



Research Article

ANTERIOR ARTHRODESIS FOR TUBERCULOSIS OF THE SPINE USING ZETA INSTRUMENTATION ON LATERAL SIDE

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ABSTRACT

This is a prospective study of twelve patients who are diagnosed to have tuberculosis of spine with some form of neurological deficit. In the present study, the progression of kyphosis and the fate of the bone graft and final outcome over an average twelve month follow up after radical anterior debridement, bone grafting and application of Zeta Instrumentation on the lateral side of the vertebral body is performed. Supplementation with an implant to the procedure of bone grafting after radical debridement is a good choice as a primary procedure. It was noted that It is easy to place the implant on the lateral aspect of the bodies of the spine. There is no need of a second procedure in the form of posterior instrumentation and posterior fusion at a later date. Can be used by surgeons, where the facilities for pedicular screw fixation are not present. There is no progression of the deformity.

KEYWORD: Tuberculosis, Spine, Drug Therapy, Chemotherapy

INTRODUCTION

The development of modern, specific anti-tuberculosis drugs has revolutionized the treatment of patients who have spinal tuberculosis. The good results that are obtained with the modern drug therapy have let to controversy between the advocates of chemotherapy and those of operative treatment [1],[2]. The study of the British Medical Research Council Working Party on tuberculosis of spine have established that the achievement of favorable status (full physical activity, clinical and radiographic evidence of quiescence of the disease and no deficits, sinuses or clinical evidence of residual abscess) at five years by chemotherapy alone compares favorably with the results of radical surgery. However, anterior spinal arthrodesis has proved to be superior to chemotherapy in the prevention of progressive deformity [3],[4],[5],[6].

Gross kyphosis, especially in the thoracic spine is a common complication in patients who are treated by chemotherapy alone [7]. When there is loss of most of two vertebral bodies; a severe kyphosis must result before

healthy vertebrae can come onto contact and consolidation of bone can occur. The final gibbus angle depends on the amount of vertebral loss before treatment and that the final gibbus angle is predictably about 30-35° when there is complete destruction of one vertebral body[8]

In prevention of progression of the deformity external support, prolonged recumbence and posterior arthrodesis have been found to be ineffective [6].Surgical extirpation of focus of disease and its replacement by bone graft in a structurally sound position have been shown to be effective [3],[6].The enormous forces transmitted across the graft are in the range of hundreds of pounds per square inch. The failure of graft due to slippage, fracture, absorption or subsidence was frequent. The length of the graft failed most often in patients in whom it spanned more than two discs [9]. It was decided that it is unwise to rely solely on the graft to prevent vertebral collapse [9]

In the present study, the progression of kyphosis and the fate of the bone graft and final outcome over an average twelve month follow up after radical anterior debridement, bone grafting and application of Zeta Instrumentation on the lateral side of the vertebral body is performed.

MATERIALS AND METHODS

This is a prospective study of twelve patients who are diagnosed to have tuberculosis of spine with some form of neurological deficit.

Inclusion Criteria:

- i. Clinical and radiological evidence of active tuberculosis.
- ii. Patients having neurological deficit.

Exclusion Criteria:

- i. Patients having severe extra spinal disease either tuberculous or non-tuberculous.
- ii. If they had history of previous anti-tuberculosis treatment for 12 months or more.
- iii. If they had a history of a previous major operation for the spinal lesion.

Chemotherapy (AKT₄) was started for all the patients and the operation was performed as soon as possible thereafter. In all the patients the interval was less than one month.

Trans-thoracic trans-pleural approach was used from the right side with the patient in the left lateral position. A general surgeon was helping us in all the cases. Kidney Bridge was raised to improve the operative view. The level of incision is two ribs above the level of lesion. The muscles and the periosteum are cut over the selected rib from the costochondral junction to posterior part of the rib. The selected rib is resected sub-periosteally. This rib is used as the graft. We tried to keep the dissection extra-pleural. In some patients the pleura had to be opened due to adhesions. In one patient a part of the diaphragm was cut on the posterior part. The lung is freed from all the adhesions. The abscess is opened up. The resection of the affected bodies was extended posteriorly without damaging the dura, cranially and caudally until healthy bleeding bone is seen. All the debris is removed carefully. The edges are resurfaced to receive the graft.

Now the kidney bridge is lowered. The pedicular screws of the Zeta system were applied on the lateral aspects of the healthy body above and below. The connecting rod was placed. The inferior screw rod assembly was tightened first. The deformity was corrected manually. The superior screw rod assembly was tightened while maintaining the corrective force. Autogenous graft (fibula and rib in all cases) was jammed in firmly. We did not sacrifice undiseased inter vertebral disc and osseous end plates at the ends of the lesion if healthy cancellous surface was exposed.

Chest tube with underwater seal was applied if the pleura had been opened. The wound was closed in layers under closed drain in all cases. Post-operative blood transfusions, antibiotics and analgesics were given. Anti-tuberculosis treatment was resumed once oral feeding started. Log rolling the patient to left lateral position was done under supervision of the doctor from 7th -8th day. Suture removal was done on the 10th day. They were advised strict bed rest and anti-tuberculosis treatment. They were

allowed log rolling to left side. Review was once in six weeks. All the patients were made ambulant using spinal extension braces at an average of 4 months depending on the radiological signs of consolidation.



The angle of kyphosis was measured by a technique similar to that described by Konstam and Blesovsky [10]. The amount of intra-operative correction that was obtained was calculated by comparing the preoperative radiograph with the first post-operative radiograph, and the progression of deformity was determined by comparing the pre-operative radiograph with the most recent follow-up radiograph.

The function of the graft and implant complex as related to the prevention of progression of the kyphosis was classified as follows [9]:

- i. Excellent – Consolidation of the graft, with some correction of the angle as compared with the pre-operative gibbus angle [9]
- ii. Good – Consolidation of the graft, with no progression of the gibbus angle as compared with the pre-operative angle [9]

- iii. Fair – Consolidation of the graft, with an increase in the gibbus angle of less than 20 degrees [9]
- iv. Poor – Consolidation of the graft, with an increase of the gibbus angle of more than 20 degrees [9]

RESULTS AND OBSERVATIONS

At the latest follow up nine patients had good result, according to the criteria mentioned. The rest three had residual neurological deficits though there was no progression of deformity. The good result was irrespective of the amount of destruction of bone, number of bodies involved and the amount of bone excised. In contrast to other studies where favorable result was seen in patients who had minimal destruction and minimum excision of bone [9]

An average of 12.679 degrees of correction was achieved and maintained in all the patients. In other studies, 54% of the patients showed late collapse and increase in the deformity [9]. This collapse is not seen in our study as the implant is augmenting the mechanical strength.

In our study the neurological deficit improved to Grade-5 in nine patients. In two there was little improvement (Grade-3 to Grade-4), and in one there was none. Four developed bed sores despite the turning and daily dressings were done till they healed. Mild urinary tract infections were seen in nine patients. Antibiotics, regular change of catheters once in three were advised.

In the other studies 23% of the patients showed some improvement in the angle after 5 years. This is attributed to the fact that they were all children in the growing age group (5-15 years)[9]. As the implant prevents the movement of the spine this is not seen in our study and none of the patients in our study belonged to that age group.

There was only one post-operative complication in one patient where the screw rod assembly sat in the wrong thread and it had loosened. We opened again and fixed it on the 13th day. This did not hinder the clinical outcome.

CONCLUSIONS

- i. Supplementation with an implant to the procedure of bone grafting after radical debridement is a good choice as a primary procedure.
- ii. It is easy to place the implant on the lateral aspect of the bodies of the spine.
- iii. There is no need of a second procedure in the form of posterior instrumentation and posterior fusion at a later date.
- iv. Can be used by surgeons, where the facilities for pedicular screw fixation are not present.
- v. There is no progression of the deformity.

LIMITATIONS OF THIS STUDY

- i. A small group is studied.
- ii. The average follow up is only 12 months.

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