



Which Parameters other than and in addition to Neurological Status are Relevant on Surgical Decision Making in Spinal Tuberculosis?

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Conflict of Interest

The authors of this manuscript have no competing interests that influence the results and discussion of this paper

Disclosures

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Background



- Patients treated for spinal tuberculosis with chemotherapy alone:
 - may have an average increase of 15° in deformity
 - 3% to 5% of these develop kyphosis greater than 60°

Surgery has been advocated as the standard treatment in these patients with progressive deformity, as well as in those with neurological loss.

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Aim



To analyze the impact of the parameters other than and in addition to the neurological status on surgical decision making in patients with spinal tuberculosis.

Patients & Methods



- Retrospective analysis of a single center case series*
- A total of 99 patients with spinal TB
 - between 2006 and 2016
 - managed surgically (S) or non-surgically (NS)
- Inclusion Criteria:
 - diagnosed as tuberculosis of spine at any level
 - treatment by means of medical and/or surgical
 - 2 years follow-up

*This patient series was not started for any research purposes and reflects the treatment preferences of the treating physician as well as the patients

Patients & Methods



- Parameters:
 - Baseline demographics
 - Clinical
 - Frankel Grade (neurology)
 - Visual Analogue Scale (VAS) Score (pain intensity)
 - Radiological
 - Number of vertebral body involvement (contiguous or not)
 - Kyphosis (mild, moderate, severe)*
- Statistical Analysis:
 - Dependent variable: Neurological status
 - Independent variables: The visual analog scale (VAS) score, contiguity of the lesion and sagittal plane deformity
 - A stepwise multivariate logistic regression method was used to evaluate the impact of clinical variables on S group.

Results-I

Baseline Characteristics

Variable	Treatment Group		
	Surgical	Medical	
Gender (F / M) (n)	50 / 33 (83)	10 / 6 (16)	
Age (median)(range)(years)	26 (4-76)	28.5 (5-78)	
Neurology (Frankel Grade)(n)			
A	2	0	
B	10	1	
C	8	2	
D	5	0	
E	58	13	
VAS Score (median)(range)	10 (0-10)	7.5 (0-10)	
# of vertebrae involved(median)(range)	2 (1-15)	2 (1-5)	
Contiguity* (Contiguos / Non-C)	76 / 7	12 / 4	*p=0.05
Deformity‡ (Yes / No)	59 / 24	7 / 9	‡p<0.05
Kyphosis (°) (median)(range)	35 (-45-130)	10 (-10-90)	
Erythrocyte Sedimentation Rate	60 (5-126)	55.5 (16-116)	

Results-II

Vertebral Involvement

Variable	Surgical T _x	Medical T _x
Region of Involvement		
C	3	2
C + T	1	1
C + T + L	1	-
T	30	3
T + L	16	2
T + L + S	-	1
L	29	7
L + S	2	-
S	1	-

C: Cervical, T: Thoracic, L: Lumbar, S: Sacral

Surgical Characteristics

Variable	n
Surgical Intervention	
Anterior	14
Posterior	25
Anterior + Posterior	41
Drainage	3
Complications	
Mortality	3
Neurological deterioration	3
Wrong level instrumentation	1
Cage displacement	1
Wound dehiscence	2

Results-III

Treatment Outcomes

Neurology (Frankel Grade)(n)

Pre-treatment		Post-treatment		Remarks
A	→ 2	→ A 2		Both died (combined A+P surgery)
B	→ 11	→ A 1		
		→ B 1		
		→ E 9		
C	→ 10	→ A 1		Died (Anterior Approach)
		→ D 2		
		→ E 7		
D	→ 5	→ C 1		Right upper extremity weakness (C8-T1)
		→ E 4		
E	→ 71	→ C 1		Right lower extremity weakness (L2-L5)
		→ E 70		

Results-IV

Multivariate Logistic Regression Analysis

	<i>B</i>	<i>S.E.</i>	<i>Wald</i>	<i>df</i>	<i>p</i>	<i>OR</i>	<i>95% C.I. for OR</i>	
							Lower	Upper
<i>Deformity</i>	2.084	0.779	7.151	1	0.007	8.036	1.745	37.011
<i>Contiguity</i>	1.658	0.816	4.132	1	0.042	5.249	1.061	25.958
<i>VAS</i>	0.315	0.136	5.357	1	0.021	1.371	1.050	1.790
<i>ESR</i>	-0.021	0.012	2.935	1	0.087	0.979	0.957	1.003
<i>Constant</i>	-2.005	1.362	2.167	1	0.141	0.135		

- The probability of having a surgical intervention increases by;
 - 8.036 times for the patients with deformity ($p < 0.05$).
 - 5.249 times for the patients with contiguous disease ($p < 0.05$).
- One-unit increment on VAS score increases the probability of having a spinal surgery by 1.371 times ($p < 0.05$).

Conclusion



Tuberculosis of the spine may result in sagittal plane deformity and most of the patients are suffering from significant amount of back pain because of the disease.

In this study based on pure surgeon and patient preferences; *the presence of kyphotic deformity, contiguity of the lesion and pain intensity* were shown to be the relevant factors in addition to the neurological status while decision making for a surgical intervention.

Thank you...



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