

CLINICAL AND FUNCTIONAL RESULTS IN PATIENTS WITH CERVICAL SPONDYLOTIC MYELOPATHY TREATED SURGICALLY BY ANTERIOR APPROACH IN A TERTIARY HEALTH CARE CENTER

RESULTADOS CLÍNICOS E FUNCIONAIS EM PACIENTES COM MIELOPATIA ESPONDILÓTICA TRATADOS CIRURGICAMENTE ATRAVÉS DE UMA ABORDAGEM ANTERIOR EM UM CENTRO DE REFERÊNCIA PARA CUIDADOS

RESULTADOS CLÍNICOS Y FUNCIONALES EN PACIENTES CON MIELOPATÍA ESPONDILÓTICA CERVICAL TRATADOS QUIRÚRGICAMENTE MEDIANTE ABORDAJE ANTERIOR EN UN CENTRO DE TERCER NIVEL DE ATENCIÓN

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ABSTRACT

Objective: To evaluate the clinical and functional results in patients with cervical spondylotic myelopathy treated surgically by anterior approach in a reference center. **Methods:** An observational, longitudinal, analytical study was carried out. The patients were evaluated using the JOA, Nurick and SF12v2 scales at hospital admission, at 3 and 6 months after surgery, analyzing the data with the Student's T test in the IBM SPSS Statistics version 24. **Results:** The male sex predominated, the mean age was 61 years; the mean JOA score before surgery, at 3 and 6 months was 8, 10.9, and 11.6, respectively. The Nurick scale obtained a presurgical score, at 3 and 6 months of 2.8, 2.2, and 1.9, respectively. Regarding the quality of life (PCS), 93.3% of the patients were found to be below the mean, 2.2% in the mean, and 4.5% above the mean, while at 6 months, 91.1% of the patients were below the mean, 6.7% in the mean, and 2.2% above the mean. In the preoperative evaluation the SF 12v2 scale, 68.9% of the patients were below the mean, 2.2% in the mean, and 28.9% above the mean, being that at 6 months, 31.1% of the patients were below the mean, 15.6% in the mean, and 53.3% above the mean. A statistically significant improvement was observed with the JOA and Nurick scales from preoperative to 3 and 6 months ($p < 0.05$) with a statistically significant difference in the mental component of quality in the same periods. **Conclusions:** Anterior approach decompression gives a significant clinical improvement at 3 and 6 months. However, this improvement does not correlate with the patient's perception of his or her health condition. **Level of Evidence III; Case control study.**

Keywords: Spinal cord compression; Quality of life; Outcome assessment.

RESUMO

Objetivo: Avaliar os resultados funcionais clínicos em pacientes com compressão da medula espinhal (CME) tratados cirurgicamente pela abordagem anterior, em um centro de referência. **Métodos:** Foi realizado um estudo observacional, longitudinal e analítico. Os pacientes foram avaliados na admissão hospitalar através das escalas JOA, Nurick e SF12v2, aos três e seis meses após a cirurgia, analisando os dados com o teste t de Student, no programa IBM SPSS Statistics versão 24. **Resultados:** O estudo mostrou uma predominância no sexo masculino, com idade média de 61 anos. Avaliação do JOA pré-cirúrgica teve uma pontuação média, no terceiro e no sexto mês, de 8, 10,9 e 11,6. Por sua vez, a escala de Nurick, obtida em um pré-operatório, foi nos mesmos meses, com pontuação de 2,8, 2,2 e 1,9. Tal como para a qualidade de vida (PCS), que foi encontrado na avaliação pré-operatória, 93,3% dos pacientes estavam abaixo da média, 2,2% na média e 4,5% superior à média. Enquanto aos 6 meses, 91,1% dos pacientes estavam abaixo da média, 6,7%, na média e 2,2% superior à média. Na avaliação pré-operatória de escala 12v2 SF, 68,9% dos pacientes estavam abaixo da média, 2,2% na média e 28,9% superior à média, sendo que aos 6 meses, 31,1% dos pacientes estavam abaixo da média, 15,6%, na média e 53,3% superior à média. Uma melhoria estatisticamente significativa com as escalas JOA e Nurick de pré-operatória em 3 e 6 meses ($p < 0,05$) foi observada e, também, uma melhoria estatisticamente significativa na qualidade do componente mental nos mesmos períodos. **Conclusões:** Pode-se concluir que a abordagem da descompressão anterior proporciona uma melhoria clínica significativa, mas esta melhoria não está correlacionada com a percepção do paciente sobre sua saúde. **Nível de Evidência II; Estudo de caso.**

Descritores: Compressão da medula espinhal, Qualidade de vida; Avaliação de resultados.

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RESUMEN

Objetivo: Valorar los resultados clínicos y funcionales en pacientes con mielopatía espondilótica cervical tratados quirúrgicamente mediante abordaje anterior en un centro de referencia. **Métodos:** Se realizó un estudio observacional, longitudinal y analítico. Los pacientes fueron evaluados mediante las escalas JOA, Nurick y SF12v2 a su ingreso hospitalario, a los 3, y 6 meses de la cirugía, analizando los datos con prueba T de Student en el programa IBM SPSS Statistics versión 24. **Resultados:** Predominó el sexo masculino, el promedio de edad fue 61 años; la valoración de JOA media antes de la cirugía, a los 3 y 6 meses fue de 8, 10,9 y 11,6, respectivamente. La escala de Nurick obtuvo una puntuación prequirúrgica, a los 3 y 6 meses de 2,8, 2,2 y 1,9 respectivamente. En cuanto a la calidad de vida (PCS), se encontró en la evaluación prequirúrgica que el 93,3% de los pacientes estaba por debajo de la media, 2,2% en la media y el 4,5% por arriba de la media, mientras que a los 6 meses, el 91,1% de los pacientes estaba por debajo de la media, el 6,7% en la media y el 2,2% por arriba de la media. En la evaluación prequirúrgica la puntuación de la escala SF 12v2, el 68,9% de los pacientes estaba por debajo de la media, 2,2% en la media y el 28,9% por arriba de la media, siendo que a los 6 meses, el 31,1% de los pacientes estaba por debajo de la media, el 15,6% en la media y el 53,3% por arriba de la media. Se observó una mejoría estadísticamente significativa con las escalas de JOA y Nurick desde el prequirúrgico hasta los 3 y 6 meses ($p < 0,05$) con una diferencia estadísticamente significativa en el componente mental de la calidad en los mismos periodos. **Conclusiones:** La descompresión por vía anterior otorga una mejoría clínica significativa a los 3 y 6 meses; sin embargo esta mejoría no se correlaciona con la percepción que tiene el paciente sobre su estado de salud. **Nivel de evidencia III; Estudio de caso control.**

Descriptor: Compresión de la médula espinal; Calidad de vida; Evaluación de resultado.

INTRODUCTION

There is no internationally accepted definition of cervical spondylotic myelopathy,¹ however, it can be defined as a degenerative condition of the spinal cord that causes neurological deterioration secondary to the compression or narrowing of the spinal canal due to the degeneration of the spinal structures in the cervical region.² This pathology is the world's most common cause of spinal cord dysfunction. Its prevalence is 1.6 cases for every 100,000 inhabitants.³ The most affected group are adults older than 55 years of age.^{4,5} The most commonly affected levels are C5 and C6.⁶

Degenerative changes do not alone explain the impact to the spinal cord, since these are static factors that cause stenosis, while dynamic factors cause injury to the spinal cord in a repetitive way such that they become the main triggers of the cervical myelopathic process.³

Anatomically, a spinal canal with an anterior-posterior diameter less than 13 mm is considered congenital cervical stenosis and diameters less than 16 mm are suggestive of developing myelopathic degeneration.⁵

There are countless scales for the evaluation of the status of neurological deterioration and the most used at the international level are the modified scale of the *Japanese Orthopedic Association* (mJOA)⁷⁻⁹ and the Nurick scale (Table 1).¹⁰

The health outcomes reported by the patients (quality of life) have acquired great relevance in clinical practice research and in public health program planning.^{11,12} One of the most used tools at the global level to measure HRQOL is the SF-36 Health Survey,¹³ and its 2002 modification, the SF-12v2.¹⁴

The objective of this study was to evaluate the functional clinical results of patients with cervical spondylotic myelopathy treated by anterior-approach surgery in a tertiary referral center.

Table 1. Nurick scale.

Grade	Impact
0	Signs and symptoms of root involvement, without evidence of spinal cord damage
1	Signs of spinal cord involvement, but with no difficulty walking
2	Slight difficulty walking that does not prevent full-time employment
3	Difficulty walking that prevents full-time employment or the ability to perform household tasks, but not so severe as to require someone else's help to walk
4	Able to walk with the help of another person or assistive devices
5	Wheelchair-bound or bedridden

METHODS

This was an observational, longitudinal, analytical study. The research was conducted at the "Dr. Victorio de la Fuente Narváez" High Specialty Medical Unit, Orthopedic Spine Service of the Hospital de Ortopedia of the IMSS in patients with cervical spondylotic myelopathy who were candidates for surgical treatment. Patients of both sexes were considered for the study. The patients were evaluated using the JOA, Nurick (Table 1), and SF-12v2 scales upon admission to the hospital and at three and six months following surgery, and the data collected was analyzed using the Student's t test in the IBM SPSS Statistics program, version 24.

Institutional Review Board approval number R-2011-3401-43.

Justification for and objective of the study

Spondylotic myelopathy is a frequent condition in older adults. It is necessary to know the rate of improvement in our environment according to international scales in order to perform a staging to be able to assess the clinical and functional improvement of our patients, aimed at generating scientific information that can be shared with the rest of the world.

RESULTS

In the period evaluated, from March to December 2016, we obtained a total of 55 patients who met the inclusion criteria, however, 10 patients were lost during follow-up, leaving a sample of 45 patients, 60% of whom (27 patients) were men and 40% of whom (18 patients) were women, with an average age of 61.67 years \pm 11.6 years. In the JOA we obtained an average presurgical score of 8 \pm 3.1. At 3 months the average score was 10.9 \pm 2.4 and at 6 months the average score was 11.6 \pm 2.2.

As regards the Nurick scale (Table 1), we obtained an average presurgical score of 2.8 \pm 1.2. At three months the average score was 2.2 \pm 1.1 and at six months the average score was 1.9 \pm 1.1.

In the physical component of the quality of life survey (PCS), we found that in the presurgical evaluation 93.3% of the patients were below the average, 2.2% were average, and 4.5% were above the average. At three months, 91.1% of the patients were below the average and 8.9% were above the average. At six months, 91.1% of the patients were below the average, 6.7% were average, and 2.2% were above the average. (Figure 1).

Meanwhile, in the mental components of the quality of life (MCS) analyzed during this study, in the presurgical evaluation we found that 68.9% of the patients were below the average, 2.2% were average, and 28.9% were above the average. At three months, 57.8% were below the average and 42.2%

were above the average. At six months, 31.1% were below the average, 15.6% were average, and 53.3% were above the average (Figure 2).

When we performed the inferential statistical analysis, we did not find a statistically significant correlation between age or sex with the JOA, Nurick, PCS, or MCS scores for any of the periods evaluated ($p > 0.05$). Statistically significant correlations were found between the JOA and Nurick scores at three and six months ($p < 0.05$), the JOA and PCS presurgical scores, and the JOA and Nurick with the PCS at three months ($p < 0.05$). We did not find any correlation between the functional scales with the MCS in any of the periods evaluated ($p > 0.05$). As regards the functional scales, a statistically significant difference was found between the presurgical JOA and the JOAs at three and six months, as well as between the presurgical Nurick and the three- and six-month Nurick scores ($p < 0.05$). In terms of quality of life, no statistically significant difference was found between the presurgical PCS and the three- and six-month PCS scores (Figure 1), or between the presurgical MCS and the MCS at three months ($p > 0.05$). We did find a statistically significant difference between the presurgical MCS and the MCS at six months ($p < 0.05$) (Figure 2).

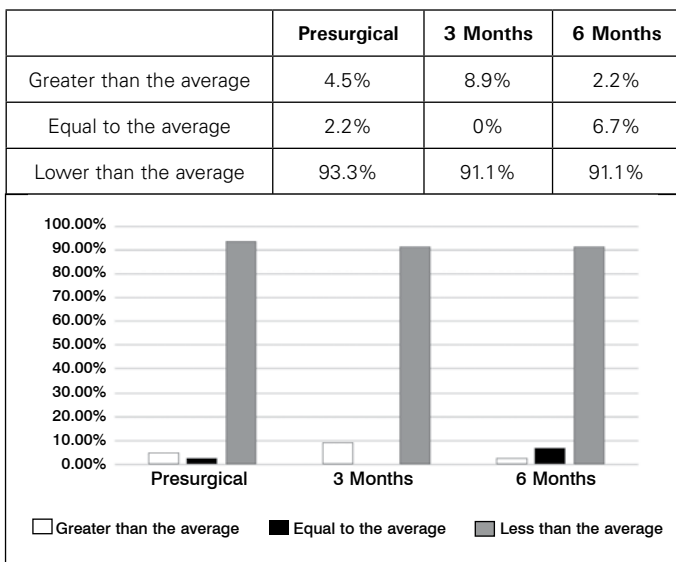


Figure 1. Physical component of quality of life.

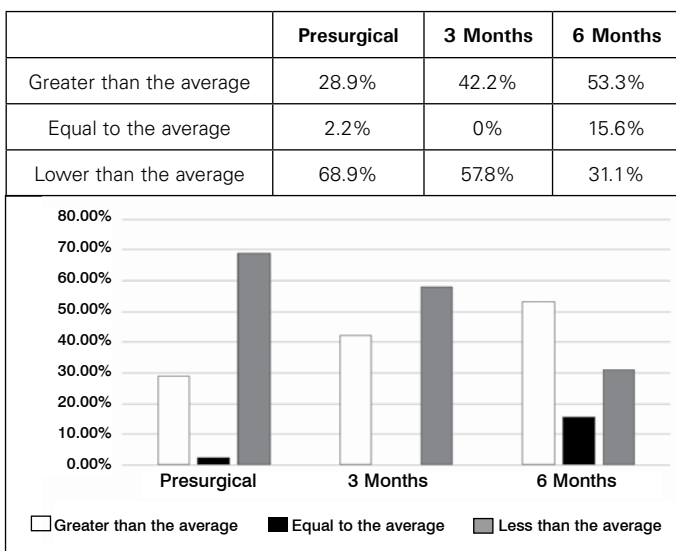


Figure 2. Mental component of quality of life.

DISCUSSION

In the six-month follow-up of the patients diagnosed with cervical spondylotic myelopathy at any level and submitted to an anterior approach surgical procedure for decompression and cervical fusion, no significant improvement and only slight recovery of the complex movements of the affected limbs were observed. Likewise, during the evaluations conducted at three and six months following surgery, it was noted that the patients who perceived an improvement in paresthesia symptoms had relapses between three and six months after surgery. The results of a retrospective analysis by R. Martin et al.¹⁵ of 54 patients who were submitted to the same procedure mention an improvement in the Nurick scale in 64.2% of the patients who were treated surgically, while in our study there was an improvement in 60% of the patients at six months following surgery. We observed neurological deterioration in 11% of our patients while R. Martin et al. mention that 9.4% of the patients presented neurological deterioration. The study by N. Fiore et al.¹⁶ reports an average of 3.37 on the Nurick scale in the preoperative period and of 1.85 in the postoperative period for their sample of 78 patients. In our study, the average Nurick observed prior to surgery was 2.3 and at six months following surgery it was 1.93. Fiore also mentions that seven patients presented no changes despite surgical treatment and 69 patients had at least one grade of improvement. In our study, 27 patients presented an improvement of at least one grade, two cases had a worsening of their status, and 15 patients remained unchanged in terms of functional status. Additionally, the average JOA score obtained in this study was 7.76 in the postsurgical period for the patients analyzed, while at the six-month follow-up it reached 11.68, as compared to the study of 27 patients with cervical spondylotic myelopathy conducted by S. Naderi et al.¹⁷ that reports an average initial JOA score of 12.85 and an average final examination score of 14.37.

These results may be useful for the Orthopedic Spine Service of the Victorio de la Fuente Narváez High Specialty Medical Unit in establishing therapeutic parameters, both in the surgical environment and for the referral and follow-up of patients in the rehabilitation unit, and thus to achieve a patient perception of clinical, physical, and mental improvement of the functions compromised over the course of their disease.

CONCLUSIONS

It can be concluded that surgical management of Cervical Spondylotic Myelopathy continues to provide improvement of functionality according to evaluation by the JOA and Nurick scales as evidenced by follow-up at zero, three, and six months after surgery. It is worth mentioning that the patient's perception of their quality of life, also evaluated during these periods, in which the mental and physical components are included, is not significant for the patient since they apparently did not perceive any improvement in the physical component. In spite of this, the mental component did present a significant improvement up until six months following surgery.

Although we found that the patients presented clinical improvement as evidenced by the functional scales, this is not related to the perception they may have of the quality of their health, which can influence the mental, psychological, and social state of the patient faced with the disease and its long-term evolution.

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