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Spinal Stabilization for early mobilization in Pott's spine.

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ABSTRACT

Pott's spine corresponds to fifty percent cases of skeletal tuberculosis. There is consensus for instrumentation and mobilization of patients with neurological deficit, whereas there is paucity of literature for cases without neurological deficit, while adhering to middle path regime. Severe pain because of instability make the patient's life miserable for mobilization and nursing care, more so in a nuclear family undergoing in-house treatment. Braces are also not sufficient to address this problem. Today spinal instrumentation is routine surgery in trauma, which can be extended for this category of patients to provide stability for early mobility with the principle of "movement is life and life is movement". In this study 11 cases of Pott's spine without neurological deficit were included. Severe pain restricted their mobility, even after continuing 3 to 4 weeks of anti-tubercular chemotherapy and were subjected for in-situ pedicle screw fixation. Pre and post-operative pain assessed by VAS score. Post operative stability provided feeling of wellbeing and confidence which helped early mobilization and better nursing care. Mean VAS scores were in pre-operative period = 8.45, at the end of first week post-operative period = 3.36, at three months = 1.45 and at six months = 1. Mean time of walking with orthosis was 3.27 weeks. Spinal instrumentation in Pott's spine with severe pain provide effective relief and better quality of life in terms of nursing care and early mobilization, and essentially helps in prevention of deformity.

Keywords: Pott's spine; Spinal instrumentation for stabilization; Early mobilization.

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INTRODUCTION

Pott's spine is the most common form of musculoskeletal tuberculosis. It corresponds to nearly fifty percent of cases of skeletal tuberculosis. The development of effective anti tuberculosis drugs has revolutionized the treatment of patients with spinal tuberculosis since most patients do not have extensive bony destruction and sequestration can now be successfully treated conservatively with chemotherapy, external bracing, and prolonged rest [1,2,3]. However some of the cases on conservative treatment without neurological deficit may have severe pain which can restrict their mobility in bed, required for basic nursing care. Also, there is paucity of articles on guidelines for mobilization of patients with Pott's spine on conservative management. With the advancement of spinal instrumentation where posterior stabilization procedures are commonly done in trauma patients with spinal instability, same principles can also be applied for such cases of symptomatic unstable Pott's spine as instrumentation in Pott's spine is quite safe, unlike other infections.

MATERIALS AND METHOD

This study was conducted in dept. of orthopaedics, Assam medical college and hospital from 2011 to 2014 with the aim to provide spinal stability with instrumentation for early mobilization of patients with Pott's spine. 11 cases of Pott's spine were included in the study with the inclusion criteria of: 1) no neurological deficit, 2) presence of severe pain restricting mobility, 3) completed a minimum of 3 to 4 weeks of anti tubercular chemotherapy and 4) patients who gave consent for surgery. Using posterior open approach in-situ pedicle screw and rod fixation was done. Pain was assessed using VAS score during pre and post-operative period (at the end of 1st week, 3 months and 6 months). Post operatively patients were continued with anti tubercular chemotherapy under DOTs. Patients were started with back extension exercises 5 to 10 minutes 3 to 4 times a day. Early ambulation was encouraged with the support of Taylor's brace during the post operative period.

RESULTS AND DISCUSSION

7 cases were female and 4 were male. Mean age was 37.36 years with a range from 21 to 57 years. Regional distribution was 4 in thoracic, 3 in thoraco-lumbar and 4 in lumbar spine. Mean operative time was 72.73 minutes with a range of 53 to 92 minutes. Significant improvement of pain was noted during the post-operative period. Mean VAS scores were in pre-operative period = 8.45, at the end of first week post-operative period = 3.36, at three months = 1.45 and at six months = 1. There was a feeling of wellbeing and confidence among the patients in the post-operative period as stabilization drastically reduced pain and helped movement. Nursing care and maintenance of personal hygiene became easy. Mean time of walking with orthosis was 3.27 weeks with a range of 2 to 6 weeks. Taylor's brace was

continued up to 3 months in 6 cases, 6 months in 3 cases and beyond 6 months of post operative period in 2 cases.

Table 1: Results of individual cases

Case	Age (years)	Sex†	Site††	Operation time (minutes)	Time to walk (weeks)	Duration of orthosis (months)
1	34	M	L	78	2	3
2	52	F	DL	53	4	6
3	28	F	L	85	2	3
4	39	F	D	70	2	3
5	24	M	D	72	4	6
6	45	F	DL	68	2	3
7	31	M	L	80	4	6
8	48	F	DL	65	6	>6
9	32	F	D	67	2	3
10	21	F	L	70	2	3
11	57	M	D	92	6	>6

† M = Male; F = Female

†† D = Dorsal; DL = Dorso-lumbar; L = Lumbar

Table 2: VAS score in individual case

Case	Pre-op.	1st week post-op.	3 months post-op.	6 months post-op.
1	8	2	1	1
2	9	5	2	1
3	8	3	O	0
4	8	3	1	1
5	8	4	2	1
6	9	2	1	1
7	8	4	2	1
8	10	5	3	2
9	8	2	1	0
10	8	3	0	0
11	9	4	3	3
Mean	**8.45**	**3.36**	**1.45**	**1**

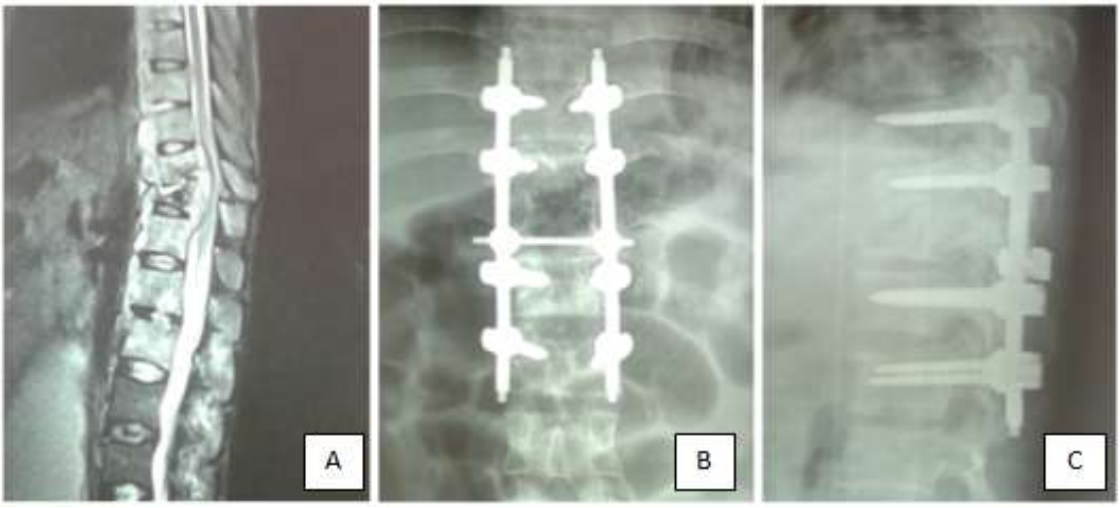

Figure 1: **A- MRI showing Tuberculous involvement of D_9 to L_2 vertebrae with compression collapse of $D_{10, 11}$ with multiple abscess. B and C- Antero-posterior and lateral view respectively, of dorso-lumbar spine with long segment pedicle screw extending from D_9 to L_1.**

Tuberculosis remains the most common cause of death from infectious disease world-wide[4]. World Health Organization estimates that approximately one third of the world's population is infected with Mycobacterium Tuberculosis and the disease is thought to cause at least 3 million deaths each year, and the annual number of new cases is now nearly 8 million[5]. Tuberculosis (TB) involves both pulmonary and extra pulmonary sites. The vertebral column is the most common site of osseous involvement, comprising in most series about 50% of cases of skeletal TB[6]. The first documented spinal tuberculosis (TB) cases date back to 5,000-year-old Egyptian mummies and the first modern case of spinal TB was described in 1779 by Percival Pott[7]. Although the thoraco-lumbar junction seems to be the most common site of the spinal column involvement in spinal TB, any part of the spine can be affected[8,9]. Advanced imaging techniques such as magnetic resonance imaging (MRI) make the early diagnosis of spinal TB easier and a considerable number of patients with spinal TB are diagnosed earlier and treated more effectively before significant neurological deficits develop. However, patients can still present late with considerable spine deformity[7]. The treatment of Pott's spine is essentially conservative and a majority of patients can be successfully managed on anti-tuberculous therapy (ATT) alone[10].

Absolute nonoperative treatment was offered in preantibiotic era. Dabsen (1951) reported 48% of paraplegia improved neurologically. Seddon, Griffith and Roaf (1955) reported 55% neurological recovery rate with the advent of modern chemotherapy[11]. Hodgson (1960) advocated radical debridement and removal of whole vertebra/vertebrae which has increased incidence of mortality and morbidity[12]. Both methodologies of management were extreme. In

1970s, middle path regime was followed by surgeons in India[13]. Here one of the indication of surgery is symptomatic mechanical instability after healing[14]. Symptomatic mechanical instability at initial period of treatment is not addressed and proper guidelines regarding mobilization of such patients are not provided and conservative management of these patients present with following challenges:

1. Providing nursing care in the setting of nuclear family.
2. Non availability of proper orthosis and patient's long term compliance to available orthosis.
3. Affordability of repeated CT scan or MRI to evaluate spinal stability.
4. Prolong time for fusion in tuberculosis unlike pyogenic infection, where destruction of inter- vertebral disc is hastened.
5. Prevalence of MDR TB and emergence of XDR TB prolongs the duration of treatment and hence the immobilization.
6. Increase number of doses of analgesic intake, adding to the toxicity of anti tubercular drugs.

In our study we have included this group of patient with severe pain with restricted bedside mobility (mechanical instability) on anti tubercular chemotherapy and opted for posterior instrumentation in the form of pedicle screw and rod fixation. AM Mukhtar (2003)[15], Mohamed Lotfy (2007)[16], Pandey (2011)[17], T Zin-Naing (2014)[18], have mentioned severe back pain not improving with conservative treatment as an indication for surgery. A K Jain (2016)[19] mentioned spinal instability as an indication for instrumentation.

Although infected, instrumentation posed no additional hazard in terms of tuberculous discitis. Oga et al. reported that M. tuberculosis has low adhesion capability and forms only a few microcolonies surrounded by a biofilm. Also the danger of implanting a foreign material into a TB focus is found to be much smaller than that of a pyogenic focus without the formation of biofilms on the metal[20]. It can possibly be explained by the different pathophysiology of the two types of infections in that pyogenic processes destroy by proteolytic enzymes, whereas TB destroys through a delayed cellular hypersensitivity response[21]. This difference has enabled a more liberal use of spinal implants in achieving the goal of deformity control and stabilization in spinal tuberculosis[22,23].

The goals of treatment in spinal tuberculosis are to cure the disease, to prevent development of paraplegia and kyphotic deformity, to correct existing deformity and neurological deficit, to allow early ambulation and finally to return the patient back to their daily life[24,25,26,27,28]. In our study excellent pain relief was achieved during early post operative period as shown by significant improvement in VAS score. Patients could be easily mobilised for basic nursing

care and there was reduced number of analgesic intake. Early walking was allowed with support of spinal immobilization orthosis during the post operative period and then without it. After providing stability repeated CT scan or MRI was not required for evaluation. Spinal stabilization ensure reduced incidence of neurological deficit and deformity. Moreover pedicle screw fixation is relatively easy surgery when compared with Debridement/Decompression with Fusion done in cases of Pott's spine, in terms of surgical expertise, duration of surgery and type of critical care and anaesthetic setup.

CONCLUSION

Spinal instrumentation can be done to stabilize symptomatic unstable cases of Pott's spine, similar to cases of traumatic spinal instability. Instrumentation is quite safe in Pott's spine unlike other infections. It provides effective pain relief, thereby providing better quality of life in terms of nursing care and early mobility to the patients.

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