Spinal deformity correction in ankylosing spondylitis

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ABSTRACT

Background: Ankylosing spondylitis (AS) is a complex, debilitating disease with few available medical therapies in its later stages.

Methods: We reviewed current clinical approaches for caring for AS patients with an emphasis on the risks and outcomes associated with surgical intervention.

Results: It is critical to understand the natural history and surgical outcomes of patient with AS. Surgery is not without risks, as a vertebral body osteotomy is often required to re-establish spinopelvic equilibrium. However, surgery can lead to clinical improvements in pain, disability, cardiac function, respiration, digestion, and sexual activity.

Conclusion: Deformity correction for AS should be carefully considered in symptomatic patients.

Keywords: Ankylosing spondylitis, Deformity, Osteotomy, Spondyarthropathy

INTRODUCTION

Ankylosing spondylitis (AS) is a complex and debilitating disease of the axial skeleton that affects 0.9% of the global population.² Evidence suggests a strong genetic influence with up to 90% of AS patients testing positive for HLA-B27.² Although there is a correlation with the HLA-B27 allele, the exact etiology and pathogenesis of disease are not fully known, making early-stage diagnosis, and treatment difficult. Advances in pharmacological treatments have improved outcomes early in the course of AS, but these treatments fail to halt the progressive anatomical changes associated with later stages of disease. As such, surgery is often required to improve quality of life.

CLINICAL MANIFESTATIONS OF AS

Clinical manifestations of spondyloarthropathies (SpAs) are generally split into articular and extra-articular involvement. Articular symptoms include chronic inflammatory axial back pain, oligoarthritis, and enthesitis. Extra-axial involvement classically includes inflammatory bowel disease, psoriasis, and anterior uveitis.² Characteristic signs of AS involve spinal tension, kyphotic spinal deformity, and lack of spinal mobility.² AS enthesitis typically occurs at
ligamentous attachments of the axial skeleton, and facilitates the development of ectopic bone inside the affected ligaments leading to syndesmophytes. Bony replacement leads to fusion of adjacent vertebrae, and the characteristic "bamboo spine." Immune cells invading the bone marrow promote the loss of trabecular bone, leading to osteoporosis with an increased fracture risk.

NEUROLOGICAL COMPLICATIONS OF AS

Neurologic complications of AS include: spinal cord injury, monophasic myelopathy, cauda equina syndrome, and even transverse myelitis. Key findings from the literature are reported in [Table 1]. These occur due to compressive myelopathies and radiculopathies from bony overgrowth and deformity. At the craniovertebral junction, AS can result in atlantoaxial instability and compressive myelopathy due to basilar invagination. Meningeal changes in AS may also contribute to ectasia and/or posterior arachnoid diverticula (with or without adherence of nerve roots). In addition, ossification of the anterior longitudinal ligament may contribute to dysphagia in the cervical spine, while ossification of the ligamentum flavum may increase the risk of cauda equina compromise.

SURGERY

Surgical intervention in AS centers around appendicular joint surgery, stabilization of spinal fractures, and spinal deformity correction to regain physiologic alignment. Given the predisposition to AAS, evaluation of the cervical spine before surgery is critical to prevent atlantoaxial injury during intubation and patient positioning.

Spinal fractures

Generalized spinal osteopenia is a hallmark of AS, and fractures most commonly occur at the C7-T1 junction. Surgical treatment for fractures is imperative, especially in patients with evidence of instability, pseudoarthrosis, repeated fractures, and/or evidence of neurologic impairment. With modern fixation techniques, surgical intervention has been shown to improve outcomes and decrease pseudoarthrosis.
Corrective osteotomies

Corrective osteotomy of the lumbar spine is frequently necessary to restore sagittal balance, and several distinct forms of osteotomies may be used depending on the overall goals of surgery and amount of correction required. These range from posterior column osteotomies such as Smith-Peterson Osteotomies, to more invasive three column osteotomies such as pedicle subtraction osteotomies and vertebral column resections.¹,²,⁷

CONCLUSION

AS is a debilitating disease with few available pharmacological therapies. Surgical intervention for AS is associated with improvements in musculoskeletal, pulmonary, cardiac, digestive, and sexual functioning.⁸

Declaration of patient consent

Patient’s consent not required as there are no patients in this study.

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Conflicts of interest

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