Assessing fatty infiltration of paraspinal muscles in patients with lumbar spinal stenosis: Goutallier classification and quantitative MRI measurements

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Background

- Atrophy and fatty infiltration of paraspinal muscles is associated to several spinal disorders: low-back pain, lumbar stenosis, disc-herniation, flat-back

- Fatty infiltration of muscle can be assessed qualitatively (i.e. Goutallier classification) and quantitatively using an image processing software.

Belavy et al., Kalichman et al., Goubert et al., Kjaer et al., Yanik et al., Masaki et al., Jun et al., Barker et al., Kim et al. Lee et al.

Objectives

- To compare the Goutallier classification to quantitative MRI measurements

- To investigate the association between anthropometric parameters and paraspinal muscle morphology and fatty infiltration

Methods

Inclusion criteria

- From 04/2019 to 08/2020
- Symptomatic lumbar spinal stenosis
- MR images of the lumbar spine from L1 to S1

Exclusion criteria

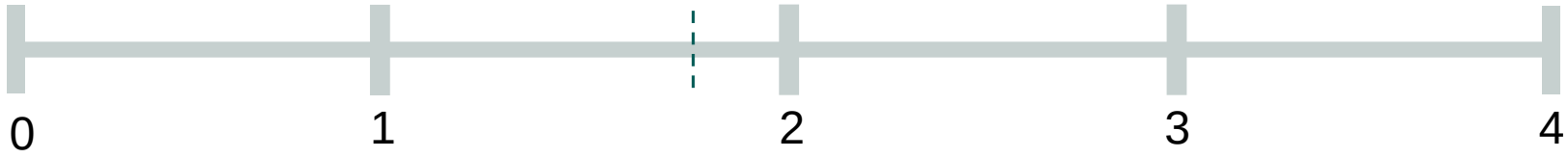
- Prior surgery of the lumbar spine
- Other causes of limited mobility of the pelvis
- Use of walking aids

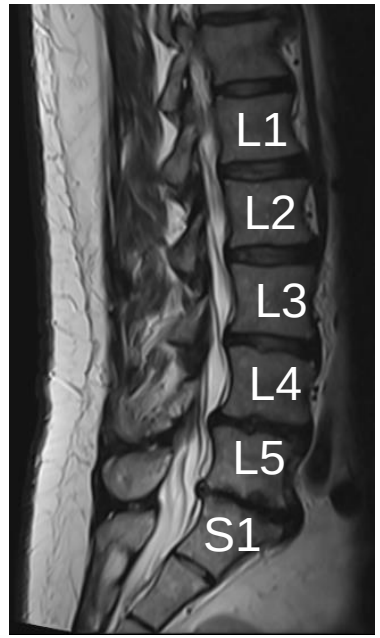
Demographics Mean (SD)	
Number of patients	18 (10 females)
Age (years)	71.3 (8.4)
Body mass (kg)	75.8 (15.0)
Height (cm)	167.1 (8.6)
BMI (kg/m^2)	27.0 (3.9)
ODI score	28.7 (13.5)

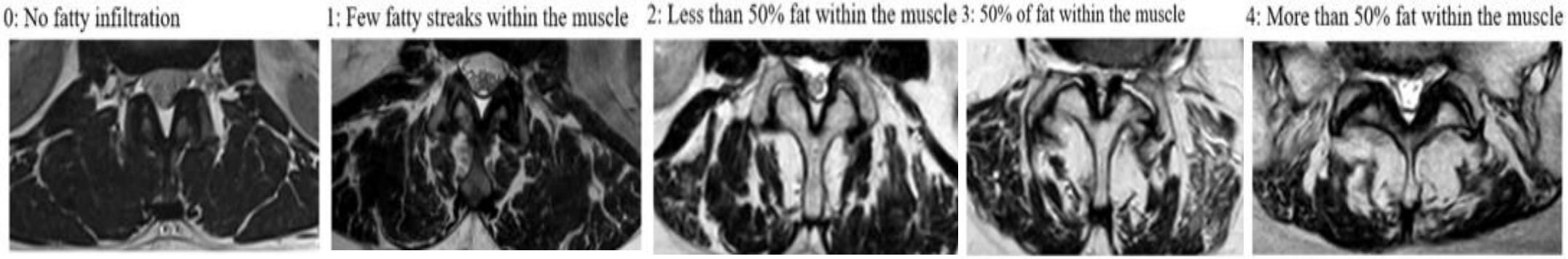
Results

Goutallier grading system: Qualitative assessment

Average Goutallier grade:
Mean 1.7 (SD: 0.6)

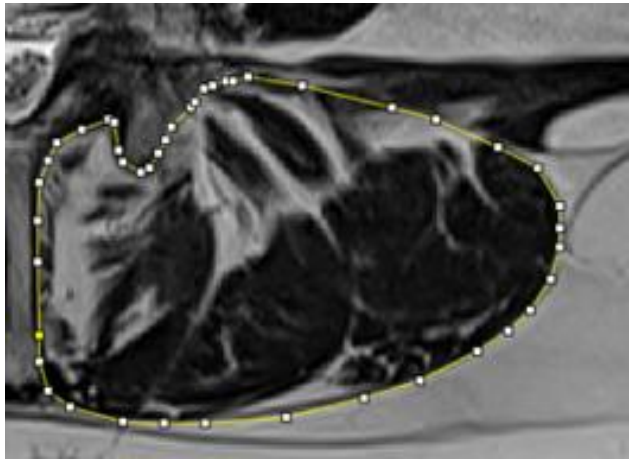




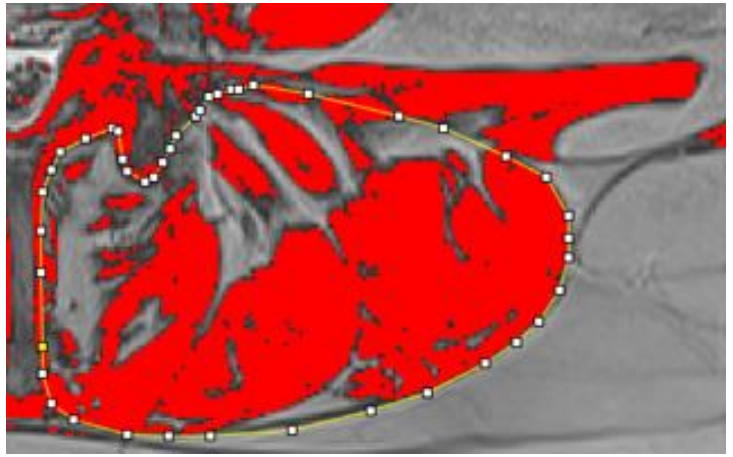


Results

Quantitative assessment



Total average CSA (left+right): 54.2 (SD: 9.3) cm^2

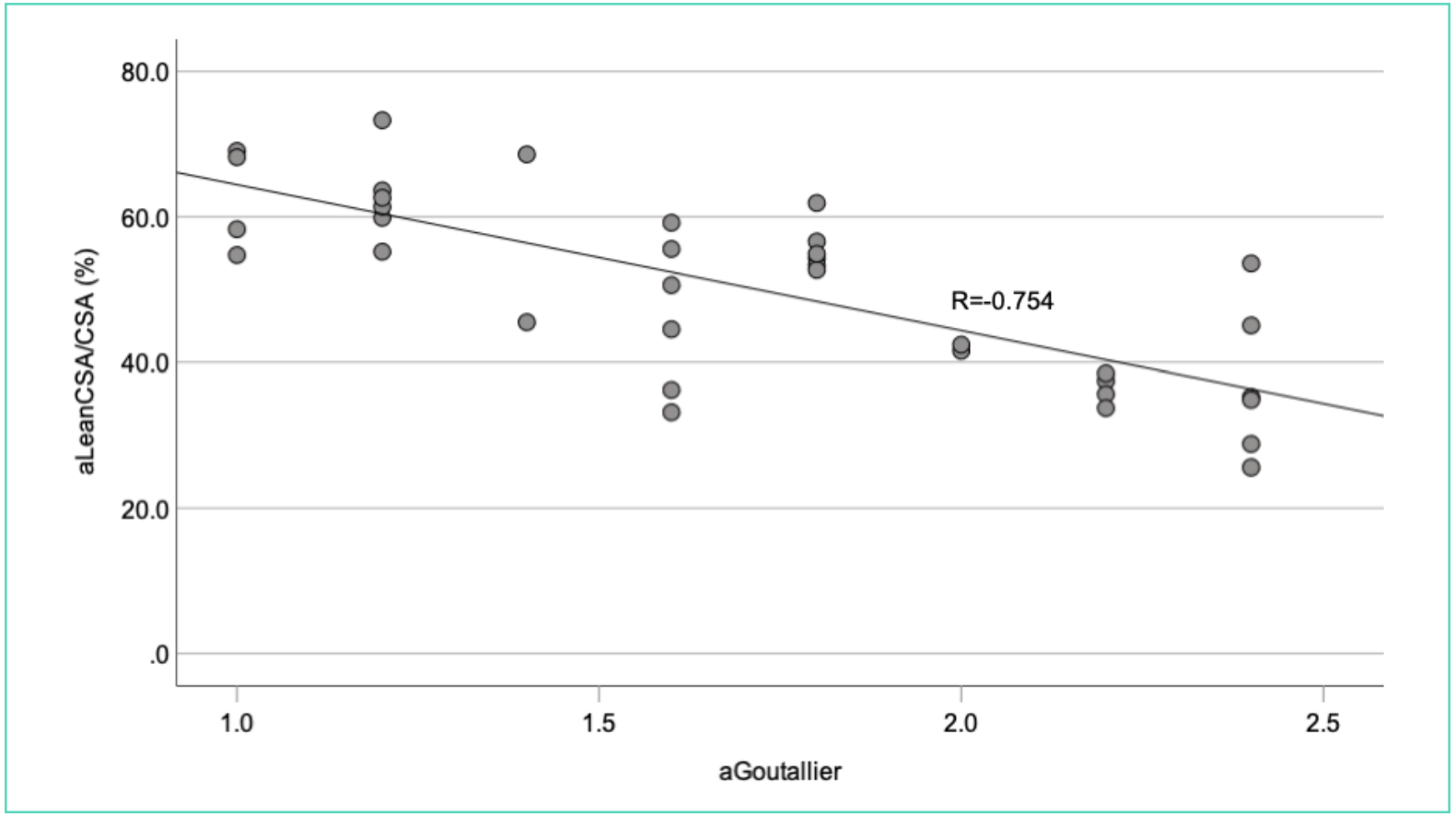


Total aLeanCSA/aCSA: 50.2% (SD: 12.0%)

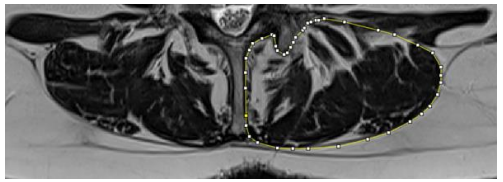
Fortin et al.

Results

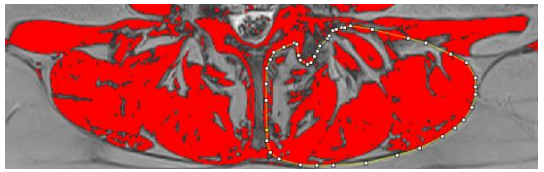
Strong correlation between quantitative and qualitative assessment



Results



Cross Sectional Area (CSA) cm^2



Lean Cross Sectional Area (LeanCSA) cm^2

Body height 	Strong correlation R > 0.700, P<0.001	Strong correlation R > 0.700, P<0.001
Vertebral body CSA 	Moderate correlation R > 0.400, P<0.001	No significant correlation
BMI 	Moderate correlation R > 0.400, P<0.001	No significant correlation

Conclusion

- The Goutallier classification is a reliable tool for assessing fatty infiltration of paraspinal muscles in patients with symptomatic lumbar spinal stenosis

- Body height should be taken as reference for normalization when assessing paraspinal muscle atrophy and fatty infiltration

- Higher BMI is not associated with more fatty infiltration of paraspinal muscles

Disclosures

- None of the authors has any potential conflict of interest