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Case Report

Effect of Cognitive Behaviour Therapy on Kinesiophobia after CRPS-I in A Case of Stroke Hemiplegia: A Case Report

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ABSTRACT

Objective: To investigate the effectiveness of CBT on kinesiophobia in a stroke hemiplegic patient with Complex Regional Pain Syndrome-I.
Design: Single case study of a 57 year old female stroke hemiplegic patient with CRPS-I and Kinesiophobia.
Method: Baseline measurement of pain, kinesiophobia and upper limb function was assessed by Visual Analog Scale, Tampa Scale of Kinesiophobia and Disability Arm Shoulder Hand respectively. Intervention: The subject received CBT for a session of 1 hour, 3 sessions per week for 6 weeks. Post CBT, measurements for all the outcome measures were taken. Setting: Department of Occupational Therapy, NILD, Kolkata, West Bengal, India. Subject: A 57 year old female.
Results: The subject showed improvement in pain (VAS change score 5), kinesiophobia (TSK change score 8) and upper limb function (DASH change score 9).
Conclusion: CBT is effective in reducing pain, kinesiophobia and improving upper limb function in stroke patient with CRPS-I.

Key words: stroke hemiplegic, Complex Regional Pain Syndrome-I, kinesiophobia, Cognitive Behaviour Therapy (CBT).

INTRODUCTION

Complex regional pain syndrome (CRPS) is a heterogeneous disorder that falls in the spectrum of neuropathic pain disorders. [1] Based on the recommendation from the International Association for the Study of Pain, complex regional pain type 1 entails pain syndrome, autonomic dysfunction, trophic changes, and functional impairment without an identifiable peripheral nerve component. [2]

CRPS-I most commonly precipitates in bone and soft tissue injuries, upper extremity immobilization, rotator cuff tear, shoulder spasticity, and Glenohumeral joint subluxation, but most of these associations have not been obviously established. [3]

Complex regional pain syndrome-1 (CRPS-1) is considered to be one of the most disabling complications after stroke. CRPS characterized by severe shoulder pain, swelling of the hand, vasomotor and

sudomotor instability, joint contractures, and subsequent functional limitation of the affected extremity. More than 12% of hemiplegic patients' rehabilitation programs are often seriously hampered by the development of CRPS-I. [4] Pain is a common complication in patients with chronic stroke and may adversely affect patients' quality of life. [5-8]

The role of psychological factors has also been considered, both in the development of CRPS-1 and in its progression. [9]

One of the models that could explain the associations between fear and CRPS-1 is the fear-avoidance model. [10] According to this model, pain-related fear influences the development and maintenance of pain-related disability. [11] Pain may lead to catastrophic thoughts, which lead to fear and avoidance of movements. In turn, this avoidance leads to disability and increase of pain. [12]

Movement commonly evokes pain in people with chronic painful disease, presumably because movement activates nociceptors. Anecdotally, however, some patients report that "it hurts to just think about moving," which raises the possibility that the command to move can itself cause pain. [13] In a single patient with chronic CRPS, imagined hand movements increased her symptoms. Imagined movements caused an increase in pain and swelling in the painful hand. [14]

Kinesiophobia is a condition in which a patient has an excessive, irrational, and debilitating fear of physical movement and activity resulting from a feeling of vulnerability to painful injury or reinjury. [15] Vlaeyen et al. (16) elaborated on the kinesiophobia phenomenon, defining it as a fear of movement/(re)injury, a specific fear believed to cause injury or re-injury. It has been stated that pain-related fear is more disabling than pain itself. (17) The association between kinesiophobia, disability and physical performance has been investigated previously. (17,18) Since kinesiophobia is said to have a negative influence on the outcome of rehabilitation, this phenomenon ought to be taken into account in the clinical situation. [17-19] Kinesiophobia is a factor that plays an important part in the rehabilitation process and hence ought to be taken into consideration when planning and designing rehabilitation programmes. [20]

Dennis Turk et al emphasized the role of attributions, efficacy expectations, personal control, and problem solving within a cognitive-behavioral perspective of chronic pain. [21] The major assumptions of the cognitive-behavioral approach are based on individual information processing: Thoughts and beliefs may alter behavior by their direct influence on emotional and physiological responses. [21] Studies reported that beliefs about pain are associated with levels of functioning. [22] Changes in patients' beliefs about their pain tend to be associated with changes in their levels of functioning. [23,24]

CBT is a psychological management strategy that may be helpful in reducing pain and kinesiophobia by treating the associated psychological and behavioural factors. In a systematic review and meta-analysis, Morley et al found that compared to alternative active treatments, CBT produced significantly greater changes for the domains of pain experience, cognitive coping, and appraisal (positive coping measures) and reduced behavioral expression of pain. They concluded that active psychologic treatments based on the principle of CBT are effective. [25]

As kinesiophobia is associated with irrational, and debilitating fear of physical movement and activity, (15) which is a maladaptive and dysfunctional thought, CBT may be effective in reducing the pain related fear and thereby reducing pain and improving function. So the present study is aimed at investigating the effect of CBT on Kinesiophobia in a case of stroke hemiplegia with CRPS-I.

METHODS

Case description: The patient was a 57-year-old woman; she had Cerebro Vascular Accident (CVA) resulting in right sided hemiparesis on 26/10/2016. She was treated at R.G Kar medical college and Hospital, West Bengal, India. She developed CRPS-I in her right shoulder, wrist and hand due to incorrect handling of upper limb after stroke. She was attending both Physical therapy and Occupational Therapy at National Institute for Locomotor Disabilities (NILD), Kolkata. Prior to her admission to Occupational Therapy she was under NSAIDs / analgesics but that did not improve her complaints. On evaluation she had pain and swelling over shoulder joint, wrist joint and dorsum of hand. Upon Range of Motion assessment she had restriction of range of motion at shoulder, wrist and finger joints. Both active and passive movement of Wrist, MP, PIP and DIP joints were restricted. The forearm was cold and atrophic. Pain was always present; it was provoked by trying to move the arm, or by contact with surroundings or cloth even with slightest touch. She was not following the activities prescribed for upper limb rehabilitation by the Occupational Therapist due to fear of increase of pain with exercise. She was not using any medication when she reported to department of Occupational Therapy.

Patient Examination

Prior to participation in the study, the subject signed an informed consent. The subject was evaluated for all the outcome measures before the training and 6 weeks after CBT. An independent assessor, who was not involved in the study and the treatment of the subject, performed all the tests. The subject was given standard instructions before testing.

Outcome measures:

Tampa Scale of Kinesiophobia (TSK) was used to measure Kinesiophobia. The TSK questionnaire comprises 17 items assessing the subjective rating of kinesiophobia. Each item has a 4-point Likert scale with scoring alternatives ranging from ‘‘strongly disagree’’ to ‘‘strongly agree’’. The total score varies between 17 and 68. A high TSK value indicates a high degree of kinesiophobia. [27-29]

Visual Analog Scale (VAS): A 10-cm VAS was used to evaluate the hemiplegic upper limb pain. The VAS score 0 was defined as no pain and a score of 10 as severe pain. VAS is the most commonly used scale for the quantification of pain. [30]

Disability of Arm, Shoulder and Hand (DASH): Function of the arm, shoulder, and hand was assessed by the Disability of Arm, Shoulder and Hand (DASH) measure. [30,32] DASH questionnaire was used to assess participant perceived change in upper limb physical functioning through a range of activities. [33,34] Originally developed for use in musculoskeletal conditions, the DASH is an extensively used, reliable, valid and responsive measure of upper limb physical function. [35]

INTRERVENTION:

The subject received CBT incorporating (1) cognitive reconditioning, including relaxation training, deep breathing exercises, active engagement in activities for attention diversion and guided imagery and (2) behavioural modifications of specific activities (e.g. operant treatment, pacing, graded exposure to activities and exercises) to modify and/or reduce the impact of pain and physical and psychosocial disability and to overcome barriers to physical and psychosocial recovery. Patient was educated about differences between nociceptive and neuropathic pain, differences between protective and non-protective pain, the importance of physical and psychosocial rehabilitation, the importance of active participation in treatment and about kinesiophobia and the manner in which thoughts and feelings can influence the pain.CBT protocol used for this patient was based on Turk et al. (1983). [36-38]

Methods of dealing with pain were taught to the patient including imaginative inattention, imaginative transformation,

transformation of context. Patient was taught how to be able to confront the pain as its severity increases, coping with the feelings that exacerbate pain such as anxiety and frustration and learning to reinforce one's self for successfully coping with the pain.

After 6 weeks of intervention, evaluation of pain, kinesiophobia and upper limb function was done by using all the outcome measures.

RESULT

Pain intensity measured by VAS scale decreased from 9 to 4.Kinesiophobia decreased from an initial score of 22 to 14 and arm function in DASH scale decreased to 54 from an initial score of 63.Reduction of pain, kinesiophobia and improvement in upper limb function is shown in table No.1.

Table.No.1: Pre and post VAS, TSK and DASH score.

Outcome measure	Pre treatment	Post treatment
Visual Analog Scale (VAS)	9	4
Tampa Scale of Kinesiophobia (TSK)	22	14
Disability Arm Shoulder Hand (DASH)	63	54

DISCUSSION

The purpose of this case study was to evaluate the effect of CBT on kinesiophobia in a stroke hemiplegic patient with CRPS-I. The result of this case study demonstrated reduction of kinesiophobia and pain, improvement in arm function.

The intensity of pain reduced from a high score of 9 to 4, which says that though pain did not reduce completely but there was a definite reduction of pain after the implementation of CBT. The ccognitive relearning and reconditioning used for this patient might have helped her in accepting pain, developing awareness of the problem, and seeking a means of coping with frightening thoughts and mood alterations. She was assisted in transferring attention from incorrect and erratic thoughts and fears to adaptive thought patterns. This along with increased ability to manage pain might have reduced the intensity of pain. Processing of internal and external stimuli is central to cognitive behavioural approaches, in order to change behaviours through a direct influence on cognitions as well as emotional and psychological responses. [(36)]

Kinesiophobia was significantly associated with pain intensity and poor self-perceived health. [39] Kinesiophobia reduced from an initial score of 22 to 14 on TSK. With the reduction of pain intensity, kinesiophobia reduced. The intervention worked by means of modifying maladaptive and dysfunctional thoughts and improving mood (e.g. anxiety and depression), leading to gradual changes in cognition and illness behaviour. The case had developed CRPS within 2 months of stroke onset and continued having the symptoms for 3.5 months. As in the present case, CRPS was not a long standing one, the kinesiophobia associated with it might not be an established dysfunctional thought. So the patient might have responded to CBT well. Because the longer the CPRS-I diagnosed, the worse the disability and pain. [(26)] The result of this study is supported by Monticone M et al 2015, where they found a positive effect of CBT on kinesiophobia in patients with chronic neck pain. [40] However other studies by Pool 2010 evaluated the long term effect of CBT and found that though CBT has a significant positive effect in terms of pain and disability but no difference was found regarding kinesiophobia. In our study, CBT has a positive effect in reducing kinesiophobia after CRPS-I in a patient with stroke hemiplegia.

As functional outcomes may rely in part on patient self-management and active participation in the recovery process, [(41,42)] and both kinesiophobia and pain reduced ,the patient was now able to use the upper limb in activities and exercises prescribed by the Occupational Therapist. Thus upper limb function in DASH scale also improved. As reported by the patient, after the intervention she also used the right upper limb in other daily living activities at home. There were certain limitations of the study. Being a single case study, the level of

evidence becomes lower for generalization of the study result. No follow up was done to find out the retention effect of CBT. Other motor, sensory and sympathetic symptoms were not considered either for evaluation or for training. Future studies with larger sample and long term follow up may be conducted to examine the effect of CBT on kinesiophobia after CRPS-I in stroke hemiplegics.

CONCLUSION

The result of this case study provides evidence, that Cognitive Behaviour Therapy can be used to reduce kinesiophobia, and pain after CRPS-I in stroke patients. With the reduction of kinesiophobia, and pain, involvement in activities also increased. Rehabilitation professionals dealing with management of CRPS-I in stroke upper limb rehabilitation, must consider treatment of kinesiophobia for a better upper limb functional outcome.

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