DOES SPINAL SURGERY FOR SPINAL TUBERCULOSIS DURING ACTIVE INFECTION PREDISPOSE TO POST OPERATIVE SURGICAL SITE INFECTION?: EXPERIENCE FROM KENYATTA NATIONAL HOSPITAL

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ABSTRACT

Background: Spinal Tuberculosis (TB) is the most common form of skeletal TB. Its incidence has seen an increase over the past 3 decades due to the AIDS epidemic. Absolute non-operative treatment was offered in pre antibiotic era. Surgery has become an integral component in the management of spinal TB in current practice. The rate of SSI varies from 2% to 20% for all surgical spinal procedures.
Objective: Does spinal surgery for spinal tuberculosis during active infection predispose to post operative Surgical Site Infection (SSI). The aim of this study was to note the incidence of infection in patients undergoing spinal surgery for tuberculosis.
Methods: All patients who had complete medical records and had surgery for spinal tuberculosis were recruited into the study. The study period was from 2005 to 2015. Relevant data was collected and appropriately analyzed.
Results: For all the patients, chemotherapy was started immediately after tuberculosis of the spine was diagnosed. Five patients had involvement of the lumbar region, one patient with involvement of the cervical region and the rest had involvement of the thoracic region. One patient had 3 vertebrae involved, 3 patients had one vertebrae involved and 14 patients had 2 vertebrae involved. Out of the 18 patients, 12 showed improvement after surgery, 4 patients had no difference after surgery and 2 patients worsened after surgery. Two patients showed improvement after 1 week; 3 patients after 2 weeks; 3 patients after 1 month; 4 patients after 2 months. Of the patients who worsened; 1 patient worsened by 1 grade while another worsened by 2 grades. No patient had any SSI. This was irrespective of whether they had instrumented spine surgery or not.
Conclusion: This study shows that spinal surgery for spinal tuberculosis does not lead to increased surgical site infection even in the presence of active tuberculosis infection. Addition of spinal instrumentation to the surgical strategy does not predispose to increased infection rate. Larger studies need to be carried out to validate this data.

Key words: Spinal tuberculosis, Spinal surgery, Surgical site infections

INTRODUCTION

Spinal Tuberculosis (TB) was first documented in 5000 year old Egyptian mummies. In 1779, the first paper on spinal tuberculosis was written by Percival Pott (1). The classic destruction of the disk space and the adjacent vertebral bodies, destruction of other spinal elements, severe and progressive kyphosis subsequently became known as Pott's disease. Currently, the term 'Pott's disease/ Pott's spine' describes tuberculous infection of the spine and the term 'Pott's paraplegia' describes paraplegia resulting from tuberculosis of the spine. Spinal TB is the most common form of skeletal TB. Any part of the spine can be affected but the thoracolumbar junction seems to be the most affected (2). Cervical spine tuberculosis (TB) is uncommon, accounting for 3% to 5% of spinal TB (3).

Absolute non-operative treatment was offered in pre antibiotic era. With the advent of effective combination chemotherapy in the early 1950s, the mortality rate among patients with spinal tuberculosis decreased to approximately 1% to 3%. The concept of radical debridement and anterior fusion was propelled by the paper published by Hodgson and Stock in 1960 (2). Since the last decade great advances in terms of operative options drastically changed the scenario in management of spine TB and indications for surgery have been extended for early resolution of disease, quicker rehabilitation and prevention of

late complications (4). Surgery in spinal tuberculosis is indicated for, neural complications, and prevention of kyphosis (5). Instrumentation has become an integral component in the management of various spinal pathologies. The rate of infection varies from 2% to 20% for all instrumented spinal procedures (6). Anterior debridement, decompression, bone grafting, and instrumentation are safe and effective methods in the surgical management of tuberculosis (6). There is however concern on whether spinal surgery on a patient who already has a pre-existing infection (TB) would lead to a higher rate of post-operative surgical site infection (8). This is especially the case when patients undergo instrumented spine surgery (8). The aim of this study was to determine if surgery on spinal TB patients with active infection leads to a higher rate of SSI.

MATERIALS AND METHODS

This was a retrospective study of patients who had spinal TB and underwent spinal surgery at the Kenyatta National Hospital between 2005 to 2015. The following were noted:

- Age
- Gender
- Time of diagnosis
- Spinal level
- Extra spinal TB
- Preop frankel grade
- Type of surgery
- Duration of surgery
- Chemotherapy
- Post op frankel grade
- ESR/CRP
- Presence or absence of SSI

There were 18 patients in total whose records were available: 10 male and 8 female. The average age of the patients was 35 years (ranging from 17 years to 70 years). All patients were telephoned and invited to a free outpatient clinic to complete data forms. Definitions of SSI was done as per CDC guidelines of 1992 (9).

RESULTS

The duration between the time of diagnosis of spinal TB to the time the patient was operated was less than a week for 6 patients, 2 weeks for 4 patients, 1 month for 6 patients and 2 months for 2 patients. The duration of surgery was 5 hours for 2 patients, 4 hours for 2 patients, 3 hours for 6 patients and between 1-2 hours for 8 patients.

For all the patients, chemotherapy was started immediately after tuberculosis of the spine was diagnosed. A combination of isoniazid, rifampicin, ethambutol and pyrazinamide was used for

Table 1
Results table

Age (years)	Gender	Spinal level	Anti TB	Surgery	Infection post op
38	M	T6-T7	Yes	Decompression	No
40	F	T5-T6	Yes	Decompression	No
17	M	T5-T6	Yes	Decompression and strut grafting	No
50	F	L5	Yes	Foraminotomy release	No
70	M	T8-T9	Yes	Decompression and CAGE	No
32	F	T6-T7	Yes	Decompression plus bone grafting	No
23	M	T8-T9	Yes	Decompression and bone grafting	No
19	F	T9-T10	Yes	Decompression and bone grafting	No
29	F	C5-C6	Yes	Anterior decompression and bone fusion	No
45	M	L4-I5	Yes	Decompression and pedicle screw placement	No
55	F	L4-S1	Yes	Laminectomy	No
23	M	T5-T6	Yes	Decompression and bone grafting	No
30	M	T2-T3	Yes	Decompression and CAGE	No
25	M	L3	Yes	Posterior instrumentation, CAGE, L2 corpectomy	No
34	F	T12	Yes	Decompression and bone grafting	No
40	M	T12-L1	Yes	Decompression and bone grafting	No
36	M	L2-L3	Yes	Decompression, L2 and L3 corpectomy and bone grafting	No
38	F	T12-L1	Yes	Anterior decompression and bone grafting	No

the first two months followed by isoniazid and rifampicin for another nine months. Three patients had concurrent extra spinal TB.

Five patients had involvement of lumbar region, one patient with involvement of cervical region and the rest had involvement of the thoracic region. 1 patient had 3 vertebrae involved, 3 patients had one vertebrae involved and 14 patients had 2 vertebrae involved.

Out of the 18 patients 12 showed improvement, 4 patients had no difference after surgery and 2 patients worsened after surgery. Of the 12 patients who improved: 4 patients improved by 5 grades; 1 patient improved by 4 grades; 2 patients improved by 3 grades; 4 patients by 2 grades; 1 patient by 1 grade. Two patients showed improvement after 1 week; 3 patients after 2 weeks; 3 patients after 1 month; 4 patients after 2 months. Of the patients who worsened; 1 patient worsened by 1 grade while another one worsened by 2 grades. The rate of post-operative surgical site infection (superficial or deep) was 0; irrespective of whether instrumentation was used or not.

DISCUSSION

A study done by Zhang *et al* (9) reported that debridement, interbody fusion with TMCs Titanium Mesh Cage (TMCs), and combined posterior instrumentation can be an effective and safe method for treating thoracic and lumbar spinal TB via posterior-only approach. Implantation of instrumentation in the setting of a spinal infection has been controversial. Lee (8) affirmed that TMCs have gained acceptance in reconstructive surgery performed in the setting of concomitant infection.

The adherence and biofilm formation of *M. tuberculosis* were evaluated on various spinal implant surfaces; *M. tuberculosis* was rarely adhered to metal surfaces and showed scanty biofilm formation, which provides the basis for successful implantation and instrumentation in TB lesions (10). In our study, none of the operated patients had any post operative surgical site infection.

CONCLUSION

This study shows that spinal surgery for spinal tuberculosis does not lead to increased post-operative surgical site infection even in the presence of active tuberculosis infection. However larger studies need to be done to validate this further.

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