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Research Article

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

[1]Faisal Ali, [2]Jamila Anwar and [3]Rabia Tariq Qureshi

[1]Senior Registrar, Department of Neurosurgery, Bahawal Victoria Hospital, Bahawalpur
[2]Senior Registrar, Department of Ophthalmology, Shahida Islam Medical College, Lodhran
[3]Woman Medical Officer, Jinnah Hospital, Lahore

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ABSTRACT

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

Materials & Methods: This cross sectional was conducted at Department of Neurosurgery, Bahawal Victoria Hospital, Bahawalpur from January 2018 to June 2018. Total 100 patients with caries spine having age 30-60 years either male or female were selected. CSF leakage was assessed in selected patients.

Results: Total 100 patients were selected for this study. Mean age of the patients was 46.67 ± 7.11 years. Out of 100 patients, CSF leakage was found in 10 (10%) patients. CSF leakage was found in 6 (10.71%) patients of age group 30-45 years and in 4 (9.09%) patients of age group 46-60 years. Statistically insignificant association between CSF leakage and age group was observed with p value 1.000. CSF leakage was noted in 7 (7.84%) male patients and in 3 (9.09%) female patients. Insignificant association of CSF leakage with gender was noted with p value 1.000.

Conclusion: Results of this study showed lower frequency of CSF leakage after cage fixation with anterior approach in caries spine patients. CSF leakage was insignificantly associated with age, gender and duration of disease.

Keywords: Kyphosis, Spinal Fusion, anterior approach, Cerebrospinal Fluid Leak.

INTRODUCTION

Although the first documented spinal tuberculosis (TB) cases date back to 5,000-year-old Egyptian mummies, the first modern case of spinal TB was described in 1779 by Percival Pott.[1] 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.[2] Spinal TB (Pott's disease) is the most common as well as one of the most dangerous forms of skeletal TB and accounts for 50% of all cases of skeletal TB. Although the thoracolumbar junction seems to be the most common site of the spinal column involvement in spinal TB, any part of the spine can be affected.[3] Furthermore, the incidence of neurologic complications in spinal TB varies

from 10% to 43%.[1] There are two distinct types of spinal TB, the classic form or spondylodiscitis, and an increasingly common atypical form which is spondylitis without disc involvement.[4]

Historically, spinal TB was managed by rest and decreased weight bearing on the diseased vertebrae by application of an immobilizing bandage, and by promoting the natural processes of healing by general hygienic measures.The following techniques are currently used for the treatment of TB spondylitis: 1) posterior decompression and fusion with bone autografts, 2) anterior debridement/decompression and fusion with bone autografts, 3) anterior debridement/decompression and fusion, followed by simultaneous or sequential posterior fusion with instrumentation, and 4) posterior fusion with instrumentation, followed by simultaneous or sequential anterior debridement/decompression and fusion.[5]The posterolateral or transpedicular approach has been used extensively for the management of spinal TB. This approach is a viable and importantly a safe surgical option for ventral decompression in thoracic spine TB when followed by antitubercolusis treatment for 18 months and immobilization in an alkathene shell for 3 months. Pedicle screw fixation has also been advocated.[6]

In the setting of non-equipped medical centers, the anterolateral approach is feasible and safe and provides 360 degree exposure for lesions located in the spine from the second thoracic vertebra down to the fifth lumbar vertebra. Using this approach, anterior debridement, decompression, bone grafting (anterior or posteriorly), posterior implant fixation, and kyphosis correction are all options.[7] Some authors suggested that anterior instrumentation in the presence of active disease can be dangerous and may fail or be associated with additional complications.[8] However, in our experience instrumented stabilization in a tubercular infected bed seems to be safe if meticulous debridment is performed.[9] On the other hand, some authors reported series of patients that underwent one-stage anterior interbody autografting and anterior instrumentation with good results.[10] Regarding the type of bone graft, some authors suggested fresh-frozen allograft and anterior instrumentation which is superior to rib grafts in supporting the anterior spinal column. Although fusion occurs late following the use of allografts, the grafts remain stable. Certainly, reoperation to remove the anteriorly placed implants is complex and is associated with higher risks than the first operation.[11] Supplementary posterior fusion should be considered to prevent postoperative kyphosis when this procedure is performed in children.[12]

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.

OPERATIONAL DEFINITIONS:

Caries Spine: All patients with proven tuberculosis (ESR>100 mm/h & positive skin tuberculin test) and significant kyphosis (>40° of segmental kyphosis) or instability (antero-posterior or lateral translation; >40° of segmental kyphosis) were deemed as positive.

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.

MATERIALS AND METHODS

This cross sectional was conducted at Department of Neurosurgery, Bahawal Victoria Hospital, Bahawalpur from January 2018 to June 2018. Total 100 patients with proven tuberculosis and having significant kyphosis (>40° of segmental kyphosis) and instability (anteroposterior

translation; >40° of segmental kyphosis), patients of age 30-60 years of both genders.

Patients with involved spine other than dorsal spine, patients not fit for surgery, patients not willing for surgery, patients not willing to be included in the study and already operated patients were excluded from the study. Study was approved in by ethical committee and written informed consent was taken from every patient. 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.

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

Total 100 patients were selected for this study. Age range was 30 to 60 years and mean age of patients was46.67 ± 7.11 years. Out of 100 patients, CSF leakage was found in 10 (10%) patients. (Fig. 1)Patients were divided into 2 age groups i.e. age group 30-45 years, age group 46-60 years. Total 56 (56%) patients belonged to age group 30-45 years and 44 (44%) patients belonged to age group 46-60 years. CSF leakage was found in 6 (10.71%) patients of age group 30-45 years and in 4 (9.09%) patients of age group 46-60 years. Statistically insignificant association between CSF leakage and age group was observed with p value 1.000. (Table 1)Total 66 (66%) patient were male and 34 (34%) patients were female. CSF leakage was noted in 7 (7.84%) male patients and in 3 (9.09%) female patients. Insignificant association of CSF leakage with gender was noted with p value 1.000. (Table 2)Patients were divided into two groups according to duration of disease. ≤3 years duration of disease group and >3 years duration of disease. Total 3 (5.17%) patients belonged to ≤3 years duration of disease group and 7 (16.67%) patients belonged to >3 years duration of disease group. Insignificant association of CSF leakage with duration of disease was noted with p value 0.089. (Table 3)

Fig. 1: Frequency of CSF leakage

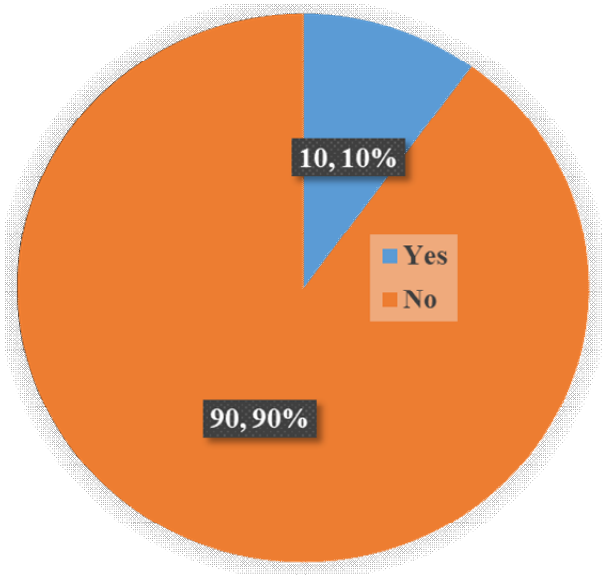

Table 1: Association of CSF Leakage with age groups

Age (years)	CSF Leakage		Total	P-value
	Yes	No		
30-45	06 (10.71%)	50 (89.29%)	56 (56%)	**1.000**
46-60	04 (9.09%)	40 (90.91%)	44 (44%)	
Total	10(10%)	90 (90%)	100	

Table 2: Association of CSF Leakage with Gender

Gender	CSF Leakage		Total	p-value
	Yes	No		
Male	07 (7.84%)	59 (92.16%)	66 (66%)	**1.000**
Female	03 (9.09%)	31 (90.91%)	34 (34%)	
Total	10(10%)	90 (90%)	100	

Table 3: Association of CSF Leakage with Duration of disease

Duration of disease	CSF Leakage		Total	p-value
	Yes	No		
≤3 years	03 (5.17%)	55 (94.83%)	58 (58%)	**0.089**
>3 years	07 (16.67%)	35 (83.33%)	42 (42%)	
Total	10(10%)	90 (90%)	100	

DISCUSSION

Total 100 patients were selected for this study. Mean age of the patients was 46.67 ± 7.11 years. Out of 100 patients, CSF leakage was found in 10 (10%) patients. CSF leakage was found in 6 (10.71%) patients of age group 30-45 years and in 4 (9.09%) patients of age group 46-60 years. Statistically insignificant association between CSF leakage and age group was observed with p value 1.000. CSF leakage was noted in 7 (7.84%) male patients and in 3 (9.09%) female patients. Insignificant association of CSF leakage with gender was noted with p value 1.000. In a study, cerebrospinal fluid leakage associated with cage fixation of caries spine has been reported in 9.1% patients.[13]

Ali M et al[14] 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.[15]

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.[16]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.[17] 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.[18,19] 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.[19]

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.[20]Anterior instrumentation in tuberculous spondylitis is a relatively new concept. Oga*et al*[21] 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 studies[21]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

Results of this study showed lower frequency of CSF leakage after cage fixation with anterior approach in caries spine patients. CSF leakage was insignificantly associated with age, gender and duration of disease.

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