PROGNOSTIC INFLUENCE OF AGE AND EVOLUTION TIME OF SYMPTOMS IN SPONDYLOTIC CERVICAL MYELOPATHY

INFLUÊNCIA PROGNÓSTICA DA IDADE E DO TEMPO DE EVOLUÇÃO DOS SINTOMAS NA MIELOPATIA CERVICAL ESPONDILÓTICA

INFLUENCIA PRONÓSTICA DE LA EDAD Y EL TIEMPO DE EVOLUCIÓN DE LOS SÍNTOMAS EN LA MIELOPATÍA CERVICAL ESPONDILÓTICA

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ABSTRACT

Objective: We present a study that aims to clarify the influence of age and time of clinical evolution of symptoms on prognosis after surgery. Method: Prospective study of 66 patients who underwent intervention due to SCM, evaluated (mJOA score) before and after surgery. Three-year follow-up. The variables of age and time of clinical evolution (TE) were analyzed. The latter was subdivided into two groups: long-term evolution (> 1 year), with 35 cases and short-term evolution (≤ 1 year), with 31 cases, as well as the variable of recent worsening (RW). Recent worsening, when the disease has progressed gradually, without significant complications, is evaluated as NO (15 cases); in cases of disease progression before the intervention, it is evaluated as YES (20 cases). Results: Age showed a significant correlation with $P < 0.01$ in preoperative clinical symptoms ($r = -0.38$) and postoperative symptoms, with $P < 0.05$ ($r = -0.30$). No correlation was found between age and recovery rate. TE did not show any correlation with preoperative state. A significant negative correlation was found between time of evolution, postoperative clinical state ($r = -0.46$) and TR , with $P < 0.001$ ($r = -0.42$). TR was 20% longer in patients with short clinical evolution. The variable RW was greater in the preoperative period, 1.45 points on average (mJOA), with statistical significance of $p<0.05$, and worse recovery rates (10%) than those of the other patients. In RW, though without statistical significance. Conclusions: Age has a negative influence on pre- and postoperative clinical symptoms, and is not predictive of improvement capacity. Time of evolution is a prognostic value of improvement capacity, and its influence is negative.

Keywords: Spinal cord diseases. Spinal stenosis; Result of treatment; Prognosis.

RESUMO

Objetivo: Apresentamos um estudo que visa esclarecer a influência da idade e do tempo de evolução dos sintomas no prognóstico depois da cirurgia. Método: Estudo prospectivo de 66 pacientes que sofreram intervenção devido a MCE, avaliados (escore mJOA) no pré e pós-operatório. Acompanhamento de três anos. Foram analisadas as variáveis idade e tempo de evolução clínica (TE). Esta última é subdividida em dois grupos: evolução longa (> 1 ano), com 35 casos e evolução curta (≤ 1 ano), com 31 casos, assim como a variável de agravamento recente (AR). O agravamento recente, quando a doença vem progredindo de forma paulatina, sem intercorrências importantes, é avaliado como NÃO (15 casos); nos casos de progressão da doença antes da intervenção, é avaliado como SIM (20 casos). Resultados: A idade teve correlação significante com $P < 0,01$ no quadro clínico pré-operatório ($r = -0,38$) e pós-operatório, com $P < 0,05$ ($r = -0,30$). Não se encontrou correlação entre a idade e a taxa de recuperação. O TE não apresentou correlação com o estado clínico pré-operatório. Verificou-se correlação negativa entre tempo de evolução, estado clínico pós-operatório ($r = -0,46$) e o TR significante com $P < 0,001$ ($r = -0,42$). O TR foi 20% maior nos pacientes com evolução clínica curta. A variável AR foi maior no pré-operatório, 1,45 pontos de média (mJOA) com significância estatística de $p < 0,05$, além de taxas de recuperação piores (10%) do que os outros pacientes. No AR, embora sem significância estatística. Conclusões: A idade influi negativamente no quadro clínico pré e pós-operatório, não sendo preditiva da capacidade de melhora. O tempo de evolução é um valor prognóstico da capacidade de melhora, sendo que sua influência é negativa.

Descritores: Doenças da medula espinal; Estenose espinal; Resultado de tratamento; Prognóstico.

RESUMEN

Objetivo: Presentamos un estudio, que trata de dilucidar la influencia de la edad y el tiempo de evolución de los síntomas, en el pronóstico tras la cirugía. Método: Estudio prospectivo de 66 pacientes, intervenidos debido a MCE, valorados (escala mJOA) pre y postoperatoriamente. Seguimiento de tres años. Se analizan las variables edad y tiempo de evolución clínica (TE), esta última se subdivide en dos grupos: larga evolución (>1 año), con 35 casos y corta evolución (≤ 1 año), con 31 casos, así como la variable de reciente agravación (RA). Esta última, si la enfermedad ha ido progresando de forma paulatina, sin grandes altibajos, se valora como NO (15 casos); si hubiese una aceleración en la progresión de la enfermedad antes de la intervención, se valora como SI (20 casos). Resultados: La edad tuvo una correlación ($r=-0,38$) con significación $P<0,01$ con la situación clínica preoperatoria ($r=-0,38$) y posoperatoria ($r=-0,30$) $p<0,05$. No se encontró correlación entre la edad y la tasa de recuperación. El TE no presentó correlación con el estado clínico preoperatorio. Se encontró una correlación negativa entre el tiempo de evolución, estado clínico postoperatorio ($r=-0,46$) y el TR ($r=-0,42$) con una significación $p<0,001$. TR fue un 20% mayor en los pacientes con corta evolución clínica. Cuanto a la variable RA, se apreció una mayor afectación clínica preoperatoria, 1,45 puntos de media (mJOA) con significación $p<0,05$, así como peores tasas de recuperación (10%) que aquellos pacientes. En RA, aunque esta última sin significación estadística. Conclusiones: La edad influye negativamente en la situación clínica preoperatoria y postoperatoria, no siendo predictiva cuanto a la capacidad de mejorar. El tiempo de evolución es un valor de pronóstico para la capacidad de mejorar, siendo su influencia negativa.

Descriptores: Enfermedades de la médula espinal; Estenosis espinal; Resultado del tratamiento; Pronóstico.

INTRODUCTION

Cervical spondylotic myelopathy (CSM) is one of the main causes of spinal cord pathology among middle-aged and elderly patients. The treatment for CSM is surgical decompression, which should halt the progression but does not guarantee an improvement in the symptoms *per se*, given that recovery is influenced by many factors. CSM presents many questions in relation to prognosis. Many works have attempted to elucidate the prognostic relationship of certain factors, such as the transverse medullary area at the point of maximum compression, age,[1-4] duration of symptoms,[5-8] number of levels affected,[9-11] high signal intensity in MRI,[12] etc.

The present work attempts to explain the prognostic relationship that exists between two clinical factors: age and time of evolution of symptoms, in CSM.

MATERIAL AND METHODS

A prospective study was carried out with 66 patients clinically diagnosed with CSM, which was confirmed by MRI image. There were 16 (24%) females and 50 (76%) males.

The patients underwent surgical decompression with a delay of not more than one month from the diagnosis.

The decompression techniques used were: the Smith-Robinson technique (18%), Hirabayashi laminoplasty (17%), corpectomy and fusion (63%) and double decompression approach, anterior (Smith-Robinson technique) and posterior (laminoplasty) (2%).

The exclusion criteria for the study were: posttraumatic myelopathy, patients with CSM and other concomitant neurological compromise, musculoskeletal disease with functional compromise, inadequate decompression, and other functional compromise not related to the CSM.

For the pre- and postoperative assessment of functional state, we used the modified Japanese Orthopedic Society Score (mJOA).

The formula of Hirabayashi et al.,[13] was used to assess recovery rate.

The patients had a follow-up to 3 years, with revisions in postoperative months 3, 6, 12, 24 and 36.

Analysis of prognostic factors

The two clinical prognostic factors analyzed were age and the time evolution of the symptoms (TE).

The variable time of evolution was divided into: Patients with short evolution of the symptoms, when they presented onset of symptoms within one year.

Patients with long-term evolution of the symptoms, when they reported symptoms with more than one year of evolution.

We include in our study a new variable in relation to the symptoms, which is not evaluated by other authors: recent aggravation of symptoms (AS), which refers to patients with long-term evolution with slow and gradual evolution of the disease, who present a sudden worsening of symptoms.

Statistical Analysis

We carried out a descriptive analysis of all the study variables; all of them presented normal distribution. The Student's t-test was used for the continuous variables and for the dichotomous variables. Pearson's correlation coefficient was used to evaluate the association between the variables. For the statistical analysis, the statistical program SPSS v19.0 was used.

RESULTS

The average age was 59.3 ± 10.8 years, with a range of 30 to 79 years.

With respect to preoperative clinical state, an average of mJOA score of 9.1 ± 2.6 was obtained, with a range of 5 to 14 points.

For mean postoperative clinical status, an mJOA score of 13.52 ± 2.2 was obtained, with a range of 8 to 17 points.

For recovery rate (RR), an average score of $56.6 \pm 26.2\%$ was obtained, with a range of 0 to 100.

The average time of evolution was 19 ± 15 months, with a range from 2 to 48 months. (Table 1)

A total of 31 patients presented short-term evolution of symptoms (≤ 1 year) and 35 presented criteria of long-term evolution (< 1 year).

Patients belonging to the short-term evolution group, RR $67.7 \pm 23\%$, presented a 20% better recovery rate than the patients of the long-term evolution group, RR $46.9 \pm 25\%$ ($p < 0.01$, Student's t-test). (Figure 1)

With respect to the variable AS, this was present in 20 patients with symptomatic long-term evolution. This group of patients had a worse preoperative clinical state, with an mJOA score of 1.45, compared with the patients that did not have this variable.

They also had 10% of the worst recovery rates, compared with patients without recent aggravation of symptoms, although this figure was without statistical significance. (Figure 2)

Table 1. Table of results.

	Minimum	Maximum	Average	Standard deviation
Age (years)	30.00	79.00	59.2727	10.80000
Evolution time (months)	2.00	48.00	19.0000	15.88100
Preop. clinical status (mJOA score)	5	14	9.10	2.600
Postop. clinical status (mJOA score)	8	17	13.52	2.200
Recovery rate (%)	.0	100.00	56.462	26.2057
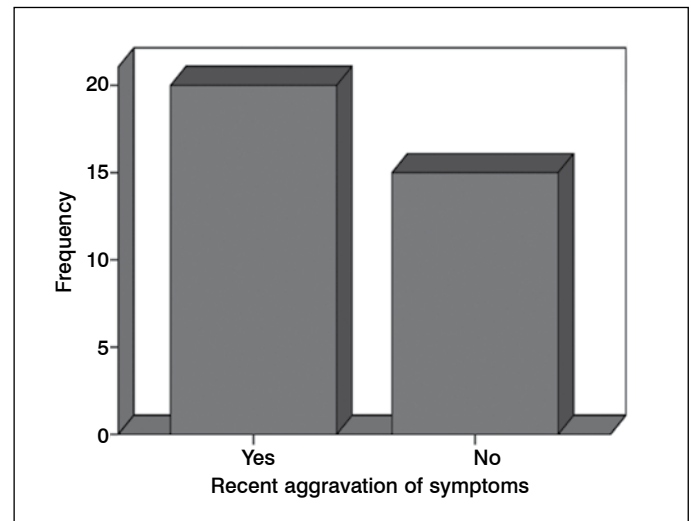
Figure 1. Frequency distribution of the variable recent aggravation of symptoms.

Analysis of association of variables

A correlation was found between age and the preoperative clinical mJOA score, with a value of $r = -0.3$ ($p < 0.05$), and also with postoperative clinical mJOA score, with $r = -0.3$ ($p < 0.05$). (Figures 3 and 4)

There was no correlation between time of evolution of the symptoms and age.

A negative correlation was found between time of evolution of the symptoms and recovery rate, $r = -0.42$ ($p = 0.001$), and also with postoperative clinical state, $r = -0.46$ ($p < 0.001$). (Figures 5 and 6). No correlation was found between time of evolution and the preoperative clinical mJOA score.
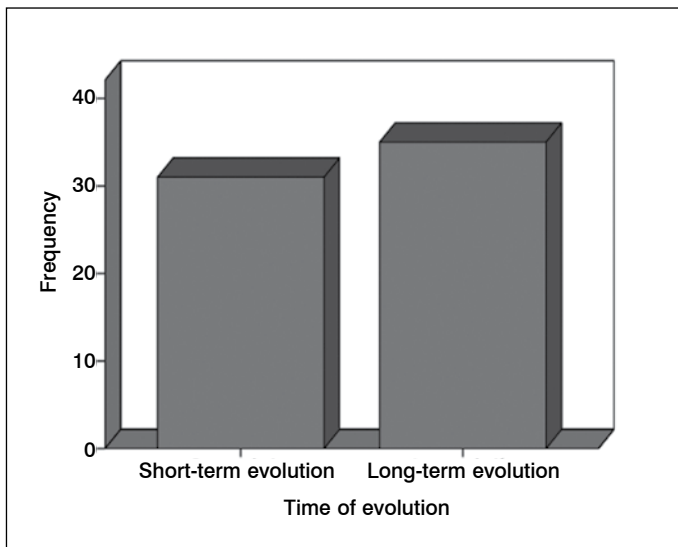
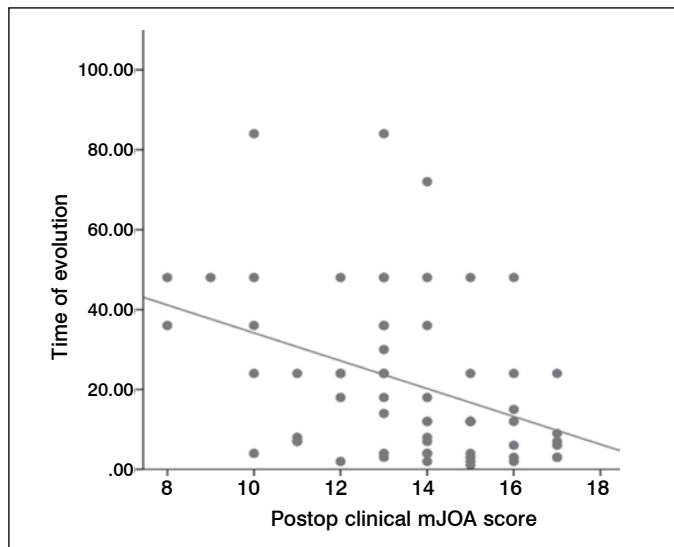**Figure 2.** Frequency distribution of the variable time of evolution.

Figure 3. Scatter diagram: Age-Time of evolution.

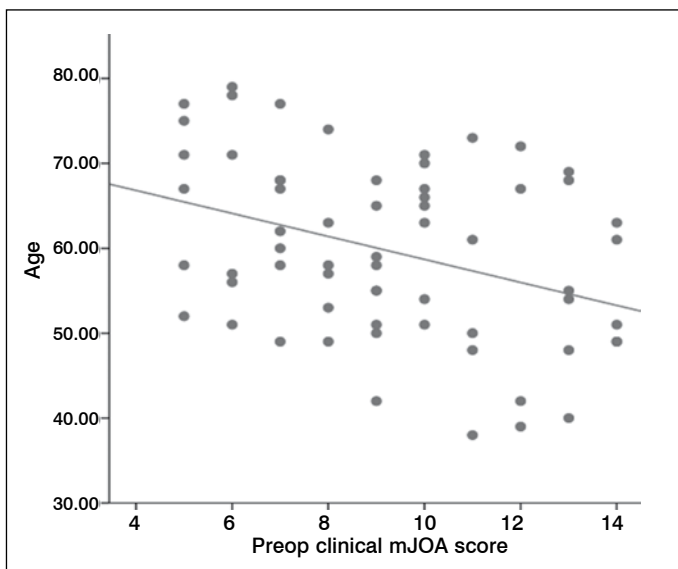**Figure 4.** Scatter diagram: Postoperative clinical Age-mJOA score.

Figure 5. Scatter diagram: Time of evolution-clinical status mJOA postop.

Figure 6. Scatter diagram: Time of evolution-recovery rate (%).
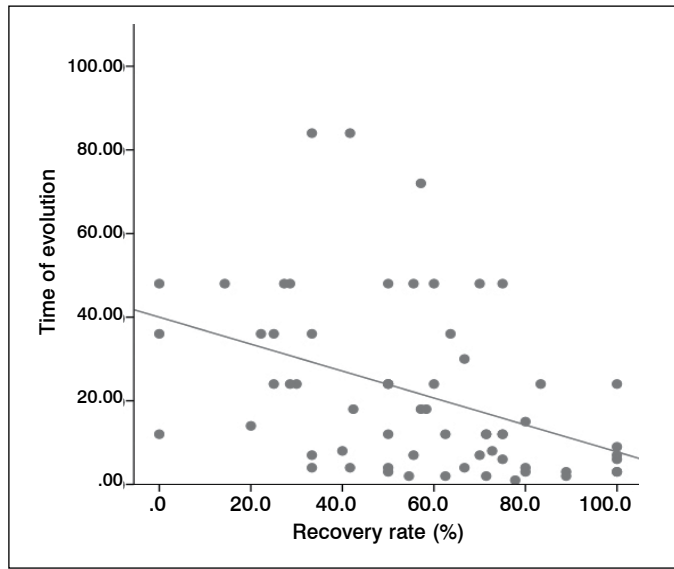
DISCUSSION

The correlation between age and preoperative clinical state may be due to the fact that the same anatomopathological injury at the spinal causes greater functional impairment in older patients than in younger patients.

There are numerous studies[14,15] that attribute a prognostic value to age, which is not supported by the findings of this study.

According to our results, the older a patient, the worse the preoperative clinical state tends to be, but this does not affect recovery rate.

We observed in our study that if, during the statistical analysis, we have different cut-off points by age, there are no differences in rates of recovery. Recovery rates do begin to decrease at age 75 and above, but without statistical significance, and the time of evolution also increases in this age group. This extended time of evolution may be due to a more delayed diagnosis in elderly patients, who are often affected by other pathologies that may be misinterpreted as being responsible for the symptoms.[16]

Failure to find differences in a sample of patients between the time of evolution and the recovery rate, may occur with samples from patients with irreversible spinal cord injury, or due to a delay in intervention; therefore all the patients would be included in the long-term evolution group.[17]

CONCLUSION

According to the results, age negatively influences the preoperative clinical state and is not predictive of improvement capacity (recovery rate).

Age alone should not be a factor to be taken into account when making a surgical decision, as the percentages of recovery are not correlated with age.

Time of evolution is not correlated with clinical status, but is negatively correlated with recovery rate.

All authors declare no potential conflict of interest concerning this article.

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