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CERVICAL SYRINGOMYELIA;

CONSERVATIVE PHYSICAL THERAPY MANAGEMENT OF A PATIENT: A CASE REPORT

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ABSTRACT… Background: Cervical syringomyelia is a rare condition and which can be idiopathic or secondary to trauma. Syrinx is most often treated surgically but can be risky at cervical level thus conservative management should be considered, however literature lacks regarding the role of conservative physical therapy management of cervical syringomyelia. **Case description:** A 33 year old man with an idiopathic syrinx at C6-C7 level presented with a chief complaint of neck pain, radiating to his right arm, associated with paresthesia involving Index and Middle finger and a positive spurling test with postural deviation and associated disability. **Intervention and Outcomes:** The patient received physical therapy management consisting of pain management, cervical traction, joint mobilization and soft tissue manual therapy aimed at postural and biomechanical correction in combination with medications. The patient's symptoms improved from 80/100mm to 30/100mm on Visual Analogue Scale and 39 to 25 on Neck Disability Index (NDI). Marked improvement was also observed in cervical posture and Range of Motion (ROM). **Discussion and Conclusion:** Conservative management including medication and physical therapy of a patient with cervical syrinx do not decrease the cervical syrinx size but can alleviate patient's signs and symptoms by postural and biomechanical correction at the segmental level leading to normalization of spinal curves and decreased tensional and compressive stress on spinal tissue.

Key words: Cervical syrinx, syringomyelia, physical therapy, biomechanics, cervical spine, neck pain, neurology, manual therapy, neck disability index.

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INTRODUCTION

Syringomyelia is a condition characterized by the presence of cyst like fluid filled cavities found within spinal cord.[1,2] The cavity is thought to be formed by altered flow of the cerebrospinal fluid (CSF)[1,2] and can be either congenital or secondary to trauma.[3-6] It is estimated that the presence of syrinx maybe upto 28% in cases of spinal trauma.[7] The syrinx is expansible, the major content of which is CSF. Syringomyelia is also suggested to be a rare complication of a tumor in the spinal cord.[8] Syringomyelia may have an indistinct presentation which may resemble other musculoskeletal complaints, and possibly overlooked because is often accredited to recent trauma and can only be best confirmed by MRI.[9-11] Syrinx management includes surgical and conservative management. Surgical intervention aims at re-establishing normal CSF flow and is found to be successful in the management of syringomyelia.[9] Evidence is however contradictory regarding the need of surgical management in case of rigorous and progressive neurological damage.[12,13] Some studies also show unsatisfactory outcomes of medical and surgical management, suggesting poor prognosis.[12,14] Current evidence emphasizes the restoration of spinal alignment and biomechanical correction.[14] Case studies exist on the conservative chiropractic management of syringomyelia[8,15,16] but no evidence exists on the physical therapy management of syringomyelia.

CASE REPORT

The patient, a 33-year-old, 90kg, 5-foot 11-inch man, had neck pain radiating into his right arm, mid-low thoracic pain, arm/hand numbness (index and middle finger) (Figure-1). The patient had no history of fall or trauma but he was aware

that he had a bad neck posture. Three years before presentation to the physical therapy clinic, he had been treated conservatively by several physicians of Islamabad and Peshawar, and was ultimately suggested to undergo surgery for his condition. He presented to the Shafi International Hospital, Physiotherapy clinic where his care was rendered. His chief complaint was neck pain, which was radiating to his right arm, associated with paresthesia involving 3rd and 4th digit and his neck pain was described as debilitating and the medications he was taking were stated to have little effect. The patient was already diagnosed by MRI having an idiopathic syrinx in his spinal cord at C6-7 level and was suggested to undergo decompression surgery for his Cervical Syrinx (Figure-2). A large circumferential disc osteophyte complex was also observed at C5-6 level, resulting in severe stenosis and bilateral intervertebral foramen narrowing, which was more significant on the right side.

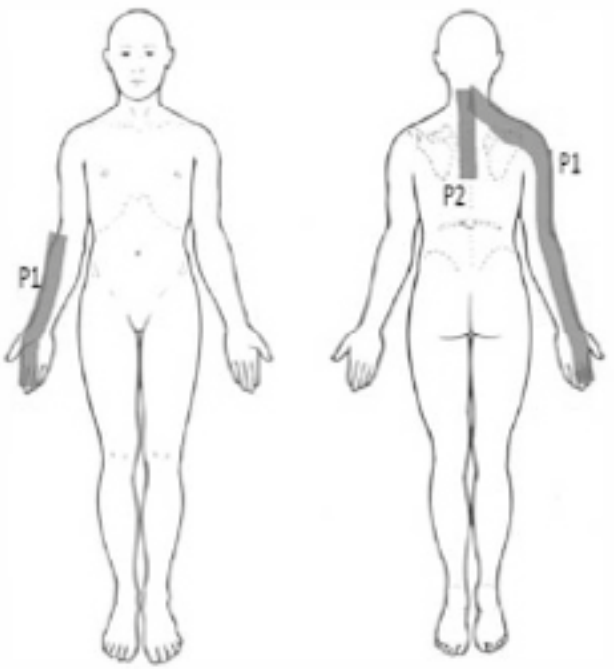

Figure-1. Body chart showing the location of symptoms, P1: Neck pain radiating into right arm, with arm/hand numbness (index and middle finger), P2: Upper thoracic pain.

The patient was not willing to undergo surgery so the idea of surgical management was dropped and it was decided to treat the patient conservatively. Syrinx development was halted but an insidious

Figure-2. Pretreatment T2-weighted Magnetic Resonance Imaging (MRI) scan indicating cervical syrinx (arrow) at the level of C6-C7

progression of symptoms ensued before his physical therapy treatment. At the time of his visit to the physical therapy clinic, he was taking medications including Meloxicam, Betahistine dihydrochloride, Methycobalmin, Piroxicam, Oxycodone, Omeprazole and Gabapentin.

Patient also had a significant history of smoking. On a pain severity scale (VAS), the patient rated the intensity of his pain as 80/100mm. His physical examination showed several positive orthopedic and neurologic tests including Spurling's, Upper Limb Neural Tension tests-ULNTTs (radial, median and ulnar bias) and cervical compression and distraction tests. Patient had pain in his C6-C7 dermatomal distribution, and weakness (4/5) in

C5-C6 myotome. The pain was described as deep/aching in the neck and sharp/shooting in the right arm, which was considered secondary to cervical pain. The pain was relieved with positioning of the cervical spine in neutral and distraction as well as heating. The pain was increased in cervical extension and end range flexion. Cervical rotation and lateral flexion were found to be 30-degrees and 10-degrees respectively on right side, and 70-degree and 20-degree respectively on left side. Cervical extension was also limited and was found to be severely limited due to pain. Palpation of the C5-C6 segment revealed localized tenderness, pain and spasm/splinting. Upper trapezius was also found to exhibit splinting/spasm.

A visual postural evaluation was performed. The posture of the head and thorax was categorized into their respective rotation (R) and translation (T) displacements in 3D. Using a right-handed Cartesian coordinate system where the x-axis is positive to the right, the y-axis is positive superiorly, and the z-axis is positive anteriorly, there are 6 rotations and 6 translations of the head and thorax respectively, in 3D.[8,17,18] The patient's posture showed the following deviations: (1) Anterior head translation (+TzH); (2) posterior thoracic translation (-TzT); and (3) lateral translation of his head to the left (-TxH).

PHYSICAL THERAPY MANAGEMENT

Physical therapy management of the patient started with pain management which included moist heat in combination with Interferential therapy (continuous waveform) which was applied for 20 minutes using four pole interference method, in pain free position on pain site at the start of every session. Afterwards, mechanical cervical traction for 15 minutes was applied. Chin retraction exercises and deep neck flexor strengthening was initiated at the fourth visit. For the first two weeks the patient received 5 sessions per week. Strengthening of rhomboids and middle/lower trapezius, pre-contraction stretching for sternocledomastoid, scaleni and upper fibers of trapezius and joint mobilization was initiated on the 6th visit, including transverse glide in prone and unilateral antero-posterior glide in supine in grade I-II to alleviate pain by right intervertebral foraminal opening and central canal opening by replicating flexion respectively. From 3rd to 4th week, patient received 3 sessions per week. Neural mobilization was initiated on the 11th visit. As the pain was alleviated grade III-IV central postero-anterior (CPA) glide and rotational mobilization towards the right side were initiated at the 17th visit to improve extension and rotation towards the right side respectively. Grade III-IV CPA glide on the thoracic spine was also initiated for the correction of posterior translation and increased thoracic kyphosis. After the 24th visit patient used to report once a month for follow up for the next 6 months, after which the patient used to report to the clinic on occasional onset and aggravation of otherwise subtle symptoms.

OUTCOME

At the time of first visit, patient graded his pain as 80mm on Visual Analogue scale (VAS), and cervical range of motion was significantly reduced in lateral flexion (10°) and rotation (30°) to the right side. Extension was not possible for the patient at the time of first visit due to severe pain. End range flexion was also painful. Patient's activities of daily living were severely affected and patient's score on Neck Disability Index (NDI) was 39/50 (Table-I).

Outcome		Pre-treatment (1st visit)	Post-treatment (24th visit)
Pain (VAS)		80mm	30mm
Disability (NDI)		39	25
Cervical ROM	Extension	Not Possible due to severe pain	30
	Flexion	Painful at end range	Not painful at end range
	Lateral Flexion Right	10°	20°
	Lateral Flexion Left	20	22
	Rotation Right	30	50
	Rotation Left	70	70

Table-I. Pre-treatment and Post-treatment status after 24 treatment sessions.

After 6th week on the 24th visit, there was a significant reduction in pain, and the resting pain level was 30mm on Visual Analogue Scale (VAS). Extension, right lateral flexion and right rotation improved to 30°, 20° and 50° respectively. Both the Spurling Test and Compression test were still positive at the 24th visit but a marked improvement was observed in Neck disability Index, with a score of 25/50 (Table-I). A note able decrease in anterior head translation (+TzH), posterior thoracic translation (-TzT) was observed and lateral translation of head to the left (-TxH) was no longer present. An improvement in upper limb neural tension signs was also noted, though ULNTTs were not completely negative.

DISCUSSION

Syringomyelia is an uncommon condition and is often associated with poor prognosis. Some individuals fail to recover at all, and pain is usually unbearable and debilitating.[8] Conservative physical therapy management is found to be effective in the management of other conditions of spine including acute, chronic and mechanical neck and back pain (19-22). Physical therapy has also been found to be effective in the management of cervicogenic headaches.[23,24] Though there is no evidence on the conservative physical therapy management in alleviating pain and disability secondary to cervical syrinx. One case study however showed improvement in symptoms with the use of chiropractic biophysics protocols.[8]

After conservative management with medication and physical therapy intervention, patient's symptoms of pain and disability were reduced. There was also an improvement in neurological signs (ULNTTs) and posture of the head and neck. It is hypothesized that the reduction of the symptoms was due to reduction in postural deviations such as restoration of cervical lordosis due to the correction of forward translation of the head, which was resulting in extension in the upper cervical spine and flattening of the lower cervical spine, and correction of the posterior translation of thorax which was resulting in upper crossed syndrome and contributing in the forward translation of head and flattening of the lower cervical spine.

Syrinx cavity development is thought to result from various factors including hematoma formation, cell necrosis, myelomalacia and release of different enzymes such as lyzozyme and proteases.[25] Adhesions of the arachnoid matter have also been suggested to result in increased stress/strain, thus affecting tissue integrity.[13] Formation of syrinx has also been linked to Arnold Chiari formation in as many as forty percent of the cases and cerebellar tonsilar invagination is thought to explain several of the peculiar and varied symptoms.[5,11,25,26] In spinal cord disorders, tension on the CNS has been thought of as the causative factor, together with formation of the syrinx and its development.[27,28] The segmental arrangement of the vertebral column allows a noteworthy movement of the vertebral column in relation to the spinal cord residing within the central canal.[29] A change in length and diameter of the canal leads to strain, which is conveyed to the dura matter and the spinal cord, resulting in the development of stress in both structures.[29] Stress/Strain on the spinal cord is found to have a direct relation to the orientation of the cervical spine in the sagittal plane (27-36). In the current case increased stress/strain on the spinal cord and associated postural deviations in the sagittal plane are suggested to be the cause for patient's symptoms.

Particular to syringomyelia, postural deviations of the cervical spine in flexed position leads to increased stress and strain on the spinal cord, which has been suggested to contribute in growth and progression of the syrinx (32-34). From a biomechanical perspective flexion of the head and neck of two to three segments results increased tensional stress and strain leading to increased intra-medullary pressure and harms the oxidative metabolism at the neuronal/cellular level.[32,34,36] In this case the patient had a forward head posture, with flattening of the lower cervical spine and diminished cervical lordosis which was restored after the physical therapy management. It is hypothesized that reduction in patient's pain and disability following physical therapy is

not due to decrease in the syrinx size but due to the biomechanical postural correction at the segmental level resulting in normalization of the cervical lordosis and thoracic kyphosis, thus decreased tensional and compressive stress and strain on spinal cord tissue.

CONCLUSION

This case study depicts the outcomes of conservative management including medication and physical therapy of a patient with cervical syrinx. The findings suggest that even though medication and physical therapy cannot decrease the cervical syrinx size but can alleviate patient's signs and symptoms and improve patient's activities of daily living by postural and biomechanical correction at the segmental level leading to normalization of cervical lordosis and thoracic kyphosis resulting in decreased tensional and compressive stress and strain on spinal cord tissue. Further studies need to be carried out regarding the effects of physical therapy and biomechanical correction in the management of syringomyelia before conclusions can be made.

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AUTHORSHIP AND CONTRIBUTION DECLARATION

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2	Furqan Yaqoob	FY designed and did topic selection, data collection manuscript writing and final manuscript approval