

SURGICAL TREATMENT OF SPINAL DEFORMITIES IN ANKYLOSING SPONDYLITIS

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Fifteen patients with the diagnosis of ankylosing spondylitis (14 male and 1 female) were operated in the Department of Orthopaedics and Traumatology, Faculty of Medicine, University of Çukurova between December 1992 and January 1994. The mean age of patients were 37 (range, 23-35). The surgical methods were as follows: Twelve patients had posterior lumbar egg-shell procedure (posterior transpedicular vertebral body decancellation) with internal fixation, 2 patients had thoracal anterior release and posterior multi-segment osteotomy with instrumentation, and one patient had cervical egg-shell procedure with halo-body external fixation. Isola system was used in the instrumented cases. Overall mean correction was 27.2 degrees in lumbar osteotomy cases. The mean follow-up period was 7.9 months (range, 4-15). All patients had the ability to look forward postoperatively, and were satisfied with the result subjectively. We had to partial loss of correction, one minor root lesion, one hematoma, and one deep infection that resulted in removal of internal fixation material. In conclusion, surgical treatment of ankylosing spondylitis especially with egg-shell procedure is satisfactory for realigning the vertebral column.

Key Word: Ankylosing spondylitis, kyphosis, osteotomy

Prevention of the spinal deformities must be the primary goal of treatment in ankylosing spondylitis. Despite serious conservative treatment more than half of these patients develop fixed flexion deformity of the spine (2). The kyphotic deformity of the ankylosing spondylitis restricts the field of vision, leads to embarrassment of abdominal and thoracic structures. The patients became isolated and withdrawn because of the deformity and its resultant physical impairments.

Surgical correction for the ankylosing spondylitis patient with kyphotic deformity involves some type of posterior osteotomy. Smith-Petersen, Larson and Aufranc (10) first reported the spinal osteotomy for ankylosing spondylitis in 1945. Subsequently, corrective osteotomies performed in one or two stages were described and reported by the others (1, 3, 5, 6, 9). These osteotomies, in general, open wedge posterior lumbar osteotomies that cause opening in the anterior aspect of the spine. This opening, especially in one stage osteotomy may cause aortic rupture, and there are some cases reported in the literature (1, 7, 9). To prevent this serious complications some modifications of lumbar osteotomies were described (4, 8, 11, 12). Scudese and Calabro (8), osteotomized the posterior part of the lumbar body, the others made transpedicular decancellation and closed wedge posterior osteotomy. The purpose of these techniques was to prevent anterior column elongation and make only posterior column

shortening. Hehne and Zielke (2) performed multiple osteotomies at various levels to reduce the risk of aortic rupture and obtain smooth curve of lordosis.

The purpose of this paper is to present our results of surgical treatment of kyphotic deformities of ankylosing spondylitis cases and describe transpedicular decancellation closed wedge vertebral osteotomy (egg shell procedure).

MATERIALS AND METHODS

Fifteen patients with the diagnosis of ankylosing spondylitis (14 male and 1 female) were operated on in our Department between December 1992 and January 1994. The mean age of the patients was 37 (range, 23-55).

The surgical methods were as follows: 12 patients had posterior lumbar (L3) egg-shell procedure (posterior transpedicular vertebral body decancellation) with internal fixation. 2 patients had thoracal anterior release and posterior multi-level osteotomy and fusion with instrumentation. One patient had cervical (C7) egg-shell procedure with halo-body external fixation.

Egg shell procedure (Figure 1): All patients were operated under endotracheal general anesthesia. After the desired amount of laminectomy, cancellous bone of the corpus was curetted out via transpedicular route. Posterior cortex of the corpus was broken with a blunt and angled instrument. Internal fixation with ISOLA system was used except cervical osteotomy case.

Plastic body cast was used for immobilization in all cases for 12 weeks.

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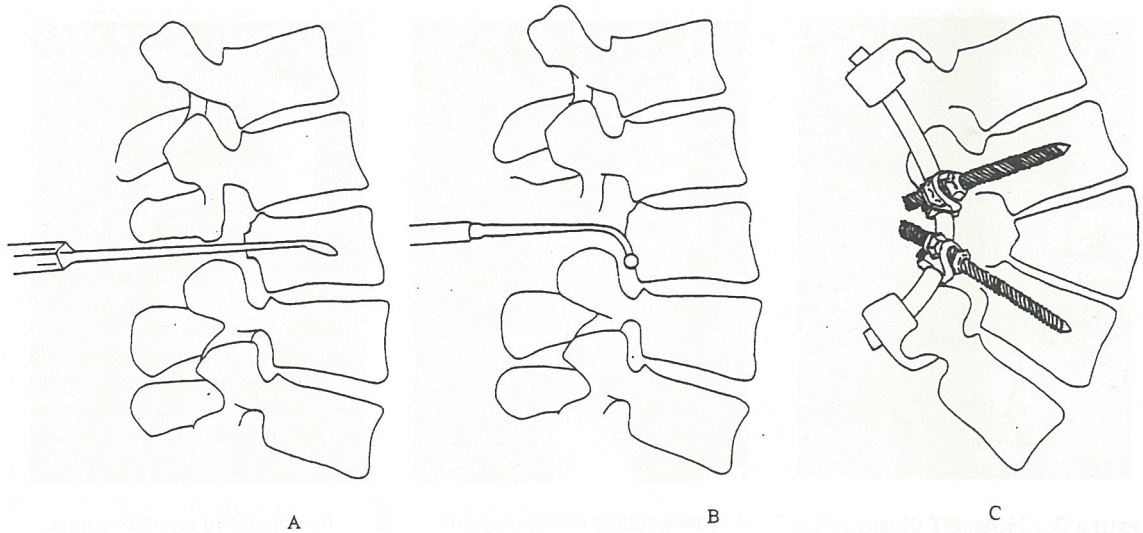


Figure 1. The egg-shell procedure and instrumentation manner.

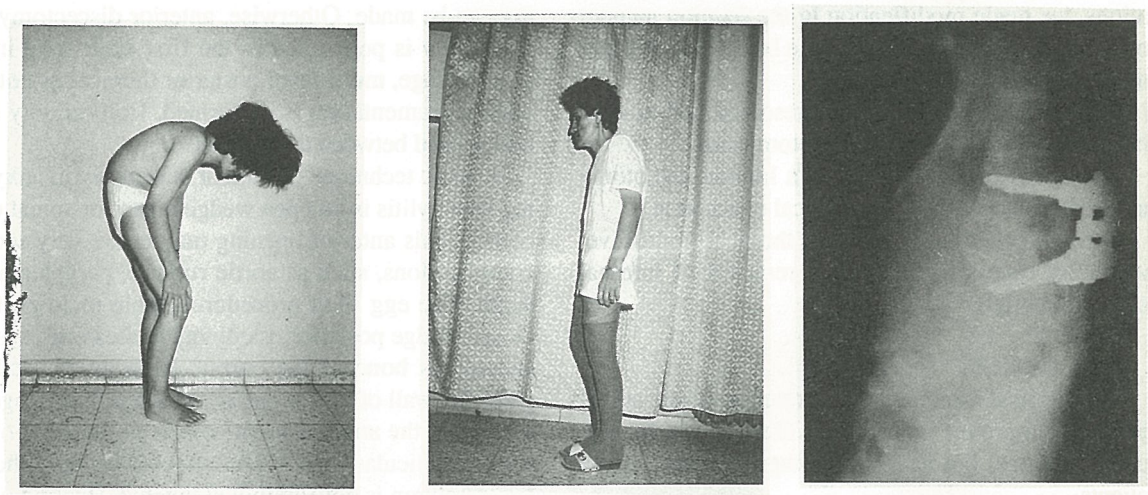
RESULTS

Dramatically postural changes were observed immediately after the operations, such as the patients could their heads to the bed in supine position, and their abdominal skin folds were opened (Figure 2). When the patients were mobilized with external sup-

port, all were satisfied with postural changes.

In lumbar osteotomy cases, overall mean correction was 27.2 degrees (range, 20-50) (Figure 3).

In two cases of thoracal multi-level osteotomy kyphosis angles were reduced from 85 degrees to 35 degrees, and from 90 degrees to 50 degrees (Figure 4).



A : Preoperative standing lateral view.

B : Postoperative standing lateral view.

C : Postoperative roentgenogram.

Figure 2. S.V. 38 years old, female.

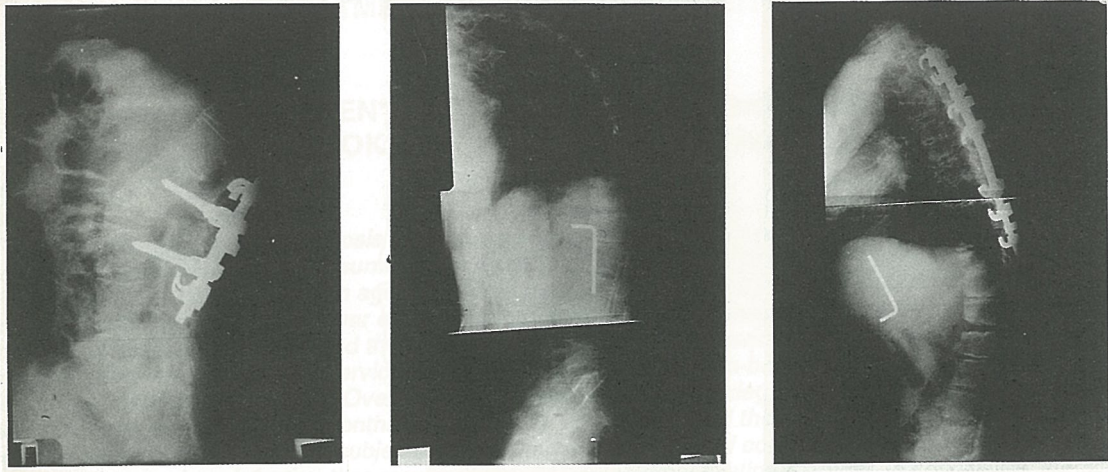


Figure 3. H.A., 37 years old, male, Postoperative roentgenogram.

A : Preoperative roentgenogram. B : Postoperative roentgenogram.

Figure 4. O.E., 29 years old, male.

These two patients had high thoracic kyphosis.

In one case of cervical osteotomy, chin-brow angle is restored to vertical line.

The mean follow-up time was 7.9 months (range, 4-15).

Complications: We had loss of correction in two cases. Both were lumbar osteotomy cases that we used only transpedicular screws and loss of corrections were 10 degrees in each patients. After these complications, we made modification in the fixation manner and we added laminar hooks to the both sides at upper and lower ends to make claws.

Minor root compression that resolved in 6 months was observed in one lumbar osteotomy case.

There was one hematoma in a lumbar osteotomy case treated successfully by surgical evacuation.

Deep infection occurred in a thoracic multi-level osteotomy case that resulted in removal of internal fixation material.

DISCUSSION

The surgical treatment for correction of the spinal deformity improves not only the field of vision, visceral functions, but also psychological status of the patients.

The deformity and the patient's general medical status is carefully evaluated. If there is hip joint involvement, a total hip replacement must be done, and

the patient's deformity evaluated again (9).

Osteotomy level is chosen according to the deformity. In cervicothoracic kyphosis and lumbar kyphosis cases, the deformity is corrected with cervical and lumbar osteotomies. Thoracolumbar kyphosis is also compensated with a lumbar osteotomy.

Surgical treatment protocol is different for thoracic kyphosis cases. If a patient has thoracic kyphosis with loss of lumbar and cervical lordosis, a lumbar osteotomy can be made. Otherwise, anterior discectomy and osteotomy is performed in the first stage, and in the second stage, multi-level posterior thoracic osteotomy with instrumentation is performed. Halo-gravity traction is used between the stages (9).

Classic technique of lumbar osteotomy in ankylosing spondylitis is an open wedge posterior spinal osteotomy. This anterior opening may cause very serious complications, such as aortic rupture, paraplegia and death. The egg shell procedure enable us to perform closed wedge posterior osteotomy in these cases, since cancellous bone of the corpus is removed, and the posterior wall of the corpus is fractured. The danger of rupture of the anterior great vessels or avulsion of the lumbar radicular vessels are reduced, because the anterior column is not forcibly elongated. Healing of the closed wedge osteotomy will be rapid since two cancellous surfaces are compressed together.

Although mortality and morbidity rates that were

reported in some series are significant, fortunately we have not observed any serious complication such as death, paraplegia, gastric dilatation and aortic rupture. The results that we obtained were considered good with respect to cosmesis and patients' satisfaction and radiological degree of correction, and coincide with the other reports.

In conclusion, surgical treatment of the spinal deformities due to ankylosing spondylitis especially with egg shell procedure is safe and satisfactory.

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