibrosis along with the burning sensation. The difference was found to be statistically significant but insignificant in advanced cases. **Conclusion:** The increased degranulated mast cell count has a profound effect on the burning sensation experienced in oral submucous fibrosis especially in early cases.*

Keywords: degranulated mast cell count, burning sensation, oral submucous fibrosis

1.Introduction

Oral submucous fibrosis (OSMF) is characterised by abnormal collagen deposition and is a premalignant disorder which transform into a malignant tumour in 1.5 to 15% of all cases. Signs and symptoms include juxtaepithelial fibrosis, ulcerations, xerostomia, burning sensation and trismus.¹ Burning sensation is an early complaint in patients with OSMF. Role of mast cells in various inflammatory disorders such as pulpitis and gingivitis has been recorded in various literature.² The association of mast cells and burning sensation in OSMF has not been widely studied. Mast cells are highly specialized cells which can be activated by number of stimuli. Activation of the mast cells by immunological or non immunological stimuli release many granules with a range of preformed mediators. Hence this study is designed to evaluate the degranulated mast cell count with the burning sensation in oral cavity.

2.Materials and Methods

In the present study total of thirty subjects comprised the study population; of these 20 cases were clinically confirmed cases of OSMF and 10 subjects with a clinically normal oral mucosa along with no history of adverse habits comprised the control group. Twelve advanced and eight early cases of OSMF were included in the study.

Mast cell counting was done using acidified toluidine blue as it gives rapid, crisp metachromatic staining of mast cells. The cytoplasm of the mast cells stained purple and the nuclei blue. Enumerations of intact and degranulated mast cells were performed with the microscope fitted with a calibrated mechanical stage, 10x and 100x objective lenses. The area encompassed by the eye piece graticule was designated as a microscopic field (MF) for counting purpose. These counts were converted to mean values of intact and degranulated mast cells and were compared with

the control using students 't' test. The significant difference was set as $p < 0.05$.

Statistical Analysis

ANOVA was used to test equality of several means without effecting type 1 error. Only if ANOVA shows significant difference, pairwise comparisons were made. Pairwise comparisons were made using 't' test for independent samples. Finally, the correlation between the degranulated mast cells and burning sensation was done using Karl Pearson's coefficient of correlation.

3.Results

Degranulated mast cell count

Mast cells were characterized by blue nuclei and purple cytoplasm. The mean densities were found to be 0.2 in normal mucosa, 2.7 in early OSMF and 0.33 in advanced OSMF. The degranulated mast cell count in normal mucosa when compared with the early OSMF showed statistical significance with P value of 0.000, but when compared with the late OSMF the P value was 0.508. The degranulated mast cell count between early and advanced OSMF showed statistical significance with a P value of 0.000.

Burning sensation

Chronic irritation of oral mucosa due to arecoline leads to infiltration of inflammatory cells like mast cells and their differentiation. Inflammatory mediators such as proteases, cathepsin G and cytokines like TNF, interleukin, histamine and serotonin are released following degranulation which may lead to burning sensation of oral mucosa. The mean burning sensation was increased in early OSMF cases when compared to the advanced cases. The difference in the burning sensation was pronounced in the early cases

with a P value of 0.000 when compared with the controls. The difference in the burning sensation between the controls and the advanced OSMF cases were also

statistically significant with a P value of 0.000, while the difference between the early and advanced cases were not significant.

Table 1: Comparison of degranulated mast cell count and burning sensation between different groups

	Group	N	Mean	Std. Deviation	F	p value
Degranulated mast cell count	Control	10	0.20	0.422	41.418	.000
	Early	8	2.75	1.035		
	Advanced	12	0.33	0.492		
	Total	30	0.93	1.285		
Burning sensation	Control	10	0.00	0.000	2.344	0.115
	Early	8	2.50	0.756		
	Advanced	12	1.83	0.718		
	Total	30	1.40	1.192		

Table 2: Pairwise comparison of degranulated mast cell count and burning sensation between control and early

	Group	N	Mean	Std. Deviation	t	p value
Degranulated mast cell count	Control	10	0.20	0.422	7.128	.000
	Early	8	2.75	1.035		
Burning sensation	Control	10	0.00	0.000	10.54	.000
	Early	8	2.50	0.756		

Table 3: Pairwise comparison of degranulated mast cell count and burning sensation between control and advanced

	Group	N	Mean	Std. Deviation	t	p value
Degranulated mast cell count	Control	10	0.20	0.422	0.674	.508
	Advanced	12	0.33	0.492		
Burning sensation	Control	10	0.00	0.000	8.04	.000
	Advanced	12	1.83	0.718		

Table 4: Pairwise comparison of degranulated mast cell count and burning sensation between early and advanced

	Group	N	Mean	Std. Deviation	t	p value
Degranulated mast cell count	Early	8	2.75	1.035	7.045	.000
	Advanced	12	0.33	0.492		
Burning sensation	Early	8	2.50	0.756	1.99	.062
	Advanced	12	1.83	0.718		

Table 5: Correlation between degranulated mast cell count and burning sensation

	r	P value
Degranulated mast cell count	0.446	0.014
Burning sensation		
		P < 0.05

4. Discussion

The findings of the present study indicated a strongly significant positive linear correlation between burning sensation and the degranulated mast cell count. The results supported the view that mast cells could possibly have a role in burning sensation associated with OSMF. Therefore increased degranulated mast cell count correlated with the pronounced burning sensation in early OSMF cases. There is very few literature to report that burning sensation was notably higher in advanced cases of OSMF. The difference between the early and advanced cases were not statistically significant, but there was a statistically significant difference between the control and the early cases. The current study found that the degranulated mast cells have a significant influence in the early cases of OSMF and their role in various clinical stages of OSMF needs to be validated further.

In summation, degranulated mast cells count were a positive predictor for burning sensation in mild to moderate cases of OSMF. Further multicentric studies with follow up period can be more efficient in understanding the possible role of mast cell degranulation in burning sensation in OSMF cases.

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5. Conclusion

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Author Profile

Dr Sabu Paul received the BDS degree in 2002 from Government Dental College, Calicut and MDS degree in Oral Pathology from Government Dental College, Trivandrum in 2007. He is now working as Assistant Professor in Oral Pathology at Government Dental College, Kottayam.