

Case Report

See the Horizon Straight-Osteotomy in Ankylosing Spondylitis

Suresh Sivadasan Pillai*

Department of Orthopedics, Aster MIMS Hospital, Mini Bypass road, Calicut, Kerala, India

***Corresponding author:** Suresh Sivadasan Pillai, Consultant spinal surgeon, HOD Department of Orthopedics Aster MIMS Hospital, Mini Bypass road, Calicut, Kerala, India. Tel: +919447391906; Email: sureshorth@gmail.com

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Abstract

Ankylosing spondylitis is an inflammatory disease of the spine among sero-negative spondyloarthropathies. Lack of forward gaze and inability to lie flat are two incapacitating symptoms of AS. Three cases of late stage ankylosing spondylitis are described here. They lacked horizontal gaze and had difficulty in walking. Two of them are treated with lumbar pedicle subtraction osteotomy and the third one nature's osteotomy and surgeon's fixation to correct the deformity. According to the literature the rate of neurological complication in such surgeries are 30%.

Keywords: Ankylosing spondylitis(AS); Pedicle Subtraction Osteotomy

Introduction

Ankylosing spondylitis is an inflammatory disease of the spine among sero-negative spondyloarthropathies. It affects the spine at the enthesis at the site of tendon and ligament insertion to the spine and sacroiliac joints for unknown reasons. Spine specialist sees these patients because of their propensity for three column fractures and kyphotic deformity of the spine. The three column unstable fractures and surgical plane imbalance make them a surgical candidate. Otherwise the main stay of treatment of Ankylosing spondylitis(AS) is non-surgical.

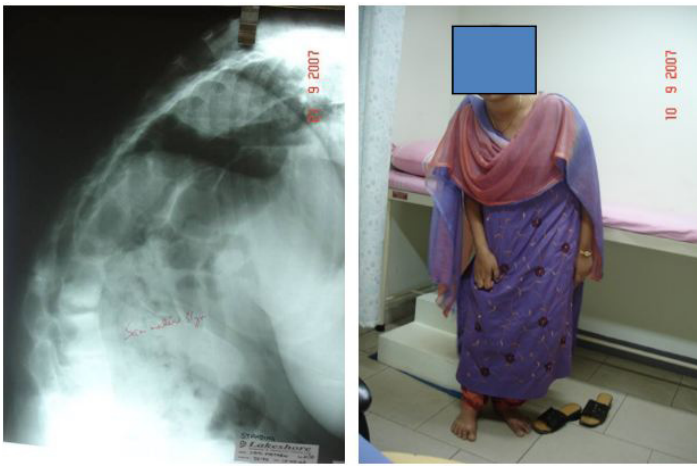
Pain and stiffness are the hallmarks of AS. ESR will be elevated in 80% cases. HLA B27 positive in 90% of Caucasian patients. The earliest change in spine occurs at the thoracolumbar junction with initial invasion of vertebral bodies leading to squaring of vertebral bodies. Ossification of the annulus fibrosis and discs lead to marginal syndesmophytes [1]. The lumbar lordosis is obliterated followed by development of thoracic kyphosis for unknown reasons. Later on, this leads to bamboo spine and fixed surgical imbalance. Lack of forward gaze and inability to lie flat are two incapacitating symptoms of AS. This will impair the ability to walk and the whole process very laborious.

As the disease progresses the ankylosis of rib case to the spine makes the lung function poor posing higher risks for anesthesia and increased chance of infections. Fixed hip deformities which may develop in the course of the disease causes further imbalance in the sagittal plane. The role of surgery in the late stages of AS is the correction of the deformity so that the patient can see the horizon straight. Open wedge osteotomy closed wedge osteotomy and polygenetic osteotomies are the three types of osteotomies described to correct these deformities.

Materials & Methods

Three cases of late stage AS are described here:

Case 1: A young lady (31 yrs) with longstanding AS and lack of horizontal gaze. She had a hand to knee gait. Fixed kyphosis of the thoracic spine with the sagittal imbalance and Anderson lesion in the lumbar spine made her gait very laborious. A pedicle subtraction osteotomy was done at L3 vertebra with three points of fixation above and below the osteotomy. Her hips and cervical spine were normal. Post-operatively she regained her horizontal gaze and was able to walk without any assistance. AS was treated in consultation with the rheumatologist. Now 10 years post-surgery she is doing alright with normal horizontal gaze and gait(See Figures below).



(A) (B)

Figure 1: Before surgery: (A) Showing kyphosis, (B) Patient with hand to knee gait.



(A) (B)

Figure 2: After surgery.

Case 2: A 74-year-old man with longstanding AS presented with inability to lie supine as there was fixed flexion deformity in his cervical spine. He was unable to rest his head on the bed. He lacked horizontal gaze as well. His hips were normal. A pedicle subtraction osteotomy was performed at L3 level with three sites of fixation above and below the osteotomy site. Postoperatively he regained his normal gaze and was able to lie supine on the bed and 8 years post-surgery he has maintained his sagittal balance and horizontal gaze (See Figures below).



Figure 3: Before Surgery.



Figure 4: After Surgery.



Figure 5: Corrected Sagittal Profile.

Case 3: An elderly man (60 yrs) slipped from his bed while he was attempting to get up. He fractured his cervical spine and became quadriparetic L2-5 below C5-6. He lacked horizontal gaze prior to the fall and is a known case of AS. He was operated 5 days after the injury (He was on clopidogrel) with anterior cervical wedge grafting and correction of the kyphosis with cervical CSLP fixation. Postoperatively he regained his neurological status to normal with a normal horizontal gaze(See Figures below).



(A)

(B)

Discussion

The treatment of sagittal plane deformity is an extension osteotomy of the spine. It was first described by Smith Petersen et al [2]. Earlier open wedge extension osteotomies are described in the literature. In extension osteotomy the posterior elements of the spine are removed and a forceful hyperextension of the spine is performed with posterior part of the body of the vertebra as a fulcrum resulting in opening up of the anterior disc and annulus. In closed pedicles subtraction osteotomies, the lamina of the particular vertebra which is osteotomized along with the lamina of the immediate upper and lower vertebrae are removed. Transpedicular instrumentation in the vertebrae (Three above and three below) or the adjustments in the operating table are used to correct the deformity. This is technically demanding procedure and potentially hazardous with high complication rates. The location of the osteotomy can be at the cervico-thoracic junction or the lumbar spine. In the lumbar spine pedicle subtraction osteotomy at L2 or below can be performed. Pedicle subtraction osteotomy in the cervical spine is limited by the fused costo-transverse joints.

Only a limited number of cases have been reported in the literature about the closing wedge osteotomy and outcome of this major surgery. These osteotomies pose a high neurological risk. The chance of neurological injury following this procedure is about 30% [3]. Recurrence of deformity and even aortic rupture has been reported following this procedure [4,5]. The amount of correction needed is planned according to the correction needed to obtain sagittal balance. AN osteotomy can result in 40-degree correction. If more than this is required a double osteotomy or a polysegmental osteotomy may be added along with this. Hip arthroplasty should be done before correcting the sagittal profile in the spine [6].

Conclusion

Lumbar pedicle subtraction osteotomy is a rewarding procedure in the end stage AS patients with sagittal plane imbalance, difficulty in seeing the horizon straight and for difficulty in lying supine. The patients can lie flat and see the horizon straight with lesser energy for ambulation after the correction. The disease as it is further managed none surgically.

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