

POSTERIOR FUSION AND INSTRUMENTATION AFTER ANTERIOR RADICAL DEBRIDEMENT AND FUSION IN THE SURGICAL TREATMENT OF POTT'S DISEASE

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Immobilization and progressive kyphosis are the major postoperative problems encountered after anterior radical surgical treatment for tuberculosis of the spine. Posterior fusion and instrumentation can be the effective solution for these problems. In this study, the indications and clinical results of posterior stabilization operations following anterior surgery are discussed and the importance of posterior stabilization is emphasized.

Eighty-five cases of tuberculosis of the spine were surgically treated between 1987 and 1993. In 57 of these cases, only the anterior radical procedure was used. Eight cases younger than 8 years of age had anterior procedure and posterior fusion without instrumentation. Remaining 20 cases had anterior procedure and posterior fusion with Cotrel-Dubousset instrumentation. Follow-up period ranges from 6.2 years to 12 months (mean 39.2 months).

Our results suggest that posterior spinal fusion and posterior stabilization following anterior debridement is superior to anterior surgery alone. The advantages of this technique are the achievement of better sagittal and coronal balance, minimal risk of loss of correction and pseudoarthrosis, early ambulation and return to daily activities and early discharge from the hospital.

Key Words: Pott's disease, anterior radical debridement posterior instrumentation.

The aim of treatment in Pott's disease is to eradicate active infection, obtain spinal stability, prevent progression of kyphosis and correct the kyphosis, early ambulation and return to daily activities. Prognosis after the treatment depends on age and general health status of the patient, neurological deficit, selected treatment.

But there are still controversy in the form of treatment the conservative, medical approach versus radical, surgical approach. Up to now, in all methods of treatment, the kyphosis due to active spinal tuberculosis tended to increase during therapy. Residual kyphosis was always a problem, and embarrassed both the doctor and the patient, though tuberculosis could be successfully treated. And the kyphosis became their main concern for further treatment, because it was cosmetically unacceptable.

Posterior fusion and instrumentation after anterior radical surgery can be the effective solution for these problem. In 1982, Moon was the first to draw attention to this subject and he recommended this procedure with two stages (7).

In this study, the indications and clinical results of posterior stabilization operations following anterior surgery are discussed and the importance of posterior stabilization is emphasized.

PATIENTS AND METHOD INDICATIONS

Posterior spinal fusion with posterior stabilization in addition to anterior surgery is performed after anterior surgery involving more than two bodies, (especially in children younger than 8-10 years, but without instrumentation), to prevent the development of kyphosis and also correct it, in cases with a high degree of kyphotic angle preoperatively.

CONTRAINDICATIONS

Contraindications are the presence of vertebral abscess around the posterior elements reaching the subcutaneous tissue, draining sinuses and superinfection.

Between 1987 and 1993, 85 patients with bacteriologically and pathologically proven spinal tuberculosis were surgically treated. In all patients Hong-Kong operation was performed. In 28 cases which form the material of this study, posterior spinal fusion (PSF) was added, in whom 20 received posterior instrumentation as well.

The procedures were performed under same anesthesia in 4 cases and under different sessions in the others.

The age distribution and neurologic statuses of the patients and levels of lesion are listed in Table 1, Table 2 and Table 3 respectively.

Grafts used in anterior surgery were iliac bone graft in 10 patients, double fibular grafts in 11, double fibular grafts with a rib in 4 and rib in 3.

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After PSF without instrumentation (in children) a plaster jacket was prescribed for 6-9 months.

After PSF with instrumentation, ambulation was allowed within the first week postoperatively.

Anti-tuberculosis chemotherapy is given for 9-12 months postoperatively. The combinations of the drugs are determined by the Department of Infectious Diseases of our Faculty.

RESULTS

The corrections in kyphosis angles are summarized in Table 4. The mean scoliosis angle was 13° preoperatively, whereas it measured 3° postoperatively.

At the end of therapy, full recovery was observed in all cases with neurologic deficits.

Postoperative staphylococcal infection was observed in one case, who had posterior instrumentation. No other complication such as graft failure, loss of correction, failure of posterior spinal instrumentation, pseudoarthrosis or reactivation of tuberculosis were seen during the follow-up period.

DISCUSSION

The kyphosis was a common complication in patients who were treated by chemotherapy alone. Since Hodgston and Stock's report in 1960, anterior arthrodesis has been advocated as the treatment of choice for tuberculosis of the spine (5, 6). However, it became clear that the only advantage of anterior arthrodesis was the decreased tendency for progression of the deformity. Furthermore, some authors reported that anterior grafting was inadequate in preventing the progression of kyphosis (4, 7, 8). Rajasekaran et al. reported that stable anterior graft provided structural support in only 41%, and graft failure with residual kyphosis occurred in 59% (8). They stated that the graft failed most often in the cases in which it spanned more than two disc spaces. In 1982, Moon, who was one of the authors believing that anterior strut graft was inadequate for preventing the progression of the spinal deformity, was the first to suggest posterior instrumentation in addition to anterior procedure in order to solve this problem (7). The author instrumented the spine two or three levels above and below the lesion with Harrington distraction rods or Luque rods and first results were published in 1983. Moon also suggested posterior instrumentation and fusion in cases involving two segments.

Moon, reported that mean kyphosis angle which was 36 degrees preoperatively was lowered to 17 de-

grees postoperatively. In our series these angles are 32 degrees, and 16 degrees, respectively.

There are controversial opinions about progressive kyphosis after solid anterior fusion in children. Upadhyay (9), Baker (2) reported that there is no disproportionate posterior spinal growth after anterior spinal fusion, which contributes to the progression of deformity. Fountain et al. reported that if late kyphosis occurs, one should consider as a cause growth retardation of the anterior vertebral ring epiphysis above or below the fusion mass, or both (3). When progression of the kyphosis is noted, a supplementary posterior spine fusion may arrest the progression. Bailey et al. pointed out that progressive kyphosis following anterior spine fusion is caused by a disproportionate growth of the posterior elements and vertebral bodies within the fusion in growing children to prevent late kyphosis due to relative overgrowth of the posterior elements. We, thinking as Bailey et al., preferred anterior and posterior combined surgery in children below the age of 10. There was not a significant change in the kyphosis angles during follow-up.

Moon suggested correction by posterior procedure first in his method which he performed under several sessions initially and as same time surgery later. We think that this decision may vary according to the patient. We prefer posterior procedure first if there is not a severe kyphotic deformity and anterior surgery first if there is a severe kyphotic deformity.

Presence of deformity in the frontal plane is of importance with regard to site of approach when due to the anterior procedure. We prefer to approach from the concave side if there is a scoliotic deformity.

Iliac bone grats are usually inadequate during anterior surgery for lesions involving two segments. Moreover fibular grafts and rib grafts in front of them provide a more stable fusion this cases.

Other advantages of posterior fusion and instrumentation are early mobilization of the patient, short hospitalization time and early return to daily life. Especially with the use of rigid and stable instrumentations such as CDI postoperative bracing is not required and the patient leads a more comfortable life. The high cost of the system is the only disadvantage.

CONCLUSION

Our results suggest that PSF and posterior stabilization following anterior debridement is superior to anterior surgery alone. The advantages of this technique are: Better sagittal and coronal balance, minimal

risk of loss of correction and pseudoarthrosis, early ambulation and return to daily activities, early discharge from the hospital.

Increased morbidity and mortality together with high costs are the disadvantages of the technique.

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Table 1. Age Distribution

Age group	Number of cases
0-10	8
11-20	3
21-40	7
41-60	2
61+	28

Table 2. Preoperative neurologic deficits

	Number of cases
Paraplegia (acute)	2
Paraparesia	3
Minor deficit	1
Normal	22
	28

Table 3. Level of lesion

Level of lesion	Number of cases
Thoracal	13
Thoracolumbar	5
Lumbar	10
	28

Table 4. Corrections in kyphosis angle

	Older than 10 years		Younger than 10 years	
	preop	postop	preop	postop
T	42°	21°	46°	35°
TL	32°	8°	37°	21°
L	12°	-2°	12°	7°

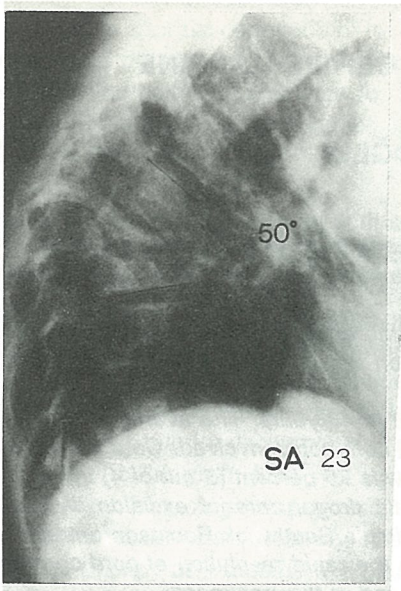


Figure 1.A.

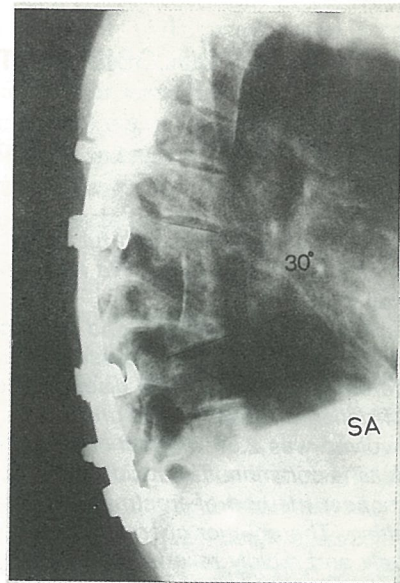


Figure 1.B.

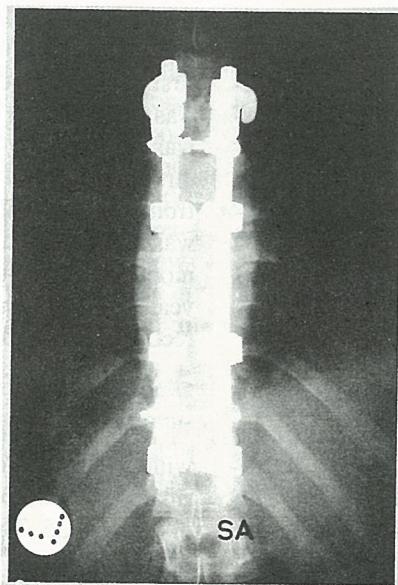


Figure 1.C.

Figure 1. Preoperative and postoperative radiographs of a case who had combined surgery