

Introduction

Thoracic ossification of the ligamentum flavum (OLF) is a common cause of thoracic myelopathy. The measurement method for the thickness of the ligamentum flavum is not standardized, which causes confusion. We hypothesized that the area of OLF is a key morphologic parameter in the diagnosis of thoracic myelopathy due to OLF.

Methods

A total of 203 patients who met the inclusion criteria were enrolled between January 1999 and December 2016. We measured the thickness of OLF (TOLF), cross sectional area of OLF (AOLF), anteroposterior canal diameter (APD), cross sectional area of the spinal canal (ASC), and the ratio of each of these parameters at the maximum thickness level. We divided the patients into two groups according to the presence or absence of thoracic myelopathy. We analyzed the relationship between the degree of ossification and myelopathy.

Results

The best cut off point of ratio of AOLF was 33.00%, with 87.1% sensitivity, 87.3% specificity and AUC of 0.934 (95% CI, 0.899 – 0.969). The sensitivity and specificity of the ratio of AOLF were higher than those of other parameters. Postoperative clinical outcome was the best with 1.37 ± 0.82 of difference between post- JOA score and pre-JOA score, when patients with ratio of AOLF more than 40% and less than 45% underwent decompressive laminectomy for thoracic myelopathy due to OLF

Conclusions

The ratio of AOLF was the most important parameter. Thus, to predict thoracic myelopathy due to OLF, the treating doctor should more carefully analyze the ratio of AOLF than other parameters. If the ratio of AOLF is > 33%, then the patient may be at a risk for myelopathy later in life, even if there is no myelopathy at present and surgical treatment is recommended before OLF take up half of the spinal canal.

TABLE.1

Measurements ^a		Sensitivity (%) ^b	Specificity (%) ^c
TOLF (mm) ^a	4.82* ^a	73.3 ^a	81.4 ^a
^a	4.84 ^a	71.3 ^a	81.4 ^a
^a	4.87 ^a	70.3 ^a	81.4 ^a
Ratio of TOLF (%) ^a	36.73* ^a	79.2 ^a	76.5 ^a
^a	36.81 ^a	78.2 ^a	76.5 ^a
^a	36.97 ^a	77.2 ^a	76.5 ^a
AOLF (mm ²) ^a	47.42 ^a	82.2 ^a	81.4 ^a
^a	47.73* ^a	82.2 ^a	82.4 ^a
^a	48.09 ^a	81.2 ^a	82.4 ^a
Ratio of AOLF (%) ^a	33.00* ^a	87.1 ^a	87.3 ^a
^a	33.12 ^a	86.1 ^a	87.3 ^a
^a	33.29 ^a	85.1 ^a	87.3 ^a
APD (mm) ^a	5.17* ^a	79.2 ^a	70.6 ^a
^a	5.21 ^a	79.2 ^a	69.6 ^a
^a	5.23 ^a	79.2 ^a	68.6 ^a
Ratio of APD (%) ^a	39.77 ^a	79.2 ^a	76.5 ^a
^a	39.89* ^a	80.2 ^a	76.5 ^a
ASC (mm ²) ^a	103.43 ^a	80.2 ^a	78.4 ^a
^a	104.29* ^a	81.2 ^a	78.4 ^a
Ratio of ASC (%) ^a	70.91* ^a	84.2 ^a	81.4 ^a
^a	70.94 ^a	84.2 ^a	80.4 ^a

Cut off values for parameters

TABLE.2

Ratio of AOLF ^a	Post-JOA – Pre-JOA ^a	p value ^a
< 33% ^a	1.05 ± 0.51 ^a	<0.01 ^a
≥ 33%, < 40% ^a	1.15 ± 0.55 ^a	<0.01 ^a
≥ 40%, < 45% ^a	1.37 ± 0.82 ^a	<0.01 ^a
≥ 45%, < 55% ^a	0.89 ± 0.65 ^a	<0.01 ^a
≥ 55% ^a	1.07 ± 0.76 ^a	<0.01 ^a

Relationship between Ratio of AOLF and postoperative clinical outcome

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Cut off values for parameters

Learning Objectives

The aim of this study is to investigate radiographic parameters affecting the degree of thoracic myelopathy in the patients with OLF