

Tuberculosis of the cervical spine

M. Lukhele

Tuberculosis of the cervical spine is rare, comprising 3 - 5% of cases of tuberculosis of the spine. Eight patients with tuberculosis of the cervical spine seen during 1989 - 1992 were reviewed. They all presented with neck pain. The 4 children presented with a kyphotic deformity. In all the children the disease was extensive, with a large prevertebral abscess formation, while in the adults it was localised to one or two motion segments. Cord compression was present in 4 of the 8 patients. All the patients were treated with antituberculosis drugs and 6 underwent surgery. There was full neurological recovery in all patients. The kyphosis was improved though not fully corrected. There was a problem in stabilisation of severe involvement of the body and dens of C2. Surgery seems to play a major role in the treatment of tuberculosis of the cervical spine.

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Tuberculosis of the spine is responsible for 60% of bone tuberculosis.^{1,2} Tuberculosis of the cervical spine is rare, however, accounting for 3 - 5% of cases of spinal tuberculosis.^{3,4} Most reports are case presentations. The largest series was that reported by Hsu and Leong,³ where 46 patients were seen over 25 years. The aim of this paper is to share our experience of 8 patients treated during 1989 - 1992, and to review and compare our cases with those reported in the literature.

Method

A retrospective study of patients seen at our hospital from October 1989 to December 1992 was undertaken. During that period 180 new patients with tuberculosis of the spine were seen and of these, 8 (4 children and 4 adults) had involvement of the cervical spine (Table I).

All the patients presented with neck pain of 2 - 6 weeks' duration. Neck pain and limitation of movement were the chief complaints in 4 patients.

Progressive weakness of both upper and lower limbs was the major reason for presentation in another 4 patients (1 adult and 3 children). They were all bed-ridden at presentation with loss of sphincter control. All 4 children presented with severe kyphotic deformity of the neck. Only 1 patient had associated cervical lymphadenopathy. None of the patients presented with dysphagia or respiratory obstruction.

All patients had a raised erythrocyte sedimentation rate and 7 had a reverse in the neutrophil-lymphocyte ratio. The purified protein derivative skin test was positive in all the children.

Plain radiographs showed classic prevertebral soft-tissue swelling in all the patients (Fig. 1). The upper cervical spine was involved in 2 patients only (Table I). One patient had Lifeso¹ stage I (Table II) involvement of the axis (C2) and the other had Lifeso stage III involvement of C2. Both patients were neurologically intact.

Table I. Cervical spine tuberculosis patients seen between 1989 and 1992

	Age	Sex	Presentation	Levels	Treatment
1.	56	F	Neck pain Limitation of movement	C2, stage I	Conservative
2.	54	M	Neck pain	C2, stage III	Surgery
3.	40	F	Tetraparesis Neck pain Limitation of movement	C5, 6	Surgery
4.	48	M	Neck pain	C5, 6	Surgery
5.	10	M	Tetraparesis Lymphadenopathy Neck pain Limitation of movement Kyphosis	C4, 5, 6, 7	Conservative
6.	7	F	Tetraparesis Neck pain Limitation of movement Kyphosis	C4, 5, 6	Surgery
7.	10	F	Tetraparesis Neck pain Limitation of movement Kyphosis	C4, 5, 6	Surgery
8.	8	F	Neck pain Limitation of movement Kyphosis	C4, 5, 6	Surgery

Table II. Staging of atlanto-axial tuberculosis⁵

Stage I
Ligaments intact
Minimal bone destruction
No anterior displacement of C1, C2
Possible proximal translocation of the dens
Stage II
Ligamentous disruption
Anterior displacement of C1, C2
Minimal bone destruction
Possible proximal translocation of the dens
Stage III
Ligamentous disruption
Marked bone destruction
Complete obliteration of anterior arch of C1

Ga-Rankuwa Hospital and Orthopaedic Spine Unit, Medical University of Southern Africa, PO Medunsa, 0204

M. Lukhele, M.B. CH.B. M.MED. (ORTH.), F.C.S. (S.A.) (ORTH.)

Six patients had involvement of the lower cervical spine. Lesions in the adult patients were localised to one motion segment (Fig. 2), making it difficult to differentiate them from malignancies. In the children, however, there was gross destruction of the vertebral bodies with extensive prevertebral soft-tissue swelling and severe kyphosis (Fig. 1).

None of our patients had involvement of other areas of the spine other than the cervical spine, and none had pulmonary tuberculosis.

All patients were treated medically with rifampicin 10 mg/kg, isoniazid 5 mg/kg and pyrazinamide 20 mg/kg.

Six patients underwent surgery (Table I). These included 1 patient who had Lifeso stage III involvement of C2 where transoral debridement and a staged atlanto-axial Gallie type fusion were performed. The other 5 patients had an anterior open biopsy, debridement and strut grafts over the vertebrae involved. A cervical titanium hollow-screw plate system was used to stabilise the spine in 1 of the 5 patients (Fig. 3), and a halo-ring traction followed by a sterno-occipitomandibular immobilisation (SOMI) was used for the other 4 patients.

Two patients were treated conservatively (Table I). One was a patient with Lifeso stage I involvement of the axis who

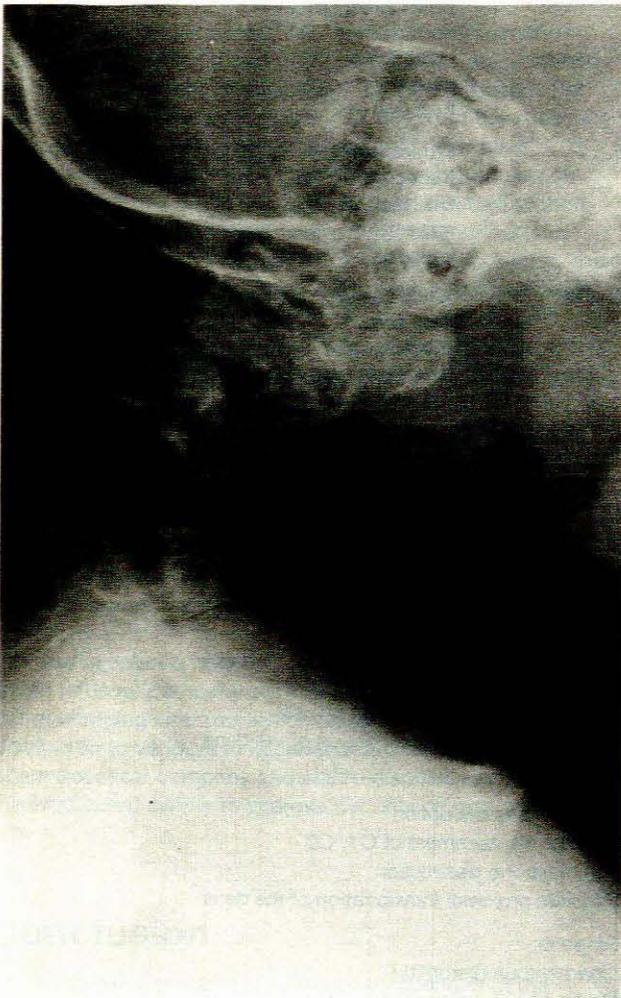


Fig. 1. Case 6. Radiograph showing severe prevertebral soft-tissue swelling. Note that C4, C5 and C6 are involved.



Fig. 2. Case 4. Involvement of C5 and C6. In adults few motion segments are involved.

was treated with a SOMI brace. The other patient had a positive lymph node biopsy and tetraparesis but was too ill to undergo surgery. He had halo traction for 6 weeks followed by immobilisation in a Minerva jacket for a further 6 weeks.

Results

The follow-up ranged from 6 months to 3 years. Five of the 6 operated patients (other than only biopsy) experienced pain relief within 7 days. In the 2 non-operated patients the pain persisted for 2 weeks. All the patients who presented with cord compression had achieved full neurological recovery by 4 weeks post-operation. The kyphosis in the operated patients was significantly improved from an average of 50° to 15° but none had full correction to normal cervical lordosis. The patient who only had lymph node biopsy and traction had a final kyphosis of 30° and full neurological recovery at 12 weeks.

The patient with Lifeso stage III disease went on to subluc further and the spine finally fused, with an atlanto-dens interval of 7 mm despite the good reduction initially obtained in theatre and 12 weeks' immobilisation in a Minerva jacket (Fig. 4).

Discussion

Tuberculosis is still a major problem in developing countries. Only a small percentage of patients are diagnosed and treated. The increasing incidence of HIV infection makes the



Fig. 3. Case 4. Radiograph after operation, stabilised with cervical titanium plate and screw.

situation worse and the incidence of tuberculosis is likely to increase, even in the First World. Tuberculosis of the cervical spine is, however, rare.²⁻⁵ Its pathogenesis is by haematogenous spread from a primary focus or other secondary sites to the cervical spine.^{1,6}

According to the literature the commonest manifestation of tuberculosis of the cervical spine is neck pain associated with limitation of neck movement.³ Our experience supports these findings. Kyphotic deformity was also a major manifestation in another 4 patients. There are many other unusual manifestations mentioned in the literature, such as respiratory obstruction, dysphagia, trismus and twelfth-nerve palsy.⁷ These should be borne in mind by clinicians, and cervical spine radiographs should be taken to exclude tuberculosis of this area.

Four of our 8 patients had spinal cord compression. This is similar to the findings of Hsu and Leong³ who reported a 42.5% incidence.

Kyphosis in tuberculosis of the cervical spine tends to be more severe, as the only natural support is the point at which the chin touches the sternum. This kyphosis together with atlanto-axial subluxation in C1/C2 involvement increases the chances of neurological involvement in tuberculosis of the cervical spine.

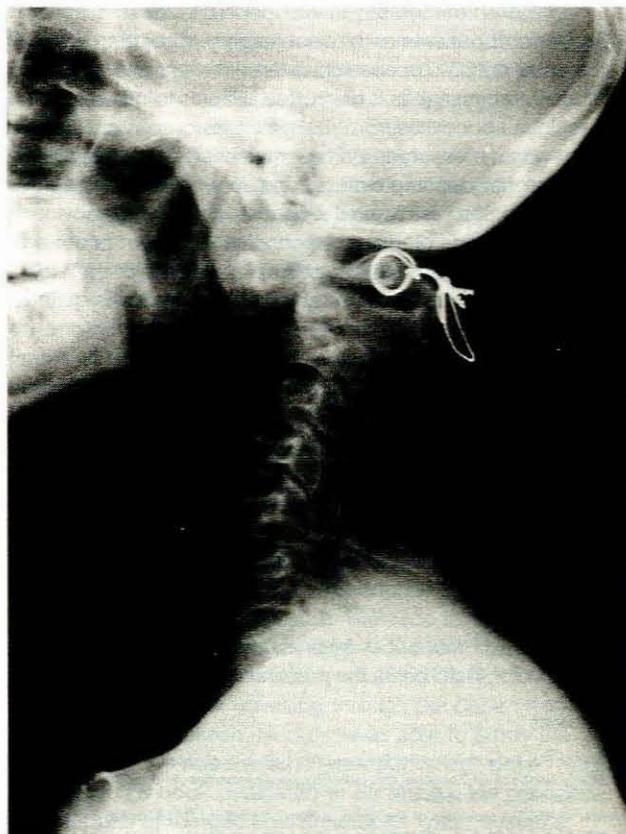


Fig. 4. Case 2. Radiograph showing C1 and C2 fused in a subluxed position 6 months after operation.

In children, tuberculosis of the cervical spine was more destructive, with massive pus formation. This is in keeping with the literature, and for this reason Hsu and Leong³ advocated that tuberculosis of the cervical spine be subdivided into an adult type and a children's type, the cut-off age being 10 years.

Tuberculosis of the upper cervical spine (C1/C2) still presents a management problem. Several suggestions have been made, ranging from antituberculosis drugs only to debridement followed by traction and debridement with bone graft.^{4,5,8} Those who advocated debridement and bone graft, however, only had 4 patients in whom this was done; in 2 of those graft slippage occurred.⁵

The most helpful guide to the management of tuberculosis of C1/C2 was given by Lifeso.⁴ He classified tuberculosis of C1/C2 into 3 stages (Table II).

Stage I has minimal ligamentous or bone destruction and no significant displacement of C1 on to C2; the suggested treatment is transoral biopsy and decompression followed by orthosis.

Stage II has ligamentous disruption and minimal bone destruction but anterior displacement of C1 on to C2; the suggested treatment is transoral biopsy and decompression, reduction by halo traction followed by a posterior C1/C2 fusion.

Stage III has marked ligamentous and bone destruction with displacement of C1 on to C2; the suggested treatment here is transoral biopsy and decompression, and reduction by halotraction followed by fusion of the occiput to C2 or

C3. Computed tomography is indispensable for staging.

Six of our 8 patients underwent surgery other than biopsy. In the adult patients open-biopsy debridement and bone-graft were necessary as it was often difficult to differentiate tuberculous spondylitis from malignant lesions. In children, surgery was necessary to correct the severe kyphosis and achieve proper decompression in those who had cord compression. If a histological diagnosis can be made from a lymph node biopsy, conservative treatment of antituberculosis drugs with halo traction to correct the kyphosis is still another option. Neurological recovery will still occur as it did in 1 of our patients although it took longer and the nursing care of a tetraparetic patient is labour-intensive, requiring vigilant care of skin, urinary tract system and joint movements. The other disadvantage of conservative treatment is that the kyphosis may not be significantly corrected. This conservative treatment, however, is a reasonable option where there is involvement of too many motion segments which may require too long a graft, and in areas where surgical facilities and skills may not be available.

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