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Clinical characteristics of oral mucosal pain among patients visiting a dental hospital

[*1] Neha Vijaya Kumaran, [2] Veena S Narayanan, [3] Yeshoda TG

[1, 3] Post graduate, Department of Oral Medicine and Radiology, Coorg Institute of Dental Sciences, Virajpet, Karnataka, India

[2] Professor and Head, Department of Oral Medicine and Radiology, Coorg Institute of Dental Sciences, Virajpet, Karnataka, India

Abstract

Background: Pain arising from mucosal lesions can be of diagnostic value and could be useful in monitoring patients and planning their treatment. Although several studies have been conducted in assessment and characterization of odontogenic and neuralgic pain, pain arising from oral mucosal lesions has not received much attention. Hence this study focuses on pain characterization and correlation of oral mucosal pain with the objective signs of the lesions.

Aim: The purpose of this study was to characterize oral mucosal pain.

Methods: Patients with symptomatic oral mucosal lesions were asked regarding their pain characteristics like quality of pain, intensity of pain (VAS I), functional disturbance (VAS F), aggravating / relieving factors and associated sleep disturbance. The data thus obtained, clinical examination findings and diagnosis were recorded.

Results: 105 patients aged 16 to 70 years (44 females and 61males) with different oral mucosal diseases including Oral submucous fibrosis (OSMF), Recurrent Aphthous Stomatitis (RAU), Traumatic ulcer (TU),Oral lichen planus (OLP), Burning mouth syndrome (BMS), Pemphigus vulgaris (PV) formed the study group. 49% patients described the pain as "burning". Moderate to severe pain intensity of pain was experienced by 65.6 % males and 75% of females. There was no significance difference between males and females for VAS I and VAS F (p=0.352 and p=0.368). Sleep disturbance was significantly associated with VAS I and VAS F (p=0.000). A highly significant negative correlation was found between intensity of pain and size of ulcers (p value =0.000).

Conclusion: Oral mucosal pain is generally burning in quality and intensity of pain is related to its functional disturbance. No significant difference was found between the genders for VAS I and VAS F measures. Smaller the size of the ulcer, greater was the intensity of pain. The characteristics of pain could aid in improving the diagnosis, quality of treatment and monitoring painful oral mucosal conditions.

Keywords: pain, mouth mucosa, pain measurement, oral submucous fibrosis, burning mouth syndrome

Introduction

The mouth has a special status within the somatosensory system. It is one of the most densely innervated parts of the body, in terms of peripheral receptors. This sensory richness is linked to the key role of oral sensorimotor control in eating, drinking, and speaking, as well as to the vivid nature of many oral sensations. The mouth also contains a large range of different tissue types (skin, muscle, teeth) in close proximity and constant interaction. These generate very rich patterns of somatosensory afferent input [1].

Patients with intermittent or painful sensations in the oral mucosa often represent a clinical challenge with regard to diagnosis and management. Due to the various conditions associated with oral mucosal pain which may share certain clinical signs and symptoms, diagnosis is often difficult. However, it is important that these patients are properly diagnosed in order to initiate an adequate treatment.

Chronic pain conditions unlike acute pain persist even after apparent tissue healing and are often difficult to treat [2]. Moreover, chronic pain conditions also appear to be associated with structural and functional alterations in the CNS. Accordingly, early and appropriate diagnosis and management of acute pain is important in order to prevent acute pain turning into a chronic pain condition, with impaired quality of life and risk of psychological morbidity such as anxiety and depression [3].

The characteristics of pain originating from the oral mucosa may be of significant diagnostic value. Characteristics such as intensity and quality are often considered in the differential diagnosis of orofacial pain and headaches. Although dental pain, burning mouth

Syndrome (BMS) and mucositis have been widely studied, little is known about intensity and the quality of pain originating from localized lesions of the oral mucosa [4].

Pain measurement is an essential component of disease assessment, including initial diagnosis, monitoring of disease progress, and evaluation of treatment effectiveness [5].

Hence the present study was conducted to evaluate the characteristics of pain arising from oral mucosal lesions which may aid in improving their diagnosis, quality of treatment, and monitoring.

Materials and methods

This is an analytical cross-sectional cohort study of patients attending the Department of Oral Medicine and Radiology, Coorg Institute of Dental Sciences, Virajpet, Karnataka, India.

The inclusion criteria were patients of both genders above 15years of age, who presented with painful oral mucosal conditions and who were not undergoing any treatment for their condition during the past two weeks. The study was approved by the Institutional Review Board. Informed consent was obtained from each patient and from the parent of the patients who were less than 18 years of age. Diagnosis was established by an Oral Medicine specialist based on the history and intra oral examination and wherever indicated diagnosis was confirmed by histopathology. The participants were asked a comprehensive set of questions modified from McGill Pain Questionnaire [6] regarding their quality of pain, intensity of pain (VAS I), functional disturbance (VAS F), aggravating/relieving factors and associated sleep disturbance. Patients had to choose the most appropriate description for their own subjective experience of pain quality from a list with an accompanying explanation (e.g., burning, dull aching, throbbing). Pain measurement was performed using a VAS I and VAS F. Pain intensity (VAS-I) was defined as the intensity of the pain, where 0 meant no pain and 10 meant the most intense pain imagined. Pain during function (VAS-F) was defined as disturbed oral function, where 0 reflected no interference and 10 indicated significant interference. Other parameters recorded were waking from sleep (yes/no) and aggravating and relieving factors.

Statistical analysis

SPSS Software (IBM Software 23) was used for data processing, with a P value of $\leq$ .05 considered statistically significant. Chi square test was used for categorical data and Pearsons correlation was used to evaluate the association between the size of ulcer and intensity of pain.

Results

105 patients (44 females and 61males) aged 16 to 70 years completed the study (Figure 1). The study group consisted of OSMF (n=26), RAU (n=41), TU (n=8), OLP (n=23), BMS (n=5), PV (n=1).

Diagnosis and quality of pain

All patients with OSMF and BMS and most patients with OLP described their pain as 'burning' in nature whereas most RAU and TU reported dull aching or pricking type of pain. (Table 1)

Aggravating and relieving factors

In patients with OSMF, BMS and OLP hot and spicy food aggravated the mucosal pain. A few patients (11.4%) reported relief on sipping cold water. (Table 1)

Intensity of pain

There was a significant association between VAS I, VAS F and the different diagnostic categories of lesions (p= 0.001 and p = 0.002 respectively). Majority of the patients with OSMF, BMS and OLP had moderate to severe VAS I and VAS F, whereas mild to moderate VAS I and VAS F was reported by most patients in the RAU and TU group. (Table 1)

Sleep disturbance

7 patients (1 BMS, 3 OSMF, 1 OLP, 1 TU, 1 PV) reported awakening from sleep due to pain (p=0.001). Sleep disturbance was highly significant with respect to VAS I and VAS F (p=0.000). (Table 2)

Association of gender and characteristics of pain

Overall no significance difference was observed between the genders for various pain characteristics. Burning was reported by 45.9% of males and 54.5 % of females. (Table 3)

Association of age and type of pain

Majority of the patients below 45 years reported with dull aching pain while burning quality of pain was reported by most patients in 46-60 age groups. (Table 4)

Correlation between size of ulcer and intensity of pain

A negative correlation was found between size of ulcer and intensity of pain (p value =0.000). (Table 5)

Discussion

Characteristics of Orofacial pain especially pertaining from the various mucosal lesions like mucositis due to radiation or chemotherapy in oral cancer, BMS, neuralgia and myofascial pain dysfunction syndrome have also been studied extensively in the literature [7, 10]. However very few studies are available regarding the characteristics of pain originating from more common mucosal lesions like RAU, OSMF, OLP etc. for which patients seek treatment.

It has been reported that pain originating from the oral mucosa shares the characteristics of visceral pain rather than cutaneous pain because of its burning nature and high level of unpleasantness and therefore differs from other types of cutaneous pain [11].

Burning quality of pain and awakening from sleep associated with painful oral lesions have been reported in literature. The present study also identified 'burning' to be the most commonly reported nature of pain; however this was not significantly associated with female gender.

Our study group predominantly comprised of patients diagnosed with OSMF, RAU and OLP. Potentially malignant disorders such as OSMF are widely prevalent in India. Worldwide estimates indicate that as many as 2.5 million people may be affected. Chewing of betel quid (areca catechu, lime and tobacco) as well as other areca nut containing products (e.g. pan masala and guthka) for mouth freshening and the mild euphoric effect is a fairly common practice in India, Pakistan and Sri Lanka [12].

The predominance of burning quality of pain was found among patients with BMS, OSMF and OLP. Neurophysiological studies conducted on BMS suggest that the central or peripheral nervous system are implicated in the pain of BMS [13, 14]. The epithelial atrophy in mucosal lesions such as OLP and OSMF reduces the distance of intra-epithelial nerve endings from the surface making it more sensitive to burning sensation.

Recent studies have hypothesized that severity of burning sensation of the oral cavity maybe due to the correlation with degree of minor salivary gland (MSG) fibrosis. These MSGs are a major source of Membrane Associated Mucin (MAM) which plays a very important role in protection and lubrication of oral mucosa [15, 18]. These MAM then acts as a scaffold for

the formation of highly hydrated and viscous gel called Salivary Mucous Gel (SMG) [19, 21]. Fibrosis and hyalinixzation of MSG and subsequent reduction of SMG causes less protection against irritation from food substances e.g. spicy and hot food. This mechanism could be mainly responsible for the burning sensation of the oral cavity. Moreover, decreased 'protective diffusion membrane function' of SMG leads to easy diffusion of spicy food elements towards intra-epithelial nerve endings causing more burning sensation. Salivary substitutes containing mucin could help in the formation of SMG layer over the surface of oral epithelium in OSMF and reduce the burning sensation.

Also the VAS I and VAS F were moderate to severe in a larger proportion of lesions diagnosed with OSMF, OLP and BMS. Higher pain intensity and functional disturbance could be the primary motivation factors for the patients to seek treatment.

Although sleep disturbance was reported only in 7 out of 105 patients, it was significantly associated with VAS I and VAS f. These findings are in accordance with earlier studies that have reported that waking from sleep was significantly associated with the intensity of pain. Sleep disturbance and poor quality of sleep has been reported observed in BMS [22, 23].

No association was found in this study, between awakening from sleep and female gender and this is in disagreement with earlier studies.

Most studies indicate that women experience greater clinical pain, suffer greater pain-related distress, and show heightened sensitivity to experimentally induced pain compared with men [24, 25]. The literature in this area clearly suggests that men and women differ in their responses to pain, with increased pain sensitivity and risk for clinical pain commonly being observed among women [26]. Studies show that this is accompanied by a significant gender-dependent difference in cortical activity but not spinal nociceptive activity, suggesting that much of the difference in experienced pain is attributable to variations in thalamocortical processing and to the ensuing changes in the appraisal of emotional responses to noxious insults [27, 29]. Contrary to these observations, in our study, we found no significant difference between the genders in association with VAS I and VAS F. The greater proportion of male patients with OSMF with higher scores of VAS I and VAS F could have resulted in this statistical variation.

We found no significant association between various pain characteristics in the different age groups except the higher prevalence of burning type of pain in 45-60 age groups. Chronic conditions such as OLP and BMS associated with burning sensation were more common in patients aged 40 and above while younger patients with RAS predominantly described the quality of pain to be 'dull aching'.

Notably, a negative correlation was found between the size of ulcer and intensity of pain. Earlier studies have also pointed out that smaller ulcers could be associated with severe pain. In a recent literature they did not find any correlation between intensity of pain and clinical measures, such as size or number of lesions [30].

This study is limited by the small sample size especially when the oral mucosal lesions were categorised into groups. Further studies with larger sample size and inclusion of quality of life measures could improve our understanding of oral mucosal pain.

Tables and figures

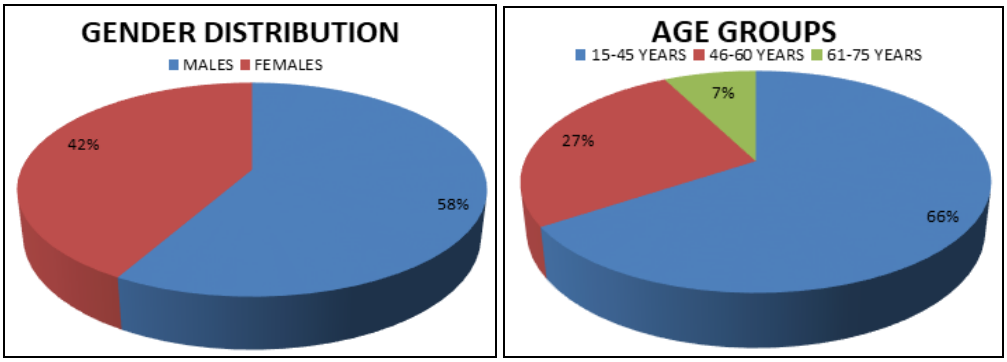

Fig 1: gender distribution and age group

Table 1: association of diagnosis with pain characters:

		Diagnosis (%)						Chi Square Value	P value
		OSMF	RAU	TU	OLP	BMS	PV		
Aggrevating Factor	Yes	26(100)	15(36.6)	4(50)	23(95.8)	5(100)	1(100)	45.066	0.000 (H.S)
	No	0(0)	26(63.4)	4(50)	1(4.2)	0(0)	0(0)		
Relieving Factor	Yes	4(15.4)	0(0)	1(12.5)	7(29.2)	0(0)	0(0)	13.936	0.016(S)
	No	22(84.6)	41(100)	7(87.5)	17(70.8)	5(100)	1(100)		
Pain	Burning	26(100)	0(0)	1(12.5)	19(79.2)	5(100)	1(100)	110.553	0.000(H.S)
	Dull Aching	0(0)	40(97.6)	4(50)	5(20.8)	0(0)	0(0)		
	Pricking	0(0)	1(2.4)	3(37.5)	0(0)	0(0)	0(0)		
Sleep Disturbance	Yes	3(11.5)	0(0)	1(12.5)	1(4.2)	1(20)	1(100)	20.027	0.001 (H.S)
	No	23(88.5)	41(100)	7(87.5)	23(95.8)	4(80)	0(0)		

Vas I	Mild	3(11.5)	20(48.8)	4(50)	5(20.8)	0(0)	0(0)	30.860	0.001(H.S)
	Moderate	17(65.4)	20(48.8)	4(50)	17(70.8)	3(60)	0(0)		
	Severe	6(23.1)	1(2.4)	0(0)	2(8.3)	2(40)	1(100)		
Vas F	Mild	8(30.8)	24(58.5)	5(62.5)	11(45.8)	1(20)	0(0)	28.253	0.002(H.S)
	Moderate	15(57.7)	17(41.5)	3(37.5)	11(45.8)	2(40)	0(0)		
	Severe	3(24.8)	0(0)	0(0)	2(8.3)	2(40)	1(100)		

Table 2: sleep and pain characters

		Sleep		**CHI SQUARE VALUE**	**P VALUE**
		Yes	**No**		
Pain	Burning	5(71.4)	47(48)	4.572	0.102 (N.S)
	Dull aching	1(14.3)	48(49)		
	Pricking	1(14.3)	3(3.1)		
Vas Intensity	MILD	0(0)	32(32.7)	27.036	0.000 (H.S)
	MODERATE	2(28.6)	59(60.2)		
	SEVERE	5(71.4)	7(7.1)		
Vas F	MILD	0(0)	49(50)	27.656	0.000 (H.S)
	MODERATE	3(42.9)	45(45.9)		
	SEVERE	4(57.1)	4(4.1)		

Table 3: Gender and All Factors

		Gender		**CHI SQUARE VALUE**	**P VALUE**
		Male	**Female**		
Aggrevating factor	Yes	43(70.5)	31 (70.5)	0.000	1.000 (N.S)
	No	18(29.5)	13(29.5)		
Relieving factor	Yes	7(11.5)	5(11.4)	0.000	1.000 (N.S)
	No	54(88.5)	39(88.6)		
Pain	Burning	28(45.9)	24(54.5)	3.232	0.199 (N.S)
	Dull aching	32(52.5)	17(38.6)		
	Pricking	1(1.6)	3(6.8)		
Sleep	Yes	4(.6.)	3(6.8)	0.003	1.000 (N.S)
	No	57(93.4)	41(93.2)		
VAS I	MILD	21(34.4)	11(25)	2.089	0.352(N.S)
	MODERATE	35(57.4)	26(59.1)		
	SEVERE	5(8.2)	7(15.9)		
VAS F	MILD	31(50.8)	18(40.9)	1.999	0.368(N.S)
	MODERATE	27(44.3)	21(47.7)		
	SEVERE	3(4.9)	5(11.4)		

Table 4: According to Age Groups and Factors

			AGE GROUP IN YEARS		CHI SQUARE VALUE	P VALUE
		15 – 45	46 - 60	61-75		
AGGREVATING FACTOR	Yes	44(63.8)	24(85.7)	6(75)	4.696	0.096(N.S)
	No	25(36.2)	4(14.3)	2(25)		
RELIEVING FACTOR	Yes	6(8.7)	4(14.3)	2(25)	2.191	0.334(N.S)
	No	63(91.3)	24(85.7)	6(75)		
PAIN	Burning	29(42)	18(64.3)	5(62.5)	17.432	0.002(H.S)
	Dull aching	39(56.5)	9(32.1)	1(12.5)		
	Pricking	1(1.4)	1(3.6)	2(25)		
SLEEP	Yes	4(5.8)	3(10.7)	0(0)	1.393	0.498(N.S)
	No	65(94.2)	25(89.3)	8(100)		
VAS I	MILD	25(36.2)	4(14.3)	3(37.5)	7.423	0.115(N.S)
	MODERATE	38(55.1)	18(64.3)	5(62.5)		
	SEVERE	6(8.7)	6(21.4)	0(0)		
VAS F	MILD	36(52.2)	10(35.7)	3(37.5)	3.556	0.469(N.S)
	MODERATE	28(40.6)	15(53.6)	5(62.5)		
	SEVERE	5(7,2)	3(10.7)	0(0)		

Table 5: Correlation Between Ulcer Sizeand Vas Intensity

	Pearson Correlation	P Value
Ulcer Size And Vas I	-0.348	0.000(H.S)

Conclusion

In this study, the characteristic of pain was reported to be mostly burning in quality, and its intensity was related to the function. No significant difference was found between the genders for VAS I and VAS F measures. Sleep was highly significant when associated with VAS I and VAS F .Smaller the size of the ulcer, greater was the intensity of pain. The characteristics of pain could aid in improving the diagnosis, quality of treatment and monitoring painful oral mucosal conditions.

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