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Weather-Related Pain or Meteoropathy has been Attracting Attention

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Abstract

Recent topic concerning weather-related pain or meteoropathy is described. Such symptoms are observed in patients with rheumatoid arthritis (RA), fibromyalgia, osteoarthritis, or headache, neck pain, stiff shoulder, back pain. Patients often feel pain when atmospheric pressure showed lower pressure of 1003-1007 hPa or decrease of 6-10 hPa. From psychosomatic point of view, decreased self-efficacy or higher catastrophic thinking are involved. Several questionnaires are useful for the evaluation, such as Pain Disability Assessment Scale (PDAS), Hospital Anxiety and Depression Scale (HADS), Pain Self–Efficacy Questionnaire (PSEQ), and Pain Catastrophizing Scale (PCS). For treatment, exercise–induced hypoalgesia (EIH) would be effective.

Keywords

Weather-Related Pain, Meteoropathy, Pain Self–Efficacy Questionnaire, Pain Catastrophizing Scale, Atmospheric Pressure, Exercise–Induced Hypoalgesia

Abbreviations

PSEQ: Pain Self–Efficacy Questionnaire; PCS: Pain Catastrophizing Scale; EIH: Exercise–Induced Hypoalgesia

During summer 2021, Tokyo Olympic Games started in late July, and the Paralympic Games started in late August [1]. The weather for this period had been irregular. It was hot with no rain in July, chill and persisting much rain, typhoon and flood in mid-August, and unstable in early September. It was uncommon to have such weather changes in Japan. By this unexpected and irregular weather, lots of patients with some pains in the head, neck, shoulder and back tended to complain of discomfort and persisting pain. Furthermore, some patients showed exacerbation of dizziness, vertigo, and psychosomatic symptoms more than usual summer time period.

Lots of patients associated with chronic pain from various pathologies often states that symptoms become worse due to weather deterioration [2]. It has been called as weather-related pain or meteoropathy, which has often found at head, neck and shoulders [3]. In Japanese, there is a word, stiff shoulder or frozen shoulder. For weather-related pain, some diseases have been strongly involved in the exacerbated pain, which include rheumatoid arthritis (RA), fibromyalgia, osteoarthritis, and so on [2]. Furthermore, some psychosomatic influence exists for its background, such as decreased self-efficacy or higher catastrophic thinking. In such patients, exercise treatment in

combination with pharmacological treatment have been effective for relieving several symptoms [4]. Among these symptoms, diseases and psychological aspects, significant correlations have been found for some degree [5].

There was a large survey in Japan as to weather-related pain for 16,482 cases in 2020. The prevalence of definite vs probable diagnosis was found in 20% vs 27% in male, and 43% vs 35% in female, respectively, which was remarkably high results [6]. Various symptoms showed headache 51.0%, neck and shoulder pain 13.4%, arthralgia 12.8% and low back pain 7.2%. Since the symptoms depend on the weather changes, self-efficacy seems to be lower and they tend to take a negative perspective of pain and associated symptoms. According to the questionnaire of 2687 residents, persisting chronic pain is found in 39%, chronic pain becomes worse along with weather deterioration is in 25%, and chronic pain becomes worse for coldness of weather or circumstance in 47% [7].

Changing weather is related to changes in atmospheric pressure, and some previous research data will be shown. As regards to weather-related pain, it has been rather common in Japan, because Japan has four seasons and quite a few changes of decreasing atmospheric pressure or typhoon. From the study of 34 Japanese patients with migraine, they felt pain in the head when atmospheric pressure showed the approach of lower pressure in the range of 1003-1007 hPa and the decrease of 6-10 hPa, which was slightly lower than the usual pressure level [8].

A research experiment was conducted concerning weather-related disorder. Decrease in barometric pressure may be the trigger meteoropathy, and then lower pressure was provided in an experimental room [4]. Mice were placed in a climatic chamber and barometric pressure was lowered from 1013 to 973 hPa (minus 30 hPa) for 50 min. To explore the related pathophysiological issue, the expression of c-Fos protein was selected for investigation as a marker for neural activation. As a result, significant c-Fos expression was found in the superior vestibular nucleus (SuVe). Similar mechanisms possibly contribute to the meteoropathic mechanism in humans.

For the pain and discomfort in the head, neck, shoulder and back, psychosocial factors in human being have been involved. They include fear of movement, self-efficacy, coping and catastrophizing [9]. As to the management, several questionnaires are useful, such as Fear Avoidance Beliefs Questionnaire, Pain Self-Efficacy Questionnaire, Coping Strategies Questionnaire, Chronic Pain Coping Index, Pain Catastrophizing Scale and the Coping Strategies Questionnaire. For patients with weather-related disease, several batteries have been applied for clinical research. They include i) pain assessment: Numerical Rating Scale (NRS), ii) functional behavior assessment: Pain Disability Assessment Scale (PDAS) [10], iii) psychosocial assessment: Hospital Anxiety and Depression Scale (HADS) [11], iv) assessment for pain in detail: Pain Self–Efficacy Questionnaire (PSEQ) [12,13], and Pain Catastrophizing Scale (PCS) [14].

A study was conducted for 93 patients with frozen shoulder [12]. They received some batteries including NRS, PCS, and PSEQ mentioned above [15]. As a result, pain intensity has brought increasing the risk of pain as self-efficacy and catastrophizing. Their catastrophizing pain has been also elevated by lower degree of self-efficacy [12]. When patient is feeling pain, catastrophizing pain was reported to influenced much for motor and sensory integrative regions [16]. Moreover, self-efficacy was also involved in the mechanism as a cognitive axis for the model associated with chronic pain [17].

Regarding the pain intensity, self-efficacy during pain management has influenced to some degree. Consequently, physician or physiotherapist can consider and intervene some psychological treatment during the daily practice [18]. The relationship was investigated among pain intensity, catastrophizing pain and self-efficacy. In addition, other factors would be studied for related situation including fear and depression [19]. Patients with RA (n=85) were studied using pain DETECT questionnaire (PDQ), PSEQ and PCS [20]. As a result, the use of PSEQ and oral analgesics showed the predictors of the five-level version of the EuroQol five-dimensional descriptive system (EQ-5D-5L).

For the treatment, exercise therapy has been effective, which seems to be from exercise–induced hypoalgesia (EIH) [21,22]. It is recommended to set the exercise intensity, persisting time and exercise content by the voluntary decision of the patient. The reason would be due to significantly increased pain threshold in such situation [23]. For patients with meteorological-related pain, several regions are commonly affected, such as head, neck and shoulders, back associated some evidence of effective exercise therapy. They include stretching, muscle endurance, muscle strengthening, and combined of these which are useful multidisciplinary treatments [24,25]. In the case of medical oral agents, certain efficacy would be expected for the taking anti-vertigo agents in advance. They include diphenidol, dimenhydrinate, diphenhydramine, and others.

In summary, recent topic concerning weather-related pain and/or meteoropathy was described in this article. We hope the information would become some reference in the medical practice.

Conflict of Interest

The author has read and approved the final version of the manuscript. The author has no conflicts of interest to declare.

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