

Effectiveness of Integrated Manual Therapy In Vertebrobasilar Insufficiency

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ABSTRACT -

Background : Vertebrerobasilar insufficiency(VBI) relates to the transient or permanent reduction or cessation of blood supply to the hindbrain through left and right vertebral and basilar artery. Dizziness is the most common manifestation of VBI and may occur as an initial isolated symptom in some patients however dizziness alone is infrequently the presenting sign of VBI. Establishing the diagnosis of VBI is more problematic as symptoms are transient and with time it becomes increasingly unlikely in the absence of associated symptoms. Also, there is hardly any literature available on physiotherapy management of VBI. Every clinical decision is uncertain and the aim is to make the best decision based on probabilities rather than making the best decision. **Objective :** To study the effectiveness of integrated manual therapy approach for a patient presenting with VBI

Methodology : The treatment approach consisted of orthopaedic manual therapy, vestibular rehabilitation and exercises for diplopia along with advice for relief of symptoms of neck pain, dizziness, diplopia and headache.

Result : The patient showed improvement in terms of pain on VAS, range of motion, functional performance on neck pain disability index and dizziness handicap inventory.

Conclusion : It can be concluded from the present study that an integrated manual therapy approach is effective in treatment of VBI

Key words : Vertebrobasilar insufficiency(VBI), neck pain, dizziness.

Introduction : Vertebrobasilar Insufficiency (VBI) relates to the transient or permanent reduction or cessation of blood supply to the hindbrain through left and right vertebral and basilar artery.^[1] Dizziness is the

most common manifestation of VBI and may occur as an initial isolated symptom in some patients, however dizziness alone is infrequently the presenting sign of VBI.^[2] The associated symptoms may include anhidrosis (lack of facial sweating), ataxia, clumsiness and agitation, diplopia, dizziness, drop attacks, dysarthria, dysphagia, facial numbness, hearing disturbances, hoarseness, hypotonia/limb weakness (arm or leg), loss of short-term memory, malaise, nausea, nystagmus, pallor/tremor, papillary changes, perioral dyesthesia, photophobia, vagueness and vomiting.^[3] VBI can most commonly arise from embolism, large artery dissection, atherosclerosis, penetrating small artery disease and less commonly by migraine, fibromuscular dysplasia, coagulopathies and drug abuse.^[2,4] The mechanical causes of occlusion include fibrous bands at the neck, anterior scalene muscle at the scaleno vertebral angle, osteophytes at foramen transversarium, subluxation of apophyseal joints, hyper rotation of transverse process, subluxation of subaxial spine, hypertrophy of uncinat process or facets at cervical spine, cervical disc herniation, stretching of artery at the point of dural penetration at foramen magnum. By far the most common cause of VBI is osteophyte arising from uncinat process and compromising vertebral artery at some point along its course in subaxial spine.^[5] Hutchinson and Yates first described the compromise of a segment of vertebral artery from spondylotic changes by anatomic studies.^[6]

Manual therapy techniques have often been used and are potentially effective in treatment of cranio-cervical pain, however there is a known risk of insult to arterial vessels around the neck leading to cervical artery disease(CAD) particularly involving the vertebral artery. In patients with VBI each clinical decision is uncertain and the aim should be on making the best decision based on probabilities rather than aiming to make the right decision.^[7,8] The purpose of this study is to present a successful conservative treatment approach for a patient who presented with a tetrad of cervical spondylosis along with dizziness, diplopia and headache resulting from VBI.

Case History : The patient Mrs. J.G, 44 year old female was referred for neck pain by an Orthopaedic

Surgeon to Physiotherapy Department. She complained of gradual onset right sided neck pain, giddiness, double vision, headache and apprehension for right neck rotation since 15 days. The quality of her neck pain was dull aching; progressive in nature, having an intensity of 2/10 on NRS which aggravated in the night while sleeping without pillow. According to Emory Pain Estimate Model she can be categorized as a verbalizer. When enquired, she told the investigating physiotherapist that although it was difficult to sleep without pillow, she continued to do so as per the advice of referring surgeon. Headache was 6/10 on NRS and was precipitated by an episode of diplopia which occurred mainly by looking down while working in the kitchen or reading books and looking towards the right. Dizziness occurred usually in the morning while getting up from bed or looking backward to the right side. The past history revealed similar complaints following a road traffic accident that happened five years back. Five years back she had a history of fall from a bike following a syncopal attack. She was diagnosed as a case of subarachnoid haemorrhage. She had complains of dizziness and balance deficit since then. Balance deficit resolved gradually however episodes of dizziness continued. Three months back she started experiencing episodes of diplopia. She underwent investigations for the same. Perimetry was done which revealed that there was no neurological deficit. She also had right sided unilateral hearing deficit.

Physical Examination : On examination, it was found that patient had forward head posture with rounded shoulder. Grade 1 tenderness was present at the mastoid process bilaterally, C2, C5 – C6 spinous process and transverse processes of C2 – C7 bilaterally. Paraspinal and suboccipital muscle spasm was present. Range of motion for flexion was full and pain free actively and passively, extension was full but painful at the end range actively, left lateral flexion was 35° actively and 45° passively and patient complained of pain in the neck during this movement, right lateral flexion was full and patient complained of pain in the right ear during this movement, rotations were 50° towards right and 55° towards left actively and 60° passively on both the sides. Sustained flexion produced diplopia with headache and combined

movement of extension and rotation towards the right produced dizziness. Repeated movements of lateral flexion and rotation towards the right side was painful. Resisted isometric movement towards left lateral flexion was painful. PA glide at C2 spinous process and facet joint was painful and hypomobile, PA glide and transverse glide at C5 spinous process was painful and hypomobile. Upper extremity strength test throughout myotomes from C2 – C7 was 5/5 on manual muscle testing. Craniocervical deep flexor endurance was 8 seconds on an average of three readings. Unilateral leg stance with eyes open was 8 seconds on the right and 12 seconds on the left. With eyes closed, the patient was unable to hold the position on right side whereas on left it was 2 seconds. Superficial, deep and combined cortical sensations at all dermatomes were normal; grip strength was 14kgs on the right and 12kgs on the left.

Test for vertebrobasilar insufficiency was positive.

Her functional score according to Neck Pain Disability Index (NPDI) was 20% and 28/100 on Dizziness Handicap Inventory Scale (DHI).

Procedure : The study design chosen for this single case study is ABA. Patient was informed about the study and an informed written consent was obtained from the patient. She was educated regarding the condition, possible physiotherapy treatment interventions, time required, number of sessions to be given and importance of adherence to the advice and treatment on regular basis. The physiotherapy management was categorized into modality, movements, advice and appliances.

- **Modality :** Continuous short wave diathermy to cervical region in with electrodes arranged in coplanar plane in supine lying for 10 minutes with mild comfortable and perceptible heat.

- **Movements :** After applying short wave diathermy, patient was given Maitland's Co-C1 mobilisation grade 2 in supine position, for 3 sessions of 30 seconds, suboccipital release in supine position for 5 minutes, stretching of the pectoral muscles in supine lying three times for a hold of 30 seconds each^[8,9], isometric retractor strengthening for a hold of 10 seconds with 3 sets of 10 repetitions and chin tucks in

supine position with 10 repetitions. After this, Cawthorne Cooksey exercise for gaze stability was performed under the supervision of principal investigator for 5 minutes. In addition to this, the patient was trained to improve cortico subcortical relay in which the patient was asked to stand on one leg, first with eyes open and then with eyes closed for as long as possible up to 30 seconds.

Figure 1: Patient performing eye exercises



Eye exercises included the following; the patient was made to sit on the chair and told to concentrate on any object on the wall for around 5 seconds and then she was made to close her eyes and reproduce the same image in her mind. Second, concentrating on a near and far object alternately, an object was placed approximately 25 centimetres away and another object was kept approximately 20 feet away and the patient was asked to focus on the near object followed by the far object alternately for 5 seconds. For the third exercise patient was asked to make a small hole between the thumb and index finger by fisting the hand at an arm distance and focusing on an object with both the eyes first and then with the other hand she was asked to close one eye and focus on the same object alternately with both the eyes. All the three exercises were performed for around 10 minutes.

The session ended with Jacobson's relaxation technique for 15 minutes.

The treatment sessions were given once a day for 6 days/week over a period of 3 weeks each lasting for 45–60 minutes.

- **Advice:** The patient was instructed to perform all exercises at home. She was advised to use a firm pillow with thickness of approximately the distance between the tip of the shoulder to the ear while sleeping in order to reduce sleep disturbances due to neck pain. If needed to look back she was advised to do it by slightly flexing her neck since combined movement of extension and rotation provoked dizziness. Also whenever she had an episode of diplopia she was advised to close the affected eye for sometime as she experienced relief of symptom on doing that.

- **Appliances :** The patient was advised to use a cervical collar only while travelling on the bike.

Result : After three weeks of intervention, Mrs. J.G. reported reasonable improvement in her symptoms. The results have been represented in the table 1.

Clinical data		Pre intervention	Post intervention	
Neck pain (NRS)		2/10	0/10	
Head ache (NRS)		6/10	2/10	
Active range of motion	Left lateral flexion	35	45	
	Left rotation	55	65	
	Right rotation	50	60	
Craniocervical flexor endurance (2nd)		8	15	
Single limb stance (seconds)	Right	Eyes open	8	15
		Eyes closed	0	10
	Left	Eyes open	12	30
		Eyes closed	2	13
Neck pain disability Index score (NPDI)		20%	6%	
Dizziness Handicap Inventory (DHI)		28/100	16/100	

Table 1 : Representing the pre and post intervention clinical outcome data

The patient also reported reduction in frequency of +Diplopia. The results obtained were maintained after 1 week of follow up

Discussion : This case study provides information on an effective management of VBI with integrated manual therapy including diplopia exercise, relaxation and vestibular rehabilitation. The results of this study show that there was decrease in neck pain and headache. The frequency of diplopia & dizziness reduced and there was an improvement seen on NPDI

& DHI. The reduction in neck pain could be attributed to the combined effect of shortwave diathermy and manual therapy. According to Goats, the application of short wave diathermy relieves pain by vasodilation causing efflux of pain mediators and by reducing muscle spasm. Manual therapy techniques including Co-C1 mobilization, suboccipital release, chin tuck exercise and scapular retractor strengthening exercise were given to the patient. Jull et al studied the effects of same on patients with cervicogenic headache and found a significant reduction in frequency and intensity of headache.^[10] It is also noted in all studies of manual therapy intervention in patients complaining of cervicogenic dizziness resulted in significant post treatment improvement in signs and symptoms of dizziness. Brown relates contribution of cervical spine to balance. Strong connections have been demonstrated between cervical dorsal roots and vestibular nucleus with neck receptors thus injury or any pathology of the neck leads to sense of dizziness and disequilibrium.^[11] In addition to it, vestibular rehabilitation program has been recommended by several authors in treatment of dizziness of cervical origin and it has positive outcomes when combined with manual therapy. Besides, they have recommended use of eye exercises to improve the function of vestibulo-ocular reflex. Manual therapy techniques are aimed at decreasing muscle spasms and trigger points of pain in the cervical musculature and decrease the irritation on the cervical proprioceptors from muscle spasms and trigger points. It has been reported that, restoration of normal muscle balance by resolving reflexive dysfunction using manual therapy could reduce mechanical compression on arterial structures in VBI.^[12,13,14] Cowthorne's Cooksey exercises in the form of vestibular rehabilitation uses compensatory responses by habituation, adaptation and substitution which promotes the use of combination of sensory input away from the site of dysfunction and postural control.^[14] The binocular diplopia in patients may be restored by means of eye exercises. However, there is hardly any study that has previously reported about the effectiveness of eye exercises in diplopia associated with VBI. These exercises are believed to strengthen eye muscles that control focus, relieve strain on the

eyes, improve visual concentration and train the eyes to focus on certain object.^[15] Jacobson's relaxation technique, in addition to manual therapy was used for treating headache. It is considered to be venerable in behavioral treatment of headache and serves as an opening to psychological management of chronic pain as progressive relaxation technique helps reduce patient's anxiety.^[16] A study conducted by Gay et al. investigated the effectiveness of Jacobson's relaxation for reduction of osteoarthritis pain and found that there was a subjective reduction in pain after four weeks of intervention as compared with subjects in control group and it can reduce the use of analgesics.^[17]

Future studies could include the use of this treatment approach with a larger sample size.

Conclusion : The results of the present study enable us to conclude that an integrated manual therapy approach can be effective in the treatment of VBI.

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THE MEANING OF WHITENESS:

White was chosen with good reason as the new standard of the medical profession. This color, representing purity, is a visual reminder of the physician's commitment to do no harm. White represents goodness. Moses, Jesus, and the Saints, for example, are often described as being clad in white. White also conveys cleanliness and connotes a purging of infection. Further, the white coat symbolizes seriousness of purpose. It communicates the physician's medical intent and serves as a symbolic barrier that maintains the professional distance between physician and patient. Perhaps most importantly, the white coat is a garment of compassion. The white coat reminds physicians of their professional duties, as prescribed by Hippocrates, to lead their lives and practice their art in uprightness and honor.

(source: ^

Andre Picard (2012-07-02). "Why do physicians wear white lab coats?". The Globe and Mail. Retrieved 2012-11-10.)