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CUTANEOUS ALLODYNIA IN MIGRAINE

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ABSTRACT:

OBJECTIVE: Objective of this study is to find out the presence and severity of cutaneous allodynia in migraine sufferers.

BACKGROUND: Cutaneous allodynia is the perception of pain in response to non noxious stimuli. It occurs due to repeated stimulations that lead to sensitization and abnormal skin response.

MATERIALS AND METHODS: It was a descriptive case study and conducted at Neurology department Pakistan Institute of Medical Sciences from June 2017 to May 2018. All patients of both genders above age 13 years of age with migraine diagnosed as having “Migraine without aura” or “Migraine with aura” according to the International Headache society criteria, ICHD-3 beta, were enrolled in this study. Cutaneous allodynia was evaluated by using Allodynia Symptom Checklist that consisted of 12-items. Cutaneous allodynia severity was defined according to score i.e No allodynia if score was 0-2, mild allodynia if score was 3-5, moderate allodynia if score was 6-8 and severe allodynia with a score of 9 or more.

RESULTS: A total of 200 patients were enrolled in study with a mean age of 33 years. 142 patients (71%) were females and 58 patients (29%) were males. 111 patients (55.5%) showed signs and symptoms of cutaneous allodynia while 89 patients (44.5%) were negative for cutaneous allodynia symptoms. Out of 111 patients who were positive for cutaneous allodynia 51 patients (45.9%) showed mild degree of cutaneous allodynia, 38 patients (34.2%) showed moderate and 22 patients (19.8%) showed severe degree of cutaneous allodynia

CONCLUSION: This study shows the presence and severity of allodynia in migraine population. Increased skin sensitivity can be determined by simple and relevant questioning about activities such as brushing hair, touching the scalp, shaving, and wearing glasses, contact lenses, earrings, or wearing tight clothes hurt patients during migraine attacks.

Key words: Migraine, Allodynia

INTRODUCTION: Migraine is a chronic debilitating disorder having many complications including allodynia that affect the quality of life. Cutaneous allodynia (CA) refers to the comprehension of pain or discomfort in response to non-noxious stimuli applied to skin.¹ When a stimulus is repeated again and again it causes sensitization. This process leads to early responsiveness by neurons.² In facial cutaneous allodynia there is involvement of trigeminal nucleus caudalis. It has nociceptive neurons and receives afferent from meninges especially the dura, facial skin, mucosa, teeth, tongue and jaw.^{3,4} These neurons after receiving input from areas inside as well as outside the brain produce different responses leading to headache and abnormal cutaneous sensations.⁵ All these processes lead to change or alteration of normal electrophysiological functions of central nervous

system as well as sensitization producing altered skin sensations, a condition named as cutaneous allodynia.⁶ A lot of studies done before suggest the prevalence of cutaneous allodynia up to 80% in patients with migraine especially during acute exacerbation.⁷ Those migraineurs who have more frequent attacks are more prone to have allodynia⁸, prevalence is more if the duration of migraine is prolonged.⁹ Studies showed the presence of abnormal cutaneous sensations for sometimes even after the migraine attack has been aborted, these findings strengthen the mechanism of involvement of trigeminal pain pathway and central sensitization.¹⁰ This theory is also supported by the presence of symptoms in transformed migraine.¹¹⁻¹³ There are three categories of cutaneous allodynia including thermal, dynamic mechanical and static mechanical.^{14,15}

The aim of our research was to find out the relation between migraine and cutaneous allodynia. For allodynia we used Cutaneous Allodynia Checklist (ASC), table-17 to describe the frequency and characteristics of cutaneous allodynia in migraine population.

**Table-1:
12-item Allodynia Symptom Checklist (ASC-12)**

Question: How often do you experience increased pain or an unpleasant sensation on your skin during your most severe type of headache when you engage each of the following?	Does not apply to me	Never	Rarely	Less than half of the time	Half of the time or more
	Score: 0	Score: 0	Score: 0	Score: 1	Score: 2
Wearing a necklace					
Wearing earrings					
Wearing glasses					
Wearing tight clothes					
Wearing a pony tail					
Wearing contact lenses					
Shaving the face					
Taking a shower					
Combing the hair					
Resting the head on a pillow					
Exposure to cold					
Exposure to heat					
Total score:					
Sum of score:					

Allodynia	ASC range
None	0-2
Mild	3-5
Moderate	6-8
Severe	9 or more

MATERIALS AND METHODS:

This was a descriptive case study conducted in department of neurology, Pakistan Institute of Medical Sciences for a period of 1 year from June 2017 to May 2018 after taking permission from ethical committee of the hospital. A total of 200 patients were enrolled using non probability consecutive sampling. Sample size was calculated using WHO sample size calculator. An informed written consent was taken from all the patients. All patients of both genders above age 13 years of age with migraine diagnosed as having “Migraine without aura” or “Migraine with aura” according to the International Headache society criteria, ICHD-3 beta, were enrolled in this study¹⁶. Cutaneous allodynia was evaluated by using Allodynia Symptom Checklist that consisted of 12-items.

Cutaneous allodynia severity was defined according to score i.e No allodynia if score was 0-2, mild allodynia if score was 3-5, moderate allodynia if score was 6-8 and severe allodynia with a score of 9 or more. The data was entered on a standard performa and analyzed by using SPSS version ¹⁷. Mean and standard deviations were calculated for numerical variables. Frequencies and percentages were calculated categorical variables.

RESULTS:

A total of 200 patients were enrolled in this study. The mean age of the patient was 33 years. Out of 200 patients 142 (71 %) were females and 58 (29 %) were males as shown in table 2. Out of 200 patients 111 (55.5 %) had some symptoms of cutaneous allodynia while 89 patients (44.5 %) didn’t show any symptoms of cutaneous allodynia as shown in table-3. Out of 111 patients who were positive for cutaneous allodynia 51 patients (45.9%) showed mild degree of cutaneous allodynia, 38 patients (34.2%) showed moderate and 22 patients (19.8%) showed severe degree of cutaneous allodynia as shown in table-4.

Table-2: Gender distribution

		Frequency	Percent %
Valid	Male	58	29
	Female	142	71
	Total	200	100.0

Table-3: Cutaneous Allodynia positive and negative patients.

		Frequency	Percent %
Valid	Positive	111	55.5
	Negative	89	44.5
	Total	200	100.0

Table-4: Severity of Cutaneous Allodynia.

CA	Frequency	Percent %
Negative	89	44.5
Mild	51	25.5
Moderate	38	19.0
Severe	22	11.0
Total	200	100.0

DISCUSSION:

Cutaneous allodynia is the feeling of discomfort and pain to the stimuli that usually do no cause pain. It is one of the several complications of migraine that develop due to chronicity as the disease progresses and affect the outcome measures in disease course.

The proposed reason for allodynia is the sensitization of the nociceptive neurons in central pain pathway. As disease progresses and its duration increases the frequency of allodynia also increases. All patients were examined and interviews directly and by the authors themselves. By using the 12-items Allodynia Symptoms Checklist, we found the frequency percentage of cutaneous allodynia in migraine sufferers was up to 56 percent with varying degrees of symptoms of allodynia ranging from mild to severe depending upon ASC-12 items score. Our study is consistent with the findings of an international study by Lipton et al¹⁷ that showed a presence of cutaneous allodynia up to 63% among migraineurs with severe allodynia present in 20.3% of migraineurs. Presence and severity of allodynia indicates the migraine severity actually indicating prompt treatment as the increased frequency of allodynia indicates the long term disease activity. Just like migraine headache that has many aggravated factors, cutaneous allodynia after sensitization involving the central process responds to even the trivial stimuli from inside as well as outside the brain. Young WB et al¹⁸ showed in their study that frequent migraine headache attacks are responsible for occurrence allodynia that favours the concept of sensitization leading to abnormal and enhanced dermal response to non irritating stimuli even. Prolonged duration of disorder and chronicity are related to higher percentages of derangements and alteration in processing of sensory stimuli in the cerebral cortex¹⁹. So the proposed structural changes in trigeminovascular excitability pathway as well as some other pain-modulating systems in the brainstem are also thought to be involved in the process of happening

of signs and symptoms of cutaneous allodynia. In another study by Ashkenazi et al²⁰ on which they found the prevalence of allodynia in migraine patients up to 80%. Usually the patients become sensitive to pain even during attack free periods of migraine but as far as the allodynia is concerned when patients were enquired about abnormal dermal response they denied any symptoms of cutaneous allodynia during headache free periods suggesting its reversible nature.

LIMITATIONS

It is a single centre study. Frequency in non-migraine patients is not checked in this study. Associations of cutaneous allodynia especially with duration and severity of migraine as well as its impact on activities of daily living was not exercised. Validated scales for CA assessment not available in other languages.

CONCLUSION:

This study shows the presence and severity of allodynia in migraine population. Increased skin sensitivity can be determined by simple and relevant questioning about activities such as brushing hair, touching the scalp, shaving, and wearing glasses, contact lenses, earrings, or wearing tight clothes hurt patients during migraine attacks.

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Ghulam Shabbir; data analysis, manuscript writing, manuscript review

Haris Majid Rajput; data collection, data analysis, manuscript writing, manuscript review

Zakir Jan; data analysis, manuscript writing, manuscript review