

CORRELATION BETWEEN THE CLINIC AND THE INDEX OF CERVICAL MYELOPATHY TORG

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ABSTRACT

Objective: Cervical myelopathy is a spinal cord dysfunction related to degeneration typical of aging. Its primary pathology is related to ischemia and spinal cord compression. Patients with myelopathy present many clinical problems; more severe cases may lead to quadriplegia if not treated in a timely manner. Because the primary pathology of this disease is caused by compression, thus generating spinal cord ischemia, we believed there must be a correlation between the degree of compression and the clinical assessment of patients with cervical myelopathy, but we did not find any study in the literature that made this correlation. Because there is doubt the literature we aimed, in our study, to analyze the correlation between the degree of clinical impairment of patients with cervical myelopathy and the Torg index. **Methods:**

A prospective, descriptive study, evaluating 46 patients, in which radiographic measurements of the Torg index were performed, with clinical analysis through the Nurick and JOA scale. **Results:** Of the 46 study patients included in the study, 100% presented a Torg score <0.8. The decrease in Torg values was directly proportional to clinical worsening on the Nurick and JOA scale. **Conclusions:** The degree of clinical impairment in patients with cervical myelopathy is directly related to the degree of spinal canal stenosis. **Level of Evidence I, Prognostic Studies - Investigating the effect of the characteristics of a patient on the outcome of the disease.**

Keywords: Spinal cord diseases. Cervical vertebrae. Spinal cord compression.

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INTRODUCTION

Cervical Spondylotic Myelopathy (CSM) is a spinal cord dysfunction related to degeneration typical of aging. Its primary pathology is related to cervical spinal cord compression. It mainly affects male patients between the fifth and seventh decades of life, while the clinical manifestations of this disease progress with alterations of the upper motor neuron, characterized by hyperreflexia, gait and coordination disorders.¹⁻³ Changes in fine movements of the upper extremity, early fatigue during repetitive movements and loss of motor coordination are frequent. Gait disorders are one of the first clinical manifestations of CSM, which occurs slowly and gradually, often going unnoticed by the patient, who initially feels loss of balance and lack of coordination when walking on a curve; loss of bladder and bowel control may occur in 20 to 50% of patients, although it is a late manifestation of the disease.⁴⁻⁶ Deep reflexes are tested observing hyperreflexia at the level below the lesion. Due to loss of inhibition of the injured upper

motor neuron, reflexes such as those of Hoffman, Babinski and Oppenheim, besides clonus evaluation, through rapid ankle flexion, should be tested, considering that a positive test is not specific for myelopathy, yet greatly corroborates the conclusions concerning the diagnosis.^{2,6}

There are many methods for analysis of the clinical impairment caused by CSM; however, the scale of the Japanese Orthopedic Association (JOA) and the Nurick scale are currently the most widespread and frequently used by various medical schools.^{7,8} The importance of using a method to analyze the degree of clinical impairment of patients with myelopathy on a routine basis is that this will enable us to analyze treatment results and compare them with other medical schools with the intention of obtaining the best possible treatment for a disease that leads to severe neurological impairment when not treated in time. After clinical suspicion of cervical myelopathy we should take cervical spine radiographs in the AP and lateral views, where we can visualize decrease in intervertebral disc space, the presence

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of osteophytes, ossification of the posterior longitudinal ligament, or the association of these signs.⁹ In addition to the abovementioned alterations, the radiographs can be used to estimate the degree of cervical canal stenosis measured by the Torg index.¹⁰⁻¹² In creating this index, Torg aimed to reduce errors in the measurement of the vertebral canal between different examiners caused by radiological magnification produced by the variation in distance between the patient, the film and the radiation tube. The Torg index remains the most common method for calculating the degree of cervical canal stenosis, and when below 0.8 signifies absolute cervical stenosis, when between 0.8 and 1.2 corresponds to relative stenosis, and when above 1.2 is considered normal.¹³⁻¹⁶

We decided to conduct this trial due to the controversy in literature regarding whether it is true that the smaller the spinal canal, the worse the patient's clinical picture, and as we did not find any study that analyzes the correlation between the degree of cervical canal stenosis gauged by the Torg index and the clinical picture analyzed by the JOA and Nurick scales.

METHODS

Prospective study, of a descriptive and comparative nature, based on the gathering of data obtained through plain radiography, as well as the use of scales for clinical evaluation of cervical myelopathy through the JOA and Nurick scales.

The criterion for inclusion was patients with Spondylotic Cervical Myelopathy who started follow-up at the Hospital Santa Casa de Misericórdia de Vitória (HSCMV). Patients with SCM secondary to infectious and tumoral processes, metabolic diseases and diseases secondary to trauma were excluded.

The JOA scale evaluates the degree of motor dysfunction of the upper and lower extremities, sensory and sphincter dysfunction. Through this scale, it is possible to numerically scale the degree of clinical impairment caused by the disease. Patients with results between 12 and 17 points are considered normal, while values below 12 points are considered SCM.¹ (Chart 1) We also use the Nurick scale for clinical analysis of the degree of myelopathy. This scale mainly analyzes the degree of independent ambulatory function, where grade 5 is considered patients incapable of walking.¹⁷⁻¹⁹ (Chart 2)

To measure the Torg index, posterior surface of the vertebral body was related to the point nearest the corresponding lamina line, divided by the sagittal diameter of the vertebral body.¹⁶ (Figure 1) The comparative study was based on the analysis of the absolute values of the Torg indexes, and the clinical evaluation of the JOA and Nurick results of each patient. The result of the trial will be demonstrated through mean \pm standard deviation (SD). Comparisons between the means obtained from the Torg index will be analyzed statistically through the unpaired Student's t-test, with significance provided for p-values < 0.05. Moreover, the quantity of patients presenting variation between the two methods will be expressed in percentage.

RESULTS

The patients evaluated numbered 46, of whom 33 were male (71.71%), with average age of 48 years.

In relation to the distribution of patients on the Nurick scale, we noticed that 14 patients presented Nurick 4, followed by 11

Chart 1. JOA Scale.

Scale for clinical evaluation of myelopathy – Japanese Orthopedic Association (JOA): 0 to 17 points	Points
I – Motor function of the upper limb	
-Impossible to eat with cutlery or to button shirt	0
-Possible to eat with cutlery, impossible to button shirt	1
-Possible to button shirt, with great difficulty	2
-Possible to button shirt, with difficulty	3
-Normal	4
II – Motor function of the lower limb	
-Impossible to walk	0
-Needs cane or assistance on flat surface	1
-Needs assistance on stairs	2
-Walks unaided, but slowly	3
- Normal	4
III – Sensory function	
Upper limb	
-Apparent sensory disorder	0
-Minimal sensory disorder	1
-Normal	2
Lower limb	
-Apparent sensory disorder	0
-Minimal sensory disorder	1
-Normal	2
Trunk	
-Apparent sensory disorder	0
-Minimal sensory disorder	1
-Normal	2
IV – Bladder function	
-Urinary retention or incontinence	0
-Sensation of retention, loss of slight flow	1
-Urinary retention and/or increase in urinary frequency	2
-Normal	3

Chart 2. NURICK scale.

Grading	NURICK clinical scale
Grade 0	Signs and symptoms of root involvement but without evidence of spinal cord disease.
Grade 1	Signs of spinal cord diseases but no difficulty walking.
Grade 2	Slight difficulty in walking which does not prevent full-time employment.
Grade 3	Extreme difficulty in walking that requires assistance and prevents full-time employment and occupation.
Grade 4	Able to walk only with someone else's help or with the aid of a walker.
Grade 5	Chairbound or bedridden.



Figure 1. Method of measurement of the Torg index.

patients with Nurick 1, while the smaller number of patients is categorized as Nurick 2.

When we analyzed the mean values of the Torg index distributed among the various grades of the Nurick scale, we observed the existence of a decreasing value between Torg and the Nurick scale, demonstrating that the worse the Torg value the worse the degree of myelopathy. (Figure 2)

We divided the analysis of the JOA results into patients with values below and above 12; of these patients, 32 exhibited values below 12, demonstrating that most patients present clinical myelopathy. In calculating the mean Torg value we observed that among the patients with JOA under 12 the mean was 0.58 while in the patients with JOA over 12 the mean was 0.72, demonstrating that the mean Torg value was directly proportional to the worsening on the Nurick and JOA scales. (Figure 3)

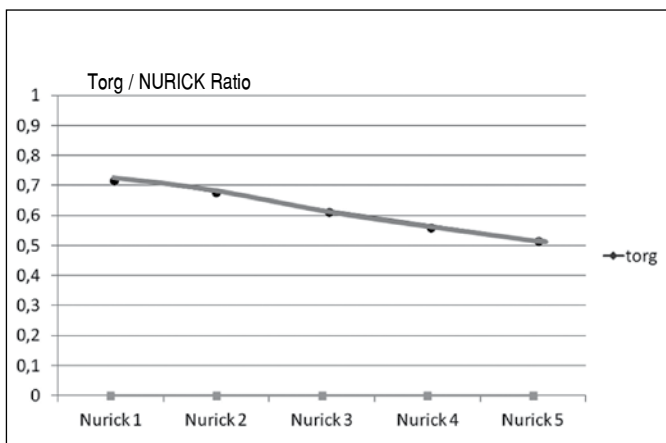


Figure 2. Ratio between Torg index and NURICK scale.

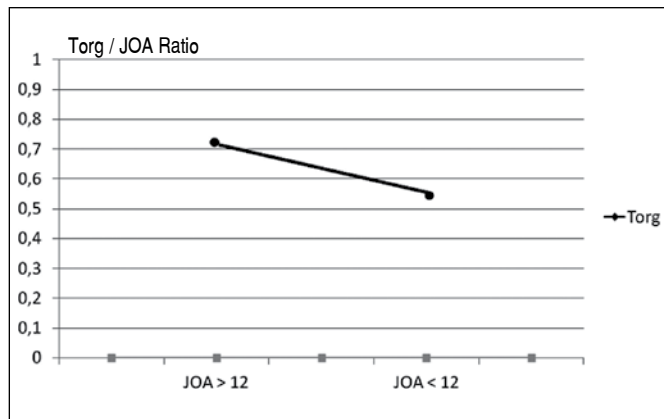


Figure 3. Ratio between Torg index and JOA scale.

DISCUSSION

Cervical spondylotic myelopathy (CSM) is a very important pathology in the orthopedic clinic with progressive spinal cord involvement that leads to varying degrees of functional incapacity. The poor surgical results are associated with the severity of the neurological picture, the symptom evolution time and central cord syndrome, stressing the need for a diagnosis and early treatment for the obtainment of a better clinical result for the establishment of surgical treatment as soon as possible.²⁰⁻²³

In literature several authors suggested that there is a correlation between the degree of cervical stenosis and clinical deterioration, yet we did not find any studies analyzing this correlation through numerical scales.^{24,25} We consider the application of scales already validated for the Portuguese language extremely important, since this applies to our population and in this manner it is possible, through numbers, to establish whether or not there is a relation between the degree of stenosis and clinical impairment.

We opted to use the Torg index as it is widely used and can be measured through plain radiography, giving a practical slant to our work, since the general orthopedic physician can, through a low value in the TORG index, suspect stenosis of the cervical spinal canal and when necessary, execute supplementary tests for the definitive diagnosis. We know that this early diagnosis is related to a better treatment result. In our study, all the patients presented a Torg value below 0.8.

As regards the Nurick and JOA scales, we consider these the most complex for the clinical analysis of patients with cervical myelopathy. As one of the main symptoms presented by these patients is gait alterations, the NURICK scale mainly evaluates gait. In our study we found that the higher degree of inability to walk is related to the worst degree of cervical canal stenosis. We used the JOA scale as this also evaluates the degree of motor coordination of patients in relation to the arm; hence we consider JOA a more complete scale, enabling us to perform a more complete analysis of patients with cervical myelopathy. The JOA scale ranges from 0 to 17 points, where it is considered that patients with values above 12 are not suffering from myelopathy. To analyze our results and due to the need for Torg distribution, we divided the JOA into above or below 12, since there were patients who despite having a JOA value above 12, presented myelopathy in the magnetic resonance images.

Acting early we decided to operate on these patients, and thus found, as in Nurick, the existence of progressive decrease of Torg scores in the patients with JOA values below 12. After conducting this study, using methods such as Torg for radiographic measurement and the Nurick and JOA clinical scales for clinical evaluation of myelopathy, we observed a directly proportional correlation between the degree of cervical

canal stenosis and the clinical deterioration of patients with cervical myelopathy.

CONCLUSION

The degree of clinical impairment in patients with cervical myelopathy is directly related with the degree of vertebral canal stenosis.

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