



Fate of kyphosis in tuberculosis of subaxial cervical spine treated non-operatively

Aditya AGGARWAL, Anuj JAIN, Nitesh JAJOIDA, Raj NAND, Sudhir KUMAR, Chandra KUMAR

From University College of Medical Sciences (UCMS) and assoc. Guru Teg Bahadur (GTB) Hospital, Delhi, India

Study design : Retrospective study

Objective : Observation of post treatment kyphotic angle in patient of cervical spine tuberculosis managed non operatively

Background : The incidence of tuberculosis of cervical spine is about 6-9%. The most dreaded complications of spinal tuberculosis are neural involvement and spinal deformity. Due to destruction of the vertebra tuberculosis of spine usually leads to variable amount of kyphotic deformity.

Methods : We retrospectively reviewed 13 patients with clinico-radiological diagnosis of cervical spine tuberculosis managed in our centre between 2004 to 2011. The patients were started on antitubercular therapy. Crutchfield tongs traction was applied 8 to 12 weeks followed by mobilization with four post collar. The kyphotic angles were measured by radiograph at presentation and last available follow up radiograph.

Observations : The mean age of the patients was 20 years. C3-C4 vertebra was the most commonly involved area. One patient had single vertebra involvement, five patients had two vertebrae involvement, five patients had three vertebrae involvement and two patients had four vertebrae involvement. The average number of vertebrae involved was 2.6 vertebrae. 9 out of 13 patients had neural deficit at the time of initial presentation. The mean follow up was 21.23 months (12 to 42 months). All patients responded favorably and had neural recovery. At final follow up, 10 out of 13 patients had improvement in kyphotic angle, two patients had deterioration of kyphotic angle and one patient had no change in kyphotic an-

gle. Only one patient had significant deterioration in kyphotic angle.

Conclusion : Non operative treatment of cervical spine tuberculosis by initial traction and antitubercular therapy improves the pretreatment deformity irrespective of the number of vertebra involved.

Keywords : cervical ; spine ; tuberculosis ; kyphotic ; deformity ; non operative ; treatment.

INTRODUCTION

The incidence of tuberculosis of cervical spine is about 6-9% (5,8). With the advent of HIV, tuberculosis is more commonly seen even in developed countries. The most dreaded complications of spinal tuberculosis are neural involvement and spinal deformity (1). There is scanty literature on fate of

- Aditya Aggarwal.
- Anuj Jain.
- Nitesh Jajoida.
- Raj Nand.
- Sudhir Kumar.
- Chandra Kumar.

University College of Medical Sciences (UCMS) and assoc. Guru Teg Bahadur (GTB) Hospital, Delhi, India.

Correspondence : Dr. Anuj Jain, Senior resident, Deptt. of Orthopaedics, UCMS and ass. GTB Hospital, Dilshad garden, Delhi, India. E-mail : jain.doctor.anuj@gmail.com

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kyphosis in cervical spine tuberculosis treated non operatively. To the best of our knowledge only one series has tried to quantify the changes in kyphotic angle in cervical spine tuberculosis (6). In the present study we observed the change in kyphotic angle following non operative treatment of cervical spine tuberculosis.

MATERIAL AND METHODS

We retrospectively reviewed patients with clinico-radiological diagnosis of cervical spine tuberculosis managed in our centre between 2004 to 2011. Out of total 18 patients, 5 patients were excluded from the study because, either they underwent surgical decompression or they showed no improvement despite being on antitubercular therapy for 3 to 6 months or had follow up of less than one year. Therefore, 13 patients were finally included for analysis in the study. A thorough history and clinical examination for assessment of neural deficit was done. Laboratory investigation including CBC and ESR were performed at regular intervals during treatment and thereafter. Radiographs of the cervical spine (antero posterior and lateral views) were obtained at the time of admission and then at 6 weeks interval. Deformity at the

time of presentation was measured on lateral radiograph using Dickson angle of kyphosis (9). Crutchfield tongs traction was applied under local anaesthesia and the patients were started on four drugs antitubercular therapy (isoniazid, rifampicin, ethambutol and pyrazinamide). Patients were allowed turning in bed with the traction. Daily neural examination of the patients was done. The traction was continued for a total of 8 to 12 weeks. Following this patient was mobilized with four post collar for further 3 months. At this time lateral radiographs of the cervical spine were obtained in flexion and extension to look for any residual instability. Thereafter ranges of motion exercises of cervical spine were started. At each follow up a lateral view of the cervical spine was obtained. Antitubercular therapy was given to the patient for minimum of 12 months. The final kyphotic angle was taken at the last available follow up lateral radiograph of the cervical spine.

OBSERVATIONS (TABLE I)

The mean age of the patients was 20 years (range, 9 to 34 years). There were 5 males and 8 females. There were 11 adults and 2 children. C3-C4 vertebra was the most commonly involved area. One

Table I. — Detail of the patients

PATIENTS	SEX	NEURAL INV.	PRE TREATMENT KYPHOSIS	POST TREATMENT KYPHOSIS	FOLLOW UP (MONTHS)	LEVEL	NO. OF VERTEBRAE
1	M	NIL	6 KYPHOSIS	3 KYPHOSIS	16	C34	2
2	F	QUADRIPARESIS	5 KYPHOSIS	0 KYPHOSIS	42	C34	2
3	F	QUADRIPARESIS	26 KYPHOSIS	0 KYPHOSIS	18	C23	2
4	F	QUADRIPARESIS	43 KYPHOSIS	34 KYPHOSIS	16	C345	3
5	F	QUADRIPARESIS	18 KYPHOSIS	3 KYPHOSIS	21	C23	2
6	F	QUADRIPARESIS	4 KYPHOSIS	8 KYPHOSIS	24	C567	3
7	F	NIL	10 KYPHOSIS	3 LORDOSIS	12	C345	3
8	M	SPASTIC, NO MOTOR SENSORY LOSS	7 LORDOSIS	11 LORDOSIS	13	C7D1	2
9	F	NIL	29 LORDOSIS	30 LORDOSIS	29	C3456	4
10	M	NIL	2 LORDOSIS	20 LORDOSIS	18	C5	1
11	F	SPASTIC, NO MOTOR SENSORY LOSS	16 KYPHOSIS	36 KYPHOSIS	26	C456	3
12	M	QUADRIPARESIS	0	0	26	C4567	4
13	M	QUADRIPARESIS	25 KYPHOSIS	8 KYPHOSIS	15	C345	3



Fig. 1a. — Pre treatment kyphotic deformity in single vertebra involving disease.

patient had single vertebra involvement (Fig. 1a and 1b), five patients had two vertebra involvement (Fig. 2a, 2b and 2c), five patients had three vertebra involvement (Fig. 3a and 3b) and two patients had four vertebra involvement (Fig. 4a and 4b). The average number of vertebrae involved was 2.6 vertebrae. 3 patients had skip lesion. 9 out of 13 patients had neural deficit at the time of initial presentation. The mean follow up was 21.23 months (12 to 42 months). All patients favorably responded to above mentioned non operative therapy and had neural recovery. There were no complications associated with the use of antitubercular drugs. One patient required immune-modulation therapy. All

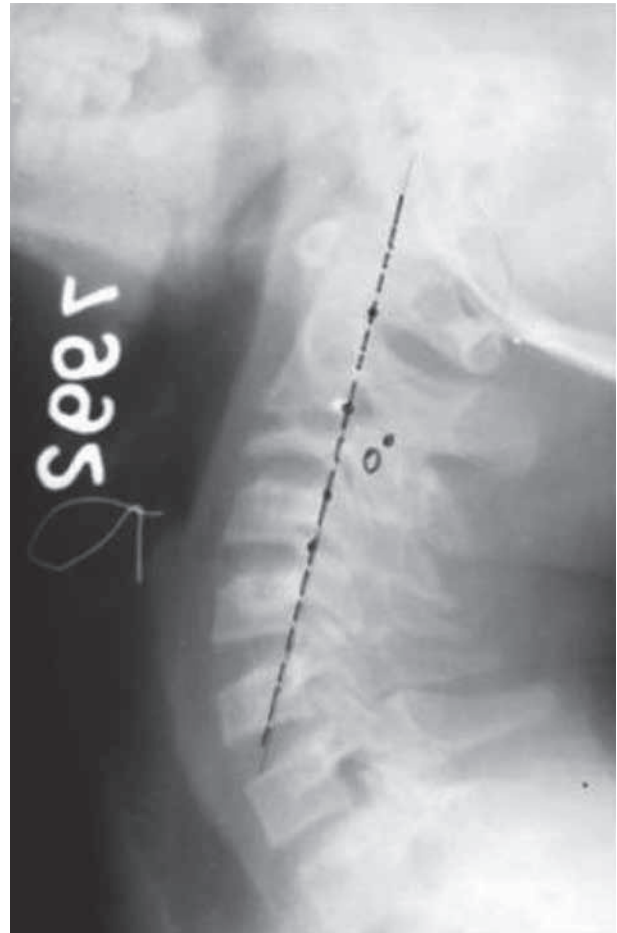


Fig. 1b. — Post treatment radiograph showing improvement in kyphotic deformity.

patients showed clinical signs of improvement 2 to 3 months following antitubercular therapy. None of the patients had residual instability of cervical spine.

At final follow up, 10 out of 13 patients had improvement in kyphotic angle (Fig. 1, 3 and 4), two patients had deterioration of kyphotic angle (case 6, 11) and 1 patient had no change in kyphotic angle (case 12). Only one patient had significant deterioration in kyphotic angle (case 11) (Fig. 2a and 2b). The mean pretreatment kyphotic angle was 17 degrees {-4 (lordosis) to 55 degree} and mean post treatment kyphotic angle was 4.7 degrees (-15 to 43 degree). The mean change in kyphotic angle was 7 degree improvement.



Fig. 2a. — Pre treatment kyphotic deformity in two vertebrae involving disease.

DISCUSSION

Non operative treatment of cervical spine tuberculosis using middle path regime is still followed, especially in resource constraint set up. Modern chemotherapy has a significant impact on the natural course of cervical spine tuberculosis. Tuberculosis is essentially a medical disease and can be cured with antituberculous drugs, rest and mobilisation with a suitable orthosis (7). The level of anti-tubercular drugs are well above the minimum inhibitory concentration in pus and granulation tissues (4,10). Inflammation at the involved region leads to increased vascularity, which stimulates a high rate of osteosynthesis once the infection is controlled.

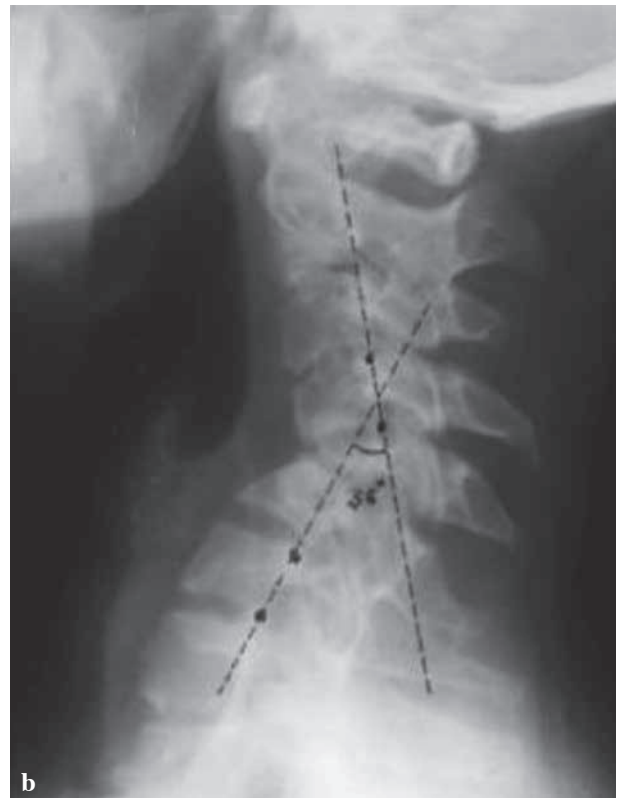


Fig. 2b and c. — Post treatment radiograph showing deterioration in kyphotic deformity.

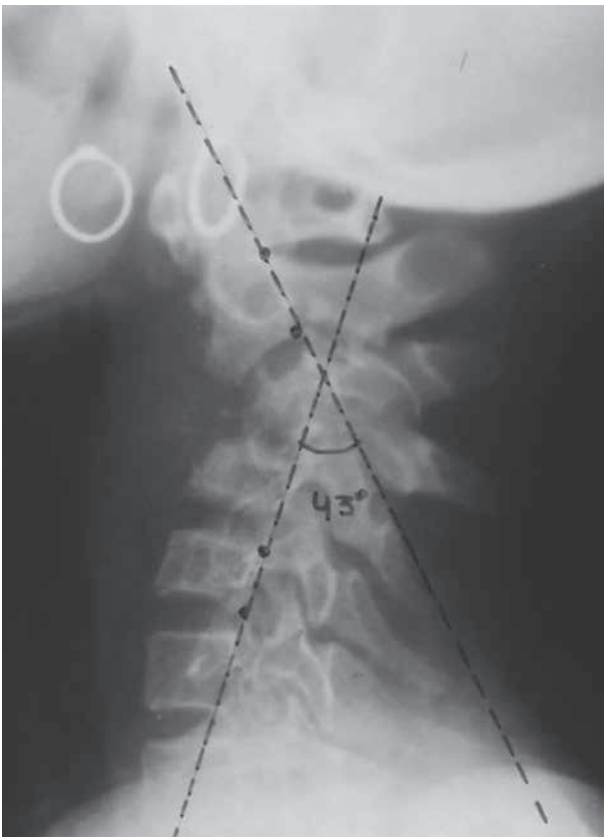


Fig. 3a. — Pre treatment kyphotic deformity in three vertebrae involving disease.

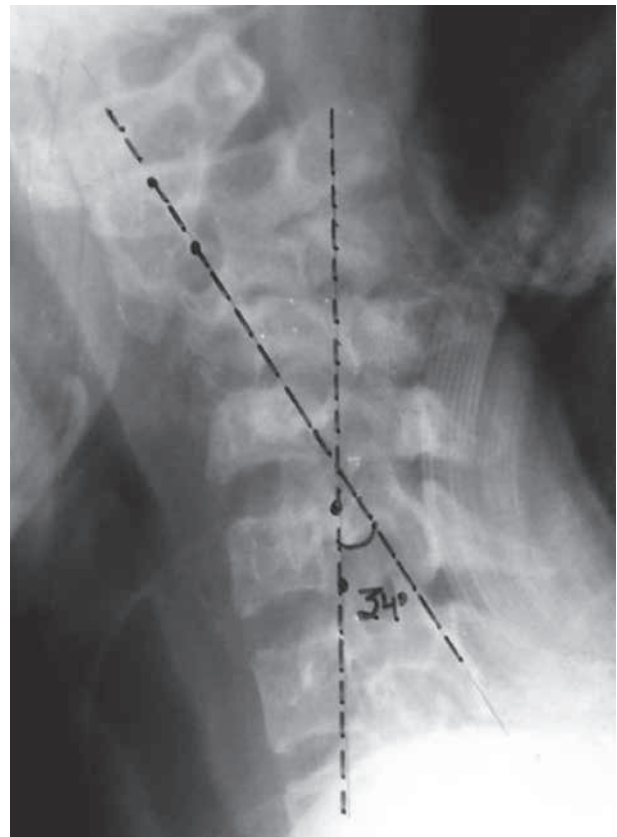


Fig. 3b. — Post treatment radiograph showing improvement in kyphotic deformity.

Tuberculosis of the spine leads to kyphotic deformity due to destruction of vertebra. Multiple vertebral involvement, active growth potential and thoracic spine involvement are associated with excessive increase in kyphosis (2). TB of dorsal spine usually produces kyphosis while cervical and lumbar spine shows reversal of lordosis first followed by kyphosis (3). The cervical spine has least kyphotic deformity as it is prevented from telescoping by the interposition of the transverse processes and also the line of weight transmission in cervical spine is in posterior half of vertebral bodies (9).

To the best of our knowledge there is very scanty literature on fate of kyphosis in patients of cervical spine tuberculosis treated by non operative regime. The method of quantification of kyphosis in cervical spine is not standardized in literature. Different methods of calculation of kyphosis (in two and three dimensional projection) have been described for

other disease processes. However different methods give different values of saggital plane angulation/deformity (11). Moon et al in a retrospective study reviewed 54 patients of cervical spine tuberculosis (23 out of which were treated non operatively) and concluded that in children initial kyphosis of 12 degree progressed to 17 degree and in adult initial kyphosis of 9 degree progressed to 13 degree (6). However there was no mention on method of assessment of kyphosis. We in our study observed severe deterioration in kyphosis in only one patient who had three vertebral involvement. In our study patient with even four vertebral involvement did not had deterioration of kyphosis. Three patients had significant kyphosis at the time of initial presentation or during treatment. In all the cases, there was significant loss of anterior height of one vertebra. Although the numbers are small, it can be reasonably argued that significant anterior destruction of the

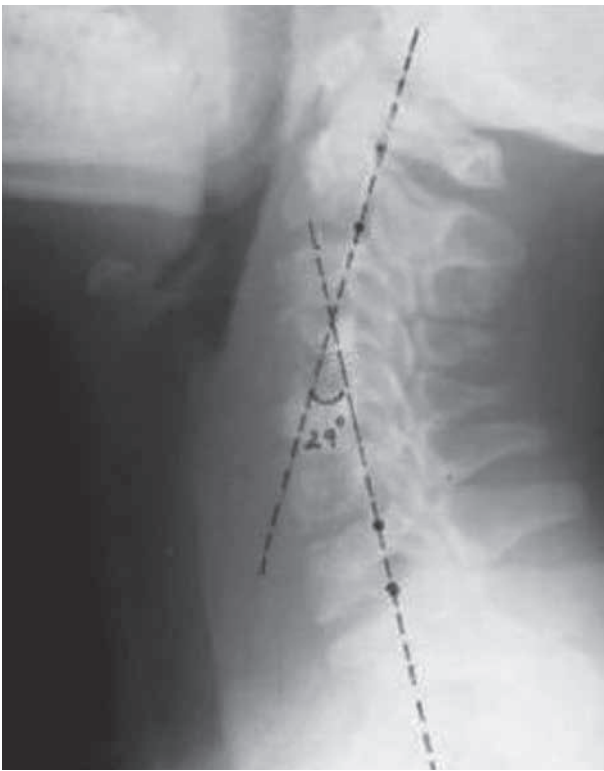


Fig. 4a. — Pre treatment kyphotic deformity in four vertebrae involving disease.

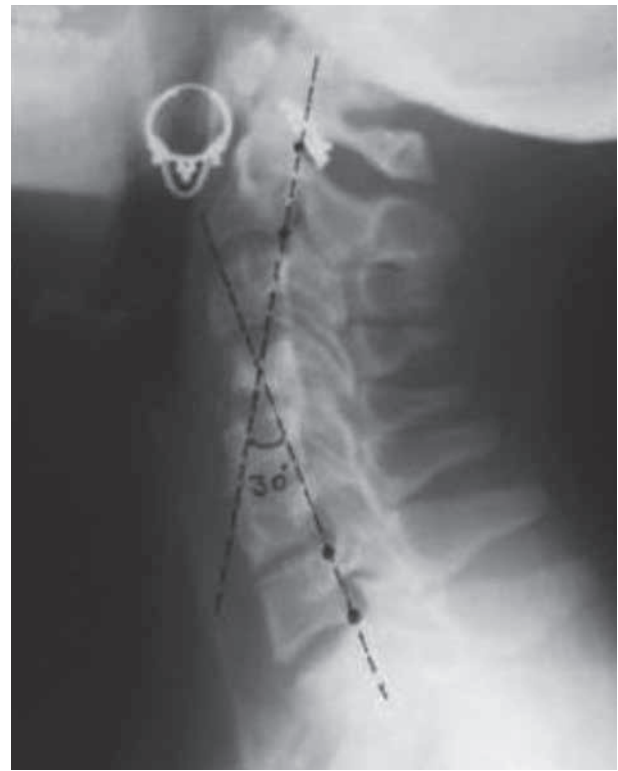


Fig. 4b. — Post treatment radiograph showing improvement in kyphotic deformity.

cervical vertebrae may be associated with a significant kyphotic deformity. The limitation of our study is that we did not use sophisticated modality of imaging like CT scan or MRI in our study and all the angles were calculated on plain radiograph.

CONCLUSION

Non operative treatment of cervical spine tuberculosis by initial traction and antitubercular therapy improves the pretreatment deformity in a significant number of patients irrespective of the number of vertebra involved.

REFERENCES

1. **Jain AK.** Treatment of tuberculosis of the spine with neurologic complications. *Clin Orthop Relat Res* 2002 ; 398 : 75-84.
2. **Jain AK.** Tuberculosis of the spine : a fresh look at an old disease. *J Bone Joint Surg Br* 2010 ; 92 (7) : 905-13.
3. **Jain AK, Dhammi IK, Jain S, Mishra P.** Kyphosis in spinal tuberculosis – Prevention and correction. *Indian J Orthop* 2010 ; 44 (2) : 127-36.
4. **Kumar K.** The penetration of drugs into the lesions of spinal tuberculosis. *Int Orthop* 1992 ; 16 : 67-8.
5. **Lifeso RM, Weaver P, Hardu EH.** Tubercular spondylitis in adults. *J Bone Joint Surg Am* 1985 ; 67 : 1405-18.
6. **Moon MS, Moon JL, Kim SS, Moon YW.** Treatment of tuberculosis of the cervical spine: operative versus nonoperative. *Clin Orthop Relat Res* 2007 ; 460 : 67-77.
7. **Tuli SM.** Results of treatment of spinal tuberculosis by “middle-path” regime. *J Bone Joint Surg [Br]* 1975 ; 57-B : 13-23.
8. **Tuli SM.** Treatment of neurological complications in tuberculosis of the spine. *J Bone Joint Surg Br* 1969 ; 51 : 680-692.
9. **Tuli SM.** Tuberculosis of the skeletal system. Third ed. New Delhi, India : Jaypee Brothers Medical Publishers, 2004.
10. **Tuli SM, Kumar K, Sen PC.** Penetration of antitubercular drugs in clinical osteoarticular tubercular lesions. *Acta Orthop Scand* 1977 ; 48 : 362-8.
11. **Vrtovec T, Pernus F, Likar B.** A review of methods for quantitative evaluation of spinal curvature. *Eur Spine J* 2009 ; 18 (5) : 593-607.