

## Surgical Outcomes of Spondylodiscitis by Fixation and Debridement: A Study in a Tertiary Care Hospital in Bangladesh

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### Abstract

### Original Research Article

**Background:** Spondylodiscitis is considered as one of the most disturbing challenges that face neurosurgeons due to variety of management strategies. Any delay in its diagnosis or management may cause serious long-term morbidity or even lead to mortality. But in Bangladesh we have very limited research-based data regarding the surgical outcomes of spondylodiscitis by fixation and debridement. **Aim of the study:** The aim of this study was to assess the surgical outcomes of spondylodiscitis by fixation and debridement. **Methods:** This prospective observational study was conducted in Khwaja Yunus Ali Medical College and Hospital, Sirajgonj, Bangladesh during the period from November 2020 to November 2022. In total 37 patients with spontaneous Cervical, thoracic, lumbar & Lumbosacral spondylodiscitis indicated for surgical intervention were enrolled in this study as study subjects. Proper written consents were taken from all the participants before data collection. All data were processed, analyzed and disseminated by using MS Excel and SPSS version 23 program as per necessity. **Results:** In this study, the mean  $\pm$ SD VAS score at 6-month follow-up stage was found as  $2.04 \pm 0.46$  which was found as  $3.82 \pm 0.79$  early post operatively and this change (Decreasing) was statistically significant where the P value was  $< 0.0001$ . In assessing the final clinical outcome as per MacNab's outcome criteria we observed that, more than one-third of our patients (35%) got 'Excellent' and 19% got 'Good' results. Besides these, 16% patients got 'Fair' and the rest 30% got 'Poor' results. **Conclusion:** Surgical management of spondylodiscitis by fixation and debridement may be considered as an effective and safe method. Prompt recovery, excellent pain control and satisfactory success rates are some good features of this procedure.

**Keywords:** Surgical outcomes, Spondylodiscitis, Fixation, Debridement, MacNab's outcome criteria.

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## 1. INTRODUCTION

Spondylodiscitis is considered as one of the most disturbing challenges which face neurosurgeons due to variety of management strategies. Spinal infections encompass several entities which have characteristic presentations and clinical courses. These may often be pyogenic but can also be granulomatous or even parasitic and include septic discitis, spondylodiscitis, vertebral osteomyelitis as well as epidural abscess [1]. Recent studies suggest that, about 95% of pyogenic spinal infections involve the vertebral body with 5% involving the posterior elements of spine [2, 3]. Spinal tuberculosis is the most serious event of musculoskeletal tuberculosis which comprises up to

50% of all affected patients. The incidence of neurologic involvement represents from 10% to 47% of those with spinal tuberculosis [4, 5]. On the other hand, hematogenous pyogenic spondylodiscitis affects preferentially the lumbar spine, followed by the cervical spine, thoracic spine, and rarely a multifocal infection [6]. Diagnosis may be difficult and is often delayed or even missed due to the rarity of such disease, the insidious onset of symptoms as well as the high frequency of LBP (Low back pain) [7]. The standard treatment method for pyogenic osteomyelitis or discitis is a course of intravenous antibiotics followed by a long course of oral antibiotics with external spinal immobilization [8, 9]. On the other hand, in presence of

progressive neurologic deficit or spinal instability, kyphotic deformity or in the absence of response to medical therapy, surgical debridement is recommended. [10]. By some surgeons, debridement without fusion is advocated. However, large multilevel laminectomies without instrumentation may result in severe instability as well as provoke neurological deficit [11]. The general management of bony infections in general includes drainage or debridement of all pus, intravenous antibiotics and possibly removal/avoidance of hardware, to sidestep bacterial colonization [12]. However, another study reported patients with spinal infections who were managed by spinal stabilization while in acute stage and had good outcomes [13]. The main criticism for placement of metallic implants carries some possibility of bacterial colonization and the formation of a biofilm that blocks the penetration of antimicrobials [14].

## 2. METHODOLOGY

This prospective observational study was conducted in Khwaja Yunus Ali Medical College and Hospital, Bangladesh during the period from November 2020 to November 2022. In total 37 patients with spontaneous Cervical, thoracic, lumbar & Lumbo-sacral spondylodiscitis indicated for surgical intervention were enrolled in this study as study subjects. Proper written consents were taken from all the participants before data collection. The whole intervention was conducted in accordance with the principles of human research specified in the Helsinki Declaration [15] and executed in compliance with currently applicable regulations and the provisions of the General Data Protection Regulation (GDPR) [16]. As per the inclusion criteria of this study, only patients with spontaneous cervical, thoracic or lumbar spondylodiscitis indicated for surgical intervention regardless of age and gender were included. On the other hand, according to the exclusion criteria of this study, severe patients of ICU were excluded. All the demographic and clinical data of the participants were recorded. A predesigned questioner was used in data collection. Final clinical outcomes were assessed by MacNab's outcome criteria [17]. Final outcomes were compared at the 6 months' follow up with baseline status. All data were processed, analyzed and disseminated by using MS Excel and SPSS version 23.0 program as per necessity.

## 3. RESULT

In this study, among total 37 participants, 68% were male whereas the rest 32% were female (Figure 1). So male participants were dominating in number and the male-female ratio was 2:1. The mean  $\pm$ SD age of the participants was  $47.18 \pm 11.42$  years. About one third (32%) of our patients were from 41-50 years' age groups which was noticeable (Table 1). In analyzing the medical history of the participants, we observed that, 22%, 16% and 11% patient were with the history of HTN, DM and CKD respectively which was noticeable

(Table 2). In motor power assessment grade 5 was found among 73% cases, in sensory assessment, radiculopathy was found among 46% and in autonomic assessment continent status was found among 86% cases which were the most frequent events among our participants (Table 3). The mean  $\pm$ SD baseline VAS score of our participants was found as  $7.21 \pm 1.24$ . In this study, we observed that, in majority of the respondents, as causative microorganism, gram negative bacteria were involved in majority of the cases which was found in 38% cases. Besides this, in 19% 16%, 11%, 8%, 5% and 3% cases Mycobacterium, Staphylococcus aureus, Methicillin-resistant, Escherichia coli, Pseudomonas and Candida albicans were involved respectively (Table 4). In this study, in motor power assessment at baseline, 'not improved', 'no sensory affection' and 'improved' status was in 5%, 19% and 76% cases respectively which was found at 6-month post-operatively in 3%, 35% and 62% respectively. In sensory assessment at baseline, 'not improved', 'no sensory affection' and 'improved' status was in 8%, 11% and 81% cases respectively which was found at 6-month post-operatively in 3%, 5% and 92% respectively. On the other hand, in autonomic assessment, majority of the cases (92%) were with continent status (Table 5). In this study, the mean  $\pm$ SD VAS score at 6-month follow-up stage was found as  $2.04 \pm 0.46$  which was found as  $3.82 \pm 0.79$  early post operatively and this change (Decreasing) was statistically significant where the P value was  $<0.0001$  (Table: 6). In assessing the final clinical outcome as per MacNab's outcome criteria we observed that, more than one-third of our patients (35%) got 'Excellent' and 19% got 'Good' results. Besides these, 16% patients got 'Fair' and the rest 30% got 'Poor' results (Table 7).

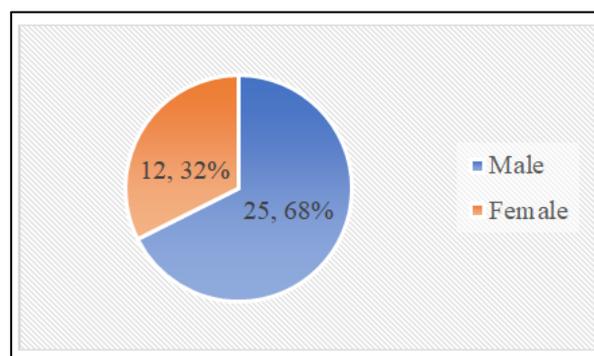


Figure 1: Distribution of the respondents by gender (N=37)

Table 1: Distribution of the respondents by age, (N=37)

Age (Year)	n	%
20-30	4	11%
31-40	9	24%
41-50	12	32%
51-60	7	19%
>60	5	14%

**Table 2: Distribution of the respondents by medical history, (N=37)**

History	n	%
HTN	8	22%
DM	6	16%
CKD	4	11%
Prostatic	3	8%
Post-COVID-19	1	3%

**Table 3: Distribution of the respondents by different preoperative clinical findings, (N=37)**

Preoperative examination	n	%
<b>Motor power assessment</b>		
Grade 0	2	5%
Grade 3	3	8%
Grade 4	5	14%
Grade 5	27	73%
<b>Sensory assessment</b>		
Normal	2	5%
Radiculopathy	17	46%
Hypoesthesia	4	11%
Claudication	13	35%
Loss of sensation	1	3%
<b>Autonomic assessment</b>		
Continent	32	86%
Incontinent	5	14%
<b>VAS score</b>		
Mean $\pm$ SD	7.21 $\pm$ 1.24	

**Table 4: Distribution of the respondents by different culture findings, (N=37)**

Causative microorganism	n	%
Negative	14	38%
Mycobacterium Tuberculosis	7	19%
Staphylococcus Aureus	6	16%
Methicillin-Resistant	4	11%
Escherichia coli	3	8%
Pseudomonas	2	5%
Candida Albicans	1	3%

**Table 5: Comparison of clinical examination between early and 6<sup>th</sup> month postoperative, (N=37)**

Variables	Early post		6-month post	
	n	%	n	%
<b>Motor power assessment</b>				
Not improved	2	5%	1	3%
Improved	7	19%	13	35%
FMP	28	76%	23	62%
<b>Sensory assessment</b>				
Not improved	3	8%	1	3%
No sensory affection	4	11%	2	5%
Improved	30	81%	34	92%
<b>Autonomic assessment</b>				
Continent	32	86%	34	92%
Incontinent	2	5%	2	5%
Improved	3	8%	1	3%

**Table 6: Comparison of mean  $\pm$ SD between early and 6<sup>th</sup> month postoperative, (N=37)**

VAS Score	Early post	6-month post	P value
Mean $\pm$ SD	3.82 $\pm$ 0.79	2.04 $\pm$ 0.46	<0.0001

**Table 7: Final clinical outcome as per MacNab's outcome criteria at 6-months' follow-up, (N=37)**

Results	n	%
Excellent	13	35%
Good	7	19%
Fair	6	16%
Poor	11	30%

#### 4. DISCUSSION

The aim of this study was to assess the surgical outcomes of spondylodiscitis by fixation and debridement. In this study, among total 37 participants, 68% were male whereas the rest 32% were female. So male participants were dominating in number and the male-female ratio was 2:1. The mean  $\pm$ SD age of the participants was 47.18 $\pm$ 11.42 years. About one third (32%) of our patients were from 41-50 years' age groups which was noticeable. While in Waheed *et al.*, they treated 44 consecutive patients with a median age of 41.3 years (range 13–65 years), and there was a slight male predominance (59.1%) [18]. In this study, we observed that, in majority of the respondents, as causative microorganism, gram negative bacteria were involved which was found in 38% cases. Besides this, in 19% 16%, 11%, 8%, 5% and 3% cases Mycobacterium tuberculosis, Staphylococcus aureus, Methicillin-resistant, Escherichia coli, Pseudomonas and Candida albicans were involved respectively. Tsai *et al.*, noted that, early surgery with antibiotics treatment had better clinical outcomes than antibiotics treatment alone in patients with pyogenic spondylodiscitis and also having better functional outcomes [19]. Ozalay *et al.*, also described the management of thoracic/lumbar spondylodiscitis with anterior debridement and reconstruction, combined with single-stage posterior instrumentation and grafting [20]. Zhang *et al.*, also reported a single-stage surgical management even for multilevel spondylitis of the upper thoracic region [21]. In this study, the mean  $\pm$ SD VAS score at 6-month follow-up stage was found as 2.04 $\pm$ 0.46 which was found as 3.82 $\pm$ 0.79 early post operatively and this change (Decreasing) was statistically significant where the P value was <0.0001. In assessing the final clinical outcome as per MacNab's outcome criteria we observed that, more than one-third of our patients (35%) got 'Excellent' and 19% got 'Good' results. Besides these, 16% patients got 'Fair' and the rest 30% got 'Poor' results. In Zhang *et al.*, study, 19 cases with preoperative neurologic deficit restored motor power after surgery by 1.3 grades according to Frankel [21]. On the other hand, Griffith-Jones *et al.*, described that, all patients (10 patients) significantly improved in VAS score after surgery [22]. While Tsai *et al.*, reported a greater improvement in

VAS score in decompression alone group than fusion group [23]. All the findings of this study may be helpful in the treatment arena of spondylodiscitis and in further similar studies.

#### Limitation of the study:

This was a single centered study with small sized samples. Moreover, the study was conducted at a very short period of time. So, the findings of this study may not reflect the exact scenario of the whole country.

#### 5. CONCLUSION & RECOMMENDATION

Surgical management of spondylodiscitis by fixation and debridement may be considered as an effective and safe method. Prompt recovery excellent pain control and satisfactory success rates are some good features of this procedures. For getting more specific results, we would like to recommend for conducting similar more studies in several places with larger sized samples.

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