

Impact of Conventional Physiotherapy on Thoracic Outlet Syndrome in a 64 Year Old Patient: A Case Report

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Abstract: Thoracic Outlet is an anatomical site surrounded by the anterior, middle scalene muscles, clavicle, and first rib. Thoracic Outlet Syndrome (TOS) is a condition that results from compression of neurovascular structures as they come out of the thoracic outlet, the most common site of compression being costoclavicular space. This condition is mostly seen between 20-50 years of age, mostly involving the upper extremity which is more used for daily routine work. The clinical presentation includes paraesthesia, tingling and sharp shooting pain. The present case discusses the role of conventional physiotherapy in a 64 years old female who suffered from TOS, had poor sleep quality and not getting relief despite getting Botulinum toxin injection. She was given conventional physiotherapy for three weeks, following which she reported an improvement in her symptoms and function of upper extremity.

Keywords: Transcutaneous electrical nerve stimulation (TENS), Kinesiophobia, Thoracic outlet syndrome (TOS), Ultrasound.

I. INTRODUCTION

Thoracic outlet syndrome is defined as a compression of brachial plexus as it passes through the thoracic outlet. It is commonly seen between the age group of 20 and 50 years and mostly involves the upper extremity mainly used in daily routine work. The incidence is more in women in contrast to men due to their lesser muscle built, mammary glands, shallow thoracic area and inferior anatomical position of sternum [1]. Both intrinsic and extrinsic factors play an important role in the development of Thoracic outlet syndrome. The intrinsic factors include lengthened transverse process, elevated scapula on one or both sides. The extrinsic factors include faulty posture, overuse strain injury, fracture of clavicle or ribs, injury resulting from a sudden movement of the neck and head [2]. Some other factors such as excessive growth of scalene muscles, reduced muscle tension of rhomboids, levator scapulae, trapezius and decrease

in length of pectoralis major and minor, trapezius and scalene muscles also contribute to development of thoracic outlet syndrome. The clinical presentation can range from numbness in the hands, paraesthesia, tingling and sharp shooting pain in the area of neck, muscle weakness in the arms and hands, poor blood perfusion and discomfort to the hands, pain in the chest, vertigo, humming in the ears and achy shoulder [3].

TOS is caused by the compression of the brachial plexus that mostly occurs within scalene triangle or in the region of subarachnoid space as the nerve root passes beneath the tendon of Pectoralis minor tendon. Patients with TOS often complain of consistent reproducible symptoms while performing overhead activities or lifting heavy weights. Symptoms can include upper extremity paraesthesia, neck or trapezius pain, pain in shoulder/arm or supraclavicular region. Severity of night pain awakes the patient and disturbs the sleep cycle and also leads to reduced manual dexterity. It is mistakenly considered as identical to carpal tunnel syndrome, complex regional pain syndrome, brachial plexopathy and cervical disc disease [4]. Many treatment options are available for TOS. The conventional physiotherapy usually consists of application of electrotherapeutic modalities like Transcutaneous Electrical Nerve Stimulation (TENS) or ultrasound [5, 6].

II. CASE PRESENTATION

A 64 years old right-handed female patient (homemaker) was hospitalised at a private hospital due to dehydration, fever and weakness on 1 July 2022. She was discharged on 1 August 2022 and revisited the hospital on 4 August 2022 with a complaint of pain in neck on the next day of her discharge which was sharp shooting in nature, progressive, non-radiating, and was giving her night cries. The pain was rated as 9/10 on Numeric Pain rating Scale (NPRS) by the patient. The pain was aggravated while sleeping on the affected side (left), combing hair, on dressing, on performing overhead activities and was relieved on sitting or resting on normal side. The patient took the

consultation from neurosurgeon on 4 August 2022 where the treatment was started by injecting a Botulinum toxin injection near the supraclavicular region on the left side of arm for pain relief. The patient was also advised for physiotherapy treatment. The patient visited the physiotherapy department where she was assessed for her condition. The patient had no history of hypertension, diabetes mellitus, surgery, alcohol consumption or smoking.

On inspection, drooped shoulder was observed on the left side. Swelling was present near the left supraclavicular region and scapula but there was no discolouration of skin. On palpation of the left arm, grade 2 tenderness on scalene and trapezius muscles was present near the left supraclavicular region and scapula. The body temperature was also normal on palpation. On clinical examination, the muscle strength as measured by manual muscle testing, was found to be grade 2 for scalene, levator scapulae and sternocleidomastoid respectively, grade 3 for pectorals and serratus anterior muscle respectively. Roos test and Adson test were found to be positive that confirmed the diagnosis for TOS. The investigation report of magnetic resonance imaging (MRI) of cervical spine exhibited that there was a straightening of cervical spine, presence of marginal anterior osteophytes at C4, C5, C6 vertebral levels, disc desiccation changes at C3-C4, C4-C5, C6-C7.

Before the physiotherapy sessions were started, the procedure was completely explained to the patient and informed written consent was taken from her. Then the following outcome measures were recorded: Thoracic outlet syndrome index (TOSI) for function and sound health, Disabilities of the arm, shoulder and hand questionnaire (DASH) for measure of upper extremity disability, Tampa Scale of Kinesiophobia (TSK) was used to quantify the fear of movement, Pittsburgh Sleep Quality Index (PSQI) to assess sleep quality of the patient and range of motion (ROM) was measured by goniometer.



Fig. 1

The physiotherapy treatment was scheduled for 3 sessions/week for total 3 weeks and patient was advised to visit on alternate days. Conventional physiotherapy consisted of TENS (Transcutaneous electrical nerve stimulation) application for 10 minutes with asymmetric biphasic mode, 150 Hz frequency and intensity set as per the bearing strength of the patient. Ultrasound was also used for healing effect with 3 MHz frequency, continuous mode, 1.5 W/cm² threshold level for a time period of 5 minutes. The physiotherapy treatment was progressed and exercises were started from stretching of scalene muscles, pectorals and trapezius [lower fibres] each for 10 repetitions, 15 minutes. In addition to it, gentle range of motion exercises each for 10 repetitions, were given to maintain range of motion. The strengthening exercise targeted the sternocleidomastoid, levator scapulae and trapezius [upper fibres] muscle, each for 10 repetitions with 30 seconds hold. The treatment ended with glenohumeral mobilization for 5 minutes with mild intensity. Posture Re-education was advised to the patient for sound health [7].

On completion of the conventional physiotherapy treatment after 3 weeks, all the outcome measures were again recorded. The patient gave affirmative response that she had a remarkable pain relief and her pain was rated as 4/10 on NPRS.

III. RESULTS

TABLE I: OUTCOME MEASURES AFTER 3 WEEKS OF CONVENTIONAL PHYSIOTHERAPY

<i>Variables</i>	<i>Pre</i>	<i>Post</i>
NPRS	9	4
DASH	93	75
TOSI	145	97
TAMPA	64	50
PSQI	18	10
Cervical Flexion	30 ⁰	40 ⁰
Cervical Extension	50 ⁰	65 ⁰
Cervical Rotation	70 ⁰	85 ⁰
Cervical Lateral Flexion	30 ⁰	38 ⁰
Shoulder Flexion	95 ⁰	115 ⁰
Shoulder Extension	37 ⁰	45 ⁰
Shoulder Abduction	95 ⁰	120 ⁰
Shoulder Adduction	35 ⁰	40 ⁰
Shoulder Internal Rotation	60 ⁰	70 ⁰
Shoulder External Rotation	40 ⁰	55 ⁰

Table I shows the pre and post intervention scores for NPRS, DASH, TOSI, TAMPA, PSQI and range of motion at cervical spine and shoulder joint. There was an improvement in scores of all the variables following the conventional physiotherapy intervention for three weeks.

IV. DISCUSSION

This case report describes the physiotherapy management for a 64 years old right-handed female patient suffering from TOS. The patient had undergone the medical treatment and was given the botulinum toxin injection for pain relief following which she had no improvement in her symptoms and her pain continued. The patient showed improvement in her symptoms after three weeks of conventional physiotherapy. Improvement in pain scores can be attributed to the application of TENS. It has been reported that TENS works on pain gate mechanism and causes presynaptic inhibition of pain signals [8].

Increase in the range of motion can be due to the effect of exercise and application of ultrasound that improves the circulation in the deeper tissues and increases the extensibility of collagen. The healing effect of ultrasound and mobilization following it, also improved the range of motion and pain reduction in the patient [9, 10]. Successful treatment of shoulder pain in the elderly depends, on accurate diagnosis as per clinical presentation and appropriate treatment lead to a successful outcome [11]. Conventional physiotherapy not only resulted in decreased pain levels but also an improvement in range of motion, better sleep quality, and function which were previously restricting the patient.

V. CONCLUSION

It can be concluded that with conventional physiotherapy, there was an improvement in pain, function, quality of sleep and range of motion in patient suffering from TOS. Results indicate that if conventional physiotherapy is started early, it can avoid medical or surgical intervention for TOS.

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