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Conservative Physiotherapy-Based Rehabilitation of Migraine: A Case Report

Riya Chauhan[1], Asra Malik[2], Akshra Kumari[3], Dr. Shakshi Naithani[4], Dr. Tripti Pandey[5]

[1]BPT 4th Year, (Uttaranchal P.G. College of Biomedical Science and Hospital)

[2]BPT 4th Year, (Uttaranchal P.G. College of Biomedical Science and Hospital)

[3]BPT 4th Year, (Uttaranchal P.G. College of Biomedical Science and Hospital)

[4](PT), Assistant Professor, College of healthcare professions, DIT University, Dehradun

[5](PT), Assistant Professor, Dev Bhoomi Uttarakhand University, Dehradun

Abstract: ***Migraine is a common neurological disorder, characterised by episodes of headaches having varying intensity from moderate to high and varying duration. These episodes of migraine are termed as "Migraine Attacks". Migraine also accompanies other symptoms like nausea and high sensitivity for light and sound. Frequent migraine attacks also affect daily activities of individuals. Many factors can induce migraine attacks in people such as stress, hormonal changes and certain food items. Migraine is a genetically induced primary headache disorder. It is considered as the first cause of disability in people under 50 years of age, among all neurological diseases. Migraine affects 14.4% population worldwide and is a major health problem in various countries. Severity of symptoms and morbidity in migraine patients depend on the type and chronicity of migraine. According to the Headache Classification Committee of the International Headache Society, Migraines can be classified broadly into two categories, which are migraine with aura and migraine without aura. Other subclassifications of migraine include Chronic migraine and probable migraine. Various risk factors such as traumatic brain injury, caffeine overuse and advancing age play a crucial role in development of migraine in any individual. Treatment for migraine include approach for pain relief using pharmacological treatment as well as many lifestyle modifications as preventive measures. Physical therapy can be adapted to support the pharmacological treatment in order to help reduce the symptoms.***

Keywords: Migraine, Suboccipital inhibition, Headache, Manual therapy, Pain Modulation, Complementary treatment, Trigeminovascular system

1. Introduction

Migraine is a neurological disorder characterised by episodic headache. It is a primary headache disorder of varying duration and intensity of headaches. Although seen in both the genders, the prevalence of migraine is generally high among females, than in males. The most prone age group was seen in 10-14 years of age group.

The word migraine is derived from the Greek word hemikrania, which was later converted into Latin as hemicranea. The French translation of the term is migraine.

It is a common cause of disability and also affects the quality and quantity of work. Among all subtypes of migraine, migraine without aura is the most common.

Epidemiology

Migraine is a common neurological disorder and its global prevalence is estimated to be 1.1 billion cases in 2019. The prevalence has substantially increased in last 3 decades. Although seen in both the genders, the prevalence of migraine is generally high among females, then in males. The highest incidence of migraine was seen in the individuals in the age group of 10-14 years.

Migraine: Anatomy

Peripheral innervation of Trigeminovascular system

The blood vessels of pia, arachnoid and dura contain nociceptors. The headache phase which arises in migraine is thought to be associated with the activation of nociceptors innervating layers of brain as well as the large cerebral arteries and sinuses.

Various triggers such as mechanical, electrical and chemical stimuli can trigger these structures and give rise to headache similar to that present in migraine and its common associated symptoms such as light sensitivity, sound sensitivity, throbbing pain and nausea.

The nociceptive innervation of brain meninges and blood vessels contain two types of axons which are unmyelinated (C fibres) and thinly myelinated (A delta fibres.) axons.

These axons contain vasoactive neuropeptide such as substance P and Calcitonin Gene Related Peptide (CGRP).

These originate mainly in trigeminal ganglion and reach towards the dura matter through the branch of trigeminal nerve that is ophthalmic branch. Maxillary and mandibular branch also play a role in carrying axons towards the dura matter.

Neurons in Upper cervical dorsal root ganglia also innervates the dura layer of brain.

Subtypes of migraine

According to the Headache Classification Committee of The International Headache Society, the migraine can further be classified into following types.

- **Migraine without aura**: This includes pulsating, unilateral, recurrent headache episodes. These episodes generally last for about 4 to 72 hours. These are moderate to severe in intensity.
- **Migraine with aura**: These are also usually recurrent and last for few minutes. These types of migraine usually present with unilateral symptoms such as language and visual disturbances.
- **Chronic migraine**: As the name suggests, these headaches persist for a longer period of time. These headaches usually occur for 15 or more days for 3 or more months.
- **Probable migraine**: These types of headaches usually lack one feature in order to be included in the above types of migraine. These are symptomatic migraine attack.

Phases of migraine

Prodrome
It is the phase which occurs in the beginning of migraine attack. It lasts upto few hours to few days and include symptoms such as mood swings and increased urination.

Aura
Not all the people with migraine attacks experience this phase. It also occurs in the beginning of migraine attack and lasts upto few minutes to hours, it includes symptoms such as visions changes and tingling sensation.

Headache
The headache during migraine attack starts gradually and increases in intensity. It can last for hours to days. It usually begins in one side of face. And include symptoms such as confusion, sound and light sensitivity.

Migraine without headaches can also occur which may include symptoms such as nausea, vomiting and constipation.

Postdrome
This phase occurs after migraine in which a person may feel dizziness and confused. The person also feels lethargic and it may take upto 2 days to recover and feel healthy again.

Case presentation
A 19-year-old, female patient had been experiencing migraine attacks around 4 times a week, and 20 to 25 days in a month for over 6 years.

Due to the headache's intensity, symptoms and duration, migraine type can be considered to that with aura, that is, migraine with aura.

Subjected assessment
Patient is a 19-year-old female who has been diagnosed with migraine. The patient is experiencing migraine attacks over 6 years. Migraine attacks usually occur 4 times a week and is unilateral. The duration of migraine headache varies from few hours or continuous for a couple of days.

Patient has no history of fall or trauma as investigated during radiological examination. Apart from migraine attacks the patient is also experiencing sinus symptoms and pain. When questioned about the pattern or type of pain, she stated that the headache accompanying migraine is severe and throbbing. Along with the migraine headache the patient also experiences symptoms like nausea, light headedness, dizziness, photophobia and phonophobia.

The patient is currently a student. Patients complain that sitting for long hours, keeping the head in downward position and bending activities are some of the activities that serve as the aggravating factors for migraine attacks.

The patient is not experiencing any restrictions in the activities of daily life except that the aggravating factors make the movement and activities quite difficult.

Objective assessment
The assessment methods used for examining the migraine patient were observation, patient's subjective assessment, special tests for muscle tenderness and stiffness and the criteria set by ICHD-3 for migraine diagnosis.

The patient is also enquired about the symptoms that occur before, during and after the migraine attack. Some tests were done which included palpating the muscles of neck and face. Pain and tenderness were found to be present in occipital and suboccipital muscles. The upper trapezius and sternocleidomastoid muscles were found to be positive for tenderness. Pain was also found to be present around the sinuses on face, masseter muscles and frontal portion.

The postural analysis of the patient was done using visual observation.

On the postural analysis of the patient, the position of head, neck and thorax positions, the sagittal view and the frontal view was observed. The patient's posture was also observed in different positions of the body such as standing and sitting.

On observation it was found that the shoulders were slight rounded and forward in alignment and the thoracic curvature was found to be normal.

For assessing the intensity of pain, the visual analogue scale was used. Due to brief and long history of migraine, the average intensity of pain noted was 10 out of 10 on the first day of assessment. The same scale was used in the subsequent months to monitor the progress of the patient.

On the assessment for symptoms, patient presented with some classical symptoms of migraine such as dizziness, nausea, photophobia, phonophobia, irritation and confusion.

Treatment
The patient was given manual therapy session, for all days of the week, continuously for 3 months. The session was shifted to alternate days after 1 month of treatment. The session went for around 35 minutes each.

The physical therapy sessions comprised of relaxation techniques, breathing techniques and suboccipital inhibition.

Additionally, the patient was also given stretching and isometric exercises for neck muscles.

The primary treatment goal was to reduce the intensity of symptoms and the frequency of migraine attacks, also to decrease the dependency on medications and improve the quality of life for the patient.

Exercise protocol for migraine patients

S. No.	Exercise	Procedure	Duration	Demonstration
1.	Relaxation: a) Prone Relaxation Technique	The subject lies in prone position and the head is turned to either of the two sides, can be rested on a pillow for more relaxation. A pillow is placed beneath lower abdomen to prevent hollowing and beneath legs, so that knees stay slightly flexed. Hips medially rotated for more relaxation.	5 minutes	
	b) Side Lying Relaxation Technique	Subject lies in side lying with the uppermost arm and legs resting on a pillow. A pillow is placed under the head to keep head and neck of the subject in alignment.	5 minutes	
	c) Mitchell Relaxation Technique	Subject is asked to move away from position of stress (punching position), then stop and feel the new position. <u>Commands:</u> • For shoulders – pull shoulders towards feet • For elbows – elbows out and open, stretching the elbow joint • For Hands – fingers and thumbs open and supported • For Hips – turn hips and legs outwards • For Feet – push away from body • For Body – press body into the support (e.g. bed) • For Head – press into the pillow • Breathing Orders – take deep breath and exhale normally	5 minutes	
2.	Breathing Exercises: a) Diaphragmatic Breathing/ Abdominal breathing	The subject lies on the back on a flat surface with knees and head supported on pillows. One of his/her hands will be on the chest and the other below the ribcage. <u>Commands</u>: • Ask him/her to take a slow and deep breath from the nose so that the stomach moves out against the hand. Although the hand on the chest should still be as much as possible. Let the subject relax and exhale out slowly through the mouth. • Exhalation should be two times longer than inhalation.	10-20 times	 
	b) Pursed Lip Breathing	The subject lies on the back on a flat surface with knees and head supported on pillows. His/her hands will be over the abdomen to feel the contractions. <u>Commands</u>: • Ask him/her to breathe in slowly and deeply through the nose. Then ask the subject to purse their lips together tightly as if trying to whistle or blow out a candle, and to exhale slowly through pursed lips. • Exhalation should be two times longer than inhalation.	10-20 times	
3	Suboccipital Inhibition technique	The subject lies in a supine position, therapist presses the sub occipital area with the tip of fingers of both hands.	10 repetitions ×15seconds	

Additional stretching exercises:

- Suboccipital muscle stretch
  Repetitions: 10 repetitions x 10 seconds
- Upper trapezius muscle stretches
  Repetitions: 5 repetitions x 10 seconds
- Sternocleidomastoid muscle stretch
  Repetitions: 5 repetitions x 10 seconds
- Scalene muscle stretch
  Repetitions: 5 repetitions x 10 seconds

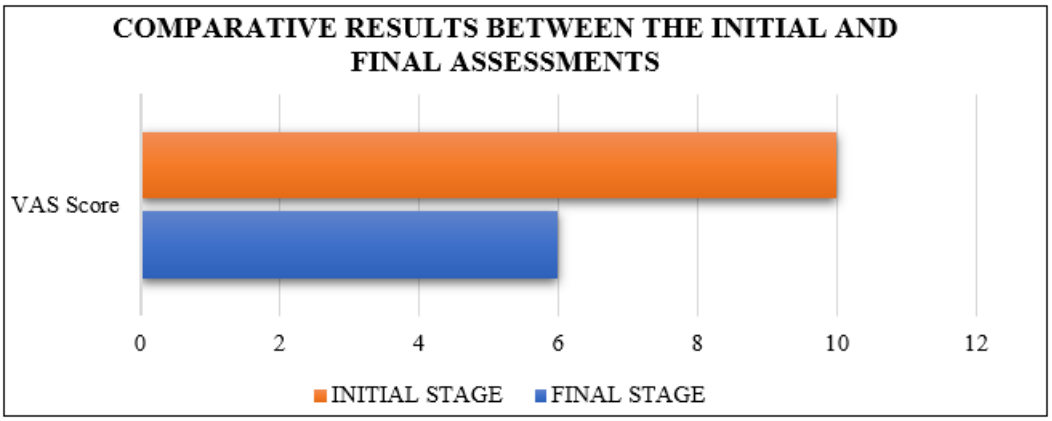
Outcomes

After the therapy sessions for 3 months, the patient reported slight decrease in the intensity of pain during migraine attacks. The patient achieved relaxation and the tenderness in the neck muscles also reduced.

The progress of the patient was divided into two phases: the initial stage and the final stage (after all therapy sessions)

The VAS score in both the stage was recorded and compared.

Initially the patient reported the VAS score to be 10 out of 10. After the sessions were over, the response of the patient was recorded on a VAS score. It was found to be around 6



2. Discussion

The young patient was experiencing chronic symptoms of migraine for over 6 years. Despite the pharmacological therapy the patient was not reporting any significant improvement in the symptoms. The physical therapy adapted to treat the patient helped her to relieve the symptoms of migraine, and provide relaxation in symptoms as well as quality of life. Through manual therapy we also released the tension in the muscles of the back and neck. The treatment was not perfectly targeted yet it helped to achieve a considerable amount of relief to the patient.

3. Conclusion

The physical therapy sessions conducted for over 3 months provided a significant result in terms of symptoms alleviation and increase in the quality of life. The physical therapy was found to be beneficial with almost no drawbacks or negative effects on the health of the patient. On the successful completion of all the sessions, the patient experienced changes in frequency and intensity of headache, with an overall satisfaction from the treatment received. Hence, physical therapy can be considered as a reliable option for migraine treatment. The relaxation and breathing techniques have a significant effect on reduction of migraine attack and on quality of life of patient. Considering its affordability and impressive outcomes, physical therapy emerges as a significant complementary option to pharmacological treatment for migraine.

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