

Research Article

**Assessment of cerebrospinal fluid leakage after cage fixation
with anterior approach in caries spine patients**

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ABSTRACT

Objective: To assess the cerebrospinal fluid leakage after cage fixation with anterior approach in caries spine patients

Materials & Methods: This case series study was conducted at Department of Neurosurgery Surgery Nishtar Hospital Multan from March 2017 to September 2017.

Results: Age range in this study was from 30 to 60 years with mean age of 48.07 ± 8.35 years. Out of 157 patients, 102 (64.97%) were males and 55 (35.03%) were females with male to female ratio of 2:1. CSF leakage was found in 13 (8.28%) patients, whereas no CSF leakage in 144 (91.72%) patients.

Conclusion: This study concludes that there is low frequency of cerebrospinal fluid leakage after cage fixation with anterior approach in caries spine patients.

Keywords: Pott's disease, kyphosis, Spinal Fusion, anterior approach, Cerebrospinal Fluid Leak.

INTRODUCTION

Pott's disease, also known as tuberculous spondylitis, is one of the oldest demonstrated diseases of humankind, having been documented in spinal remains from the Iron Age in Europe and in ancient mummies from Egypt and the Pacific coast of South America.¹ Spinal tuberculosis is the commonest form of skeletal tuberculosis and constitutes about 50 percent of all cases of tuberculosis of bones and joints.² Spinal involvement occurs in less than 1% of patients with TB but the increasing frequency of TB in both developed and developing countries has continued to make spinal TB a health problem.^{3,4} The lower thoracic and upper lumbar vertebrae are the areas of the spine most often affected.⁵ Scientifically, it is called tuberculous spondylitis

and it is most commonly localized in the thoracic portion of the spine.^{5,6}

The symptoms of spinal TB are backache and neck-ache, radicular pain in arms and legs, weakness in both upper and lower limbs and spinal deformity with sphinteric involvement and bedsores.⁷ Early diagnosis and treatment are important in the prevention of long-term neurological sequelae.⁸ Surgical treatment for severe spinal instability or progressive neurological symptoms with evidence of cord compression and deformation is considered.⁹ The goals of surgery in Pott's spine are adequate decompression, adequate debridement, maintenance and reinforcement of stability and correction and prevention of deformity.¹⁰ After

meticulous debridement of all infected tissue, the anterior column defect is then reconstructed with bone graft or titanium cages can also be used to reconstruct these defects.^{11,12} Cerebrospinal fluid leakage associated with cage fixation of caries spine has been reported in 9.1% patients.¹³

Rationale of study was to find out the frequency of cerebrospinal fluid leakage after cage fixation with anterior approach in caries spine patients. To the best of my knowledge, no data was available from this region. This would not only tell us the magnitude of problem locally but would also help us for developing recommendations and guidelines for clinical staff for reducing post-surgical morbidity of caries spine patients.

MATERIALS AND METHODS

This case series study was conducted at Department of Neurosurgery Surgery Nishter Hospital Multan from March 2017 to September 2017.

OPERATIONAL DEFINITIONS:

- 1. Caries Spine:** All patients with proven tuberculosis (ESR>100 mm/h & positive skin tuberculin test) and significant kyphosis (>40° of segmental kyphosis) or instability (anteroposterior or lateral translation; >40° of segmental kyphosis) were deemed as positive.
- 2. Cerebrospinal Fluid Leakage:** any post-surgical leakage of CSF from wound on computed tomography myelogram scan (the leakage of contrast from site of dural tear upto skin surface) was considered as positive and final outcome was noted at the end of one month.

Inclusion Criteria:

- a. All patients with proven tuberculosis and having significant kyphosis (>40° of segmental kyphosis) and instability (anteroposterior translation; >40° of segmental kyphosis)
- b. Patients of age 30-60 years of both genders.

Exclusion Criteria:

- a. Patients with involved spine other than dorsal spine.

- b. Patients not fit for surgery.
- c. Patients not willing for surgery.
- d. Patients not willing to be included in the study.
- e. Already operated patients.

Data collection procedure:

After approval from the ethical review committee, a total of 157 patients admitted to Neurosurgery Department of Nishter Hospital, Multan fulfilling the inclusion/exclusion criteria were selected. Then after taking informed written consent and explaining all the risks or complications of the procedure to the patients, all patients underwent cage fixation of caries spine through anterolateral approach. All patients were given same injectable antibiotics pre-operatively and for 5 days post-operatively. All patients were followed for 1 month for presence or absence of CSF leakage (yes/no) and final outcome was noted. This all data was recorded on a specially designed proforma.

Statistical analysis:

The collected information was analyzed by computer software SPSS version 20. Mean and standard deviation were calculated for quantitative variables i.e. age and duration of disease. Frequency and percentage were calculated for qualitative variables i.e. gender and CSF leakage (yes/no). Effect modifiers like age, gender and duration of disease were controlled through stratification. Post-stratification chi square test was applied to see their effects on outcome and p-value ≤0.05 was considered as significant.

RESULTS

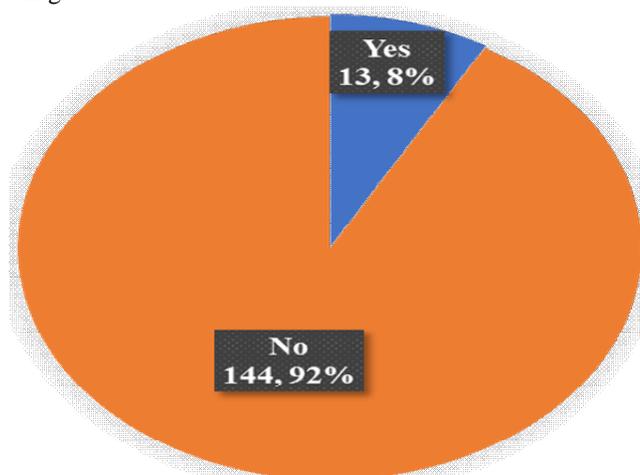
Age range in this study was from 30 to 60 years with mean age of 48.07 ± 8.35 years. CSF leakage was found in 13 (8.28%) patients, whereas no CSF leakage in 144 (91.72%) patients. (Fig. 1)

Patients were divided into 3 age groups i.e. age group 30-40 years, age group 41-50 years and age group 51-60 years. Thirty five (22.29%) patients belonged to age group 30-40 years, 58 (36.94%) patients belonged to age group 41-50 years and 64 (40.76%) patients belonged to age group 51-60

years. CSF leakage was noted in 2 (5.71%), 05 (8.62%) and 06 (9.38%) patients of three age groups respectively. Insignificant ($P = 0.813$) association of CSF leakage with age of the patients was noted. (Table 1)

Out of 102 (64.97%) male patients, CSF leakage was found in 08 (7.84%) patients and out of 55 (35.03%) female patients, CSF leakage was found in 05 (9.09%) patients. Statistically insignificant

Fig. 1: Frequency of CSF leakage



association of CSF leakage with gender was noted with p value 0.787. (Table 2)

In 94 (59.87%) patients, duration of disease was ≤ 3 years and CSF leakage was noted in 05 (5.32%) patients. In 63 (40.13%) patients of >3 years, CSF leakage was noted in 08 (12.70%) patients. Insignificant ($P = 0.100$) association of CSF leakage with duration of disease was noted. (Table 3)

Table 1: Stratification of CSF Leakage with respect to age groups.

Age (years)	CSF Leakage		Total	P-value
	Yes	No		
30-40	02 (5.71%)	33 (94.29%)	35 (22.29%)	0.813
41-50	05 (8.62%)	53 (91.38%)	58 (36.94%)	
51-60	06 (9.38%)	58 (90.62%)	64 (40.76%)	
Total	13(8.28%)	144 (91.72%)	157	

Table 2: Stratification of CSF Leakage with respect to Gender.

Gender	CSF Leakage		Total	p-value
	Yes	No		
Male	08 (7.84%)	94 (92.16%)	102 (64.97%)	0.787
Female	05 (9.09%)	50 (90.91%)	55 (35.03%)	
Total	13(8.28%)	144 (91.72%)	157	

Table 3: Stratification of CSF Leakage with respect to Duration of disease.

Duration of disease	CSF Leakage		Total	p-value
	Yes	No		
≤ 3 years	05 (5.32%)	89 (94.68%)	94 (59.87%)	0.100
>3 years	08 (12.70%)	55 (87.30%)	63 (40.13%)	
Total	13(8.28%)	144 (91.72%)	157	

DISCUSSION

The purpose of this study was to find out the frequency of cerebrospinal fluid leakage after

cage fixation with anterior approach in caries spine patients. Age range in our study was from 30 to 60 years with mean age of $48.07 \pm$

8.35 years. Majority of the patients i.e. 64 (40.76%) were between 51 to 60 years of age. Out of 157 patients, 102 (64.97%) were males and 55 (35.03%) were females with male to female ratio of 2:1. CSF leakage was found in 13 (8.28%) patients, whereas no CSF leakage in 144 (91.72%) patients. In a study, cerebrospinal fluid leakage associated with cage fixation of carries spine has been reported in 9.1% patients.¹³

Ali M et al⁸ believes that canal decompression and correction of spinal deformity is best achieved through anterior decompression and grafting technique. The early management for spinal TB is the use of ATT drug. This type of management is suitable for cases that are in the early course of disease, without myelopathy and without demonstrable radiological instability or cord compression. Even then, such patients should be closely observed with repeated imaging to look for delayed instability. Anti-tubercular drugs with immobilization and external orthosis is a must in the initial stage of treatment.¹⁴

Anterior surgery on the spine represents a less commonly utilized but important adjunct in the armamentarium of the spine surgeon. The anterior approach provides excellent exposure of the thoracic and lumbar spine.¹⁵ Through a single-stage approach, direct visualization for spine decompression and stabilization is possible. Anterior approaches to structured insufficiency of the anterior and middle column and to anterior decompression of the neural structures are based on solid theoretical concepts with favorable clinical results.¹⁶ Spinal reconstruction in cases of tumor, infection or trauma will continue, under certain circumstances, to be routine indications for anterior surgery of the thoracic and lumbar spine.^{17,18} On the other hand, the anterior approach to the thoracic and lumbar spine is a more complex procedure, and requires anatomic and technical knowledge by the spine surgeon.¹⁸

The bone graft does not give initial stability and graft related complications occur more often when the span of the graft exceeds a two-disc

space.¹⁹ Anterior instrumentation in tuberculous spondylitis is a relatively new concept. Ogaet al²⁰ evaluated the adherence capacity of *Mycobacterium tuberculosis* to stainless steel and concluded that adherence was negligible and the use of implants in regions with active tuberculosis infection may be safe. Several studies¹⁴⁴ have demonstrated that treatment of active tuberculosis spondylitis with anterior instrumentation along with anterior debridement and fusion provides a high and effective rate of deformity correction and maintenance. However, there may be associated lung scarring secondary to old/active pulmonary tuberculosis, which may preclude the anterior approach.

CONCLUSION

This study concluded that there is low frequency of cerebrospinal fluid leakage after cage fixation with anterior approach in carries spine patients. So, we recommend that anterior approach for cage fixation should be used primary approach in carries spine patients in order to reduce their morbidity.

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