Spine surgery in patients with ankylosing spondylitis

Natália Maria Fernandes Britto, M.D.¹
Beatriz Souza Renor, M.D.¹
Enrico Ghizoni, M.D., Ph.D.²
Helder Tedeschi, M.D., Ph.D.²
Andrei Fernandes Joaquim, M.D., Ph.D.³

¹ Neurosurgery resident - Universidade Estadual de Campinas, Unicamp, Campinas-SP, Brasil.
² Neurosurgery Professor - Universidade Estadual de Campinas, Unicamp, Campinas-SP, Brasil.
³ Neurosurgeon – Universidade Estadual de Campinas, Unicamp, Campinas-SP, Brasil.

INTRODUCTION: Ankylosing spondylitis (AS) is an idiopathic seronegative spondyloarthropathy that involves mainly the axial skeleton and the sacroiliac joints. AS promotes biomechanical changes in the spine that predispose to fractures, spinal deformity and spondylodiscitis. The aim of this article is to report the clinical and laboratorial characteristics of patients with AS who underwent spinal surgery at our Institution.

METHODS: Retrospective review of medical charts of patients who had AS and underwent spinal interventions.

RESULTS: Nine patients were found and eight were included in the present study. There were three men and six women and the patients’ mean age was 57 years old. All patients had pain at the involved spinal level and one patient had tetraparesis due to cervical myelopathy. Acute-phase proteins were positive in six patients (75%), and HLA-B27 was found in two patients (25%). Four patients had the radiological diagnosis of spondylodiscitis (50%) and underwent a spinal disc biopsy. They were all characterized as having aseptic spondylodiscitis. Three patients were free of pain with analgesics in their last follow-up and one patient was operated because of a cervical kyphotic deformity (12.5%). There were no deaths or surgical complications in this series.

CONCLUSIONS: The majority of our clinical and laboratory findings were discrepant with the medical literature. These differences may be secondary to regional characteristics or by the fact that our population included only those patients who underwent spinal surgery.


INTRODUCTION

There is a rough correlation between the prevalence of HLA B27 and the incidence and prevalence of AS.² Although 6-10% of the world population is positive for HLA B27, only 5% of them will develop AS. However, almost 90% of the AS patients are positive to HLA B27.¹,³,⁴ There are no laboratorial findings that define AS, and in contrast to other systemic inflam-
Inflammatory diseases, acute-phase proteins are frequently in the normal range.

The diagnosis was first defined using the modified New York criteria. These criteria presented high sensibility and specificity; however they were not useful for early diagnosis or prevention. Because of that the most recent ASAS classification criteria for axial spondyloarthritis were developed for early and established cases and include the MRI technique (to depict active inflammation) as an important tool for early diagnosis (Table 1).

AS has a caudo-rostral progression, altering the biomechanical properties of the spine and diminishing its resistance through a process of remodeling, which involves ligamentary ossification, vertebral joint fusion, osteoporosis and finally, spinal deformity. The ankylosed spine is prone to fractures even after minor traumas; additionally, fractures are often unstable and require proper treatment to avoid primary and secondary neurological injury, disability, and progressive deformity.

Other possible complication is the occurrence of spondylodiscitis, especially for those patients who receive medicaments such as biologic agents or tumor necrosis factor antagonists, who may increase the chances of infections. It is radiologically suspected by the combination of narrowing of the disc space and erosions at the terminal plates summed to peripheral sclerosis, most of the times with gadolinium enhancement at the MR. Of note, it may also be aseptic, secondary to AS disease itself.

The aim of the present manuscript is to analyze the patients with AS who underwent spinal surgeries at our tertiary University Hospital.

TABLE 1 - ASAS CLASSIFICATION CRITERIA FOR AXIAL SPONDYLOARTHRITIS (SPA)

<table>
<thead>
<tr>
<th>In patients with ≥ months back pain and age onset &lt; 45 years</th>
<th>OR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sacroilitis on imaging and ≥1 SpA feature</td>
<td>HLA B27 positive and ≥2 other SpA features</td>
</tr>
<tr>
<td>Spa features:</td>
<td>Sacroilitis on imaging</td>
</tr>
<tr>
<td>Inflammatory back pain</td>
<td>Active (acute) inflammation on MRI highly suggestive of sacroilitis associated with SpA</td>
</tr>
<tr>
<td>Arthritis</td>
<td>Definite radiographic sacroilitis according to Modified New York criteria</td>
</tr>
<tr>
<td>Enthesitis (heel)</td>
<td></td>
</tr>
<tr>
<td>Uveitis</td>
<td></td>
</tr>
<tr>
<td>Dactylitis</td>
<td></td>
</tr>
<tr>
<td>Psoriasis</td>
<td></td>
</tr>
<tr>
<td>Crohn’s / colitis</td>
<td></td>
</tr>
<tr>
<td>Good response to NSAIDs</td>
<td></td>
</tr>
<tr>
<td>Family history of SpA</td>
<td></td>
</tr>
<tr>
<td>HLA B27</td>
<td></td>
</tr>
<tr>
<td>Elevated C reactive protein</td>
<td></td>
</tr>
</tbody>
</table>

METHODS

A retrospective study at the University Hospital of the State University of Campinas, São Paulo, Brazil, was performed. The medical charts of all patients with the diagnosis of AS that had spine surgery, were reviewed. Institutional Review Board approval was obtained under the number 17337313.7.0000.5404.

The inclusion criteria were: patients with diagnosis of AS established by the internal medical department of our institution that underwent a spinal procedure by any reasons in our hospital. All procedures were performed by the same spine surgeon (AFJ).

The exclusion criteria were: lack of medical or radiological data or lack of postoperative follow-up.

The following variables evaluated were:

Clinical information: gender, age, time of disease progression, clinical manifestation, neurological status at diagnosis, description of the surgical procedure and clinical evolution, conventional criteria to evaluation of AS (peripheral arthritis, enthesopathy, uveitis), comorbidities, and history of trauma.

Laboratorial information: acute-phase proteins results, presence of antigen HLA B27, results of hemocultures and biopsy results.

Radiological findings: reported on spine MRI and CT scans.

RESULTS

Nine patients were found (three males and six females), but one patient was excluded due to the lack of data in the medical charts. Eight patients were included in the present study and were fully evaluated.

The male/ female ratio was 1:3; the mean age was 57 years, ranging from 30 to 73 years; the mean time of disease progression was 9.5 years, ranging from five to 20 years. The most common clinical presentation of spinal disease was pain in the affected segment, present in all cases.

Considering the neurological status, only one patient had incomplete neurological deficits (Frankel C) (12.5%). This patient was diagnosed with spondylodiscitis at C45 and C67 disc and had a concomitant myelopathy and tetraparesis. He underwent an open anterior cervical disc biopsy, and the tetraparesis improved spontaneously after a few months. No bacteriological origin was confirmed. All the remaining patients were neurologically intact.

Peripheral arthritis was documented in 50% of the cases, enthesopathy in 25% of them and uveitis.
was not reported in the included patients. The most common comorbidities were arterial hypertension and diabetes that presented comitantly in three patients. Two patients were smokers.

The laboratorial findings showed that acute-phase proteins were positive in six patients (75%), and HLA-B27 was found in two patients (25%).

Four patients had the diagnosis of spondylodiscitis (50%). One case at L5S1, one case at C45 and C67 (with myelopathy, as mentioned above), one case at T12L1 disc, and the last case at T1112. The clinical presentation was limiting pain in the affected segment in all cases, and the cervical case had some degree of cervical myelopathy in the affected segment. All of them presented negative hemocultures and urocultures, but two of them had elevated acute phase proteins. After that, a percutaneous needle spine biopsy was performed in three cases and one had an open spinal biopsy. The results revealed unspecific chronic inflammatory process in all cases, without positive identification of the etiological agent, characterizing aseptic spondylodiscitis. Treatment consisted in a short-term empiric antibiotics treatment, pain medication and physical therapy. The outcome was complete pain resolution in three patients, and one patient had partial resolution of the pain in the following months.

Three patients had spinal fractures (37.5%), associated with minor trauma and one woman had a cervical kyphotic deformity that precluded her from looking horizontally when walking (12.5%). The cervical kyphotic deformity was treated by posterior instrumented cervical fusion (C2T3) with a pedicle subtraction osteotomy of c7.

The three patients with thoracic fractures were treated by a posterior instrumented fusion and had an AO type B3 injury with anterior distraction (T1011; T910 and T89 fractures). All of them had a posterior instrumented fusion two segments above and two segments below the involved level with a reasonable clinical improvement of their pain.

**DISCUSSION**

Our spine surgery division performs around 150 procedures each year. However, in the period between 2011 and 2016, only nine patients had the diagnosis of AS, with an estimated incidence of one per 100 patients who underwent a spinal procedure at our institution.

Regarding gender, our study found a predominance of the female population, with a male/female ratio of 1/3. The literature estimates about two men for each woman affected by AS. Some authors suggested an overestimation of male prevalence due to lighter forms of presentation in women, leading to under notification of those cases.

The laboratory findings in our patients also diverged from the reported in the literature. In our series, most patients (62.5%) presented positive acute phase proteins, and the minority (25%) presented positive antigens HLA-B27. These differences may be secondary to regional characteristics of our patients or by the fact that our population included only those patients who underwent a spinal procedure.

The majority (50%) of our evaluated patients was diagnosed with an aseptic spondylodiscitis also known as Andersson’s lesions (described for AS). This data diverges from the literature which suggests that discitis is a rare presentation in the setting of AS. However, its incidence may be underestimated due to the asymptomatic presentation of some cases of aseptic spondylodiscitis. Of note, the biopsy of
patients with spondylodiscitis may not identify any infectious agent, leading to false negative results. This should be taken into account as a potential bias of our high rate of aseptic spondylodiscitis.

The incidence of surgically treated fractures was low, corresponding to only three cases (37.5%). The only segment fractured in our small sample was the lower thoracic spine. Both data disagree with the literature in occurrence and location, which presents the majority of the cases in the cervical spine. The progressive cervical kyphotic deformity present in these patients results in major susceptibility to cervical fractures in comparison to the other segments. Other factors involved in the vulnerability of the cervical segment are: small vertebral bodies, oblique articular facets and the mobility of the heavy skull on the cervical spine. Therefore, the most common level of fractures is the cervical level. Westerveld et al. reviewed 93 articles and found 280 (81.2%) cases of cervical fractures in a total of 345 patients with AS and diagnosis of spinal fractures. However, our series does not include conservatively managed patients, which may also change the epidemiological presentation of spinal fractures.

Although limited by the small case number, and retrospective nature, our retrospective study provides unique information about AS patients treated for spinal diseases in a Brazilian university hospital.

CONCLUSIONS

This series displays epidemiological differences in clinical and laboratorial findings, with a high incidence of aseptic spondylodiscitis, when compared to the literature. The regional features of surgically managed patients with diagnosis of AS, could be used as future reference for the management of patients in our country.
e dois eram HLA-B27 positivos. Em quatro pacientes houve o diagnóstico radiológico presumido de espondilodiscite e estes foram submetidos à biópsia de disco (três por via percutânea e um com biópsia aberta) – em nenhum deles houve identificação de agente infeccioso. Desses, três pacientes tiveram melhora total da dor durante o seguimento, enquanto um deles mantinha dores leves. Houve três casos de fraturas tratadas cirurgicamente (37,5%) e um caso de deformidade cervical cifótica grave (12,5%). Não houve mortes ou complicações relacionadas às cirurgias nessa série.

CONCLUSÕES: A maioria dos dados clínicos e laboratoriais de nosso estudo divergiu da literatura. Essas diferenças podem ser atribuídas às características regionais de nossa população ou pelo fato de incluíirmos apenas pacientes que foram submetidos à intervenção cirúrgica.