

Objective

- Total-Body PET/CT is a novel scanner able to capture simultaneously **head-to-toe** tracer distribution across **all the body tissues/organs** in a single imaging position.
- We aimed to describe the spectrum of **spondylitic changes** seen from Total-Body PET/CT imaging using ¹⁸F-FDG (a marker of glucose metabolism) in patients with **psoriatic arthritis (PsA)**.

Methods

- Twenty-four PsA participants; 8 patients with inflammatory back pain.
- ¹⁸F-FDG PET using 1/5th the standard dose. Ultra-low-dose CT (~1 mSV).¹
- Qualitative and quantitative (rSUVmax) features were evaluated for:
 - Atlantoaxial, apophyseal, costovertebral/costotransverse, and sacroiliac joints
 - Entheses (cervical/thoracic/lumbar supra- and interspinous ligaments).

Results

- Qualitatively, PET demonstrated abnormality in ≥1 evaluated site(s) in 21 (88%) patients, including all 8 pts. with inflammatory back pain:
 - Twenty (83%) patients showed **spinal enthesitis on PET (Fig.1)**, including two patients with **no structural evidence of arthritis or sacroiliitis (Fig.3)**.
 - 63% showed **atlantoaxial (Fig.4-5)** and 78% showed **apophyseal involvement**.
 - A few patients demonstrated evidence of **sacroiliitis on PET (n=4)**. The involvement was **unilateral in 2 patients and bilateral but asymmetric in the other 2 patients (Fig.2,6,7)**.
- Quantitatively, the summed rSUVmax for all the described sites was 7.3±3.1 per patient.

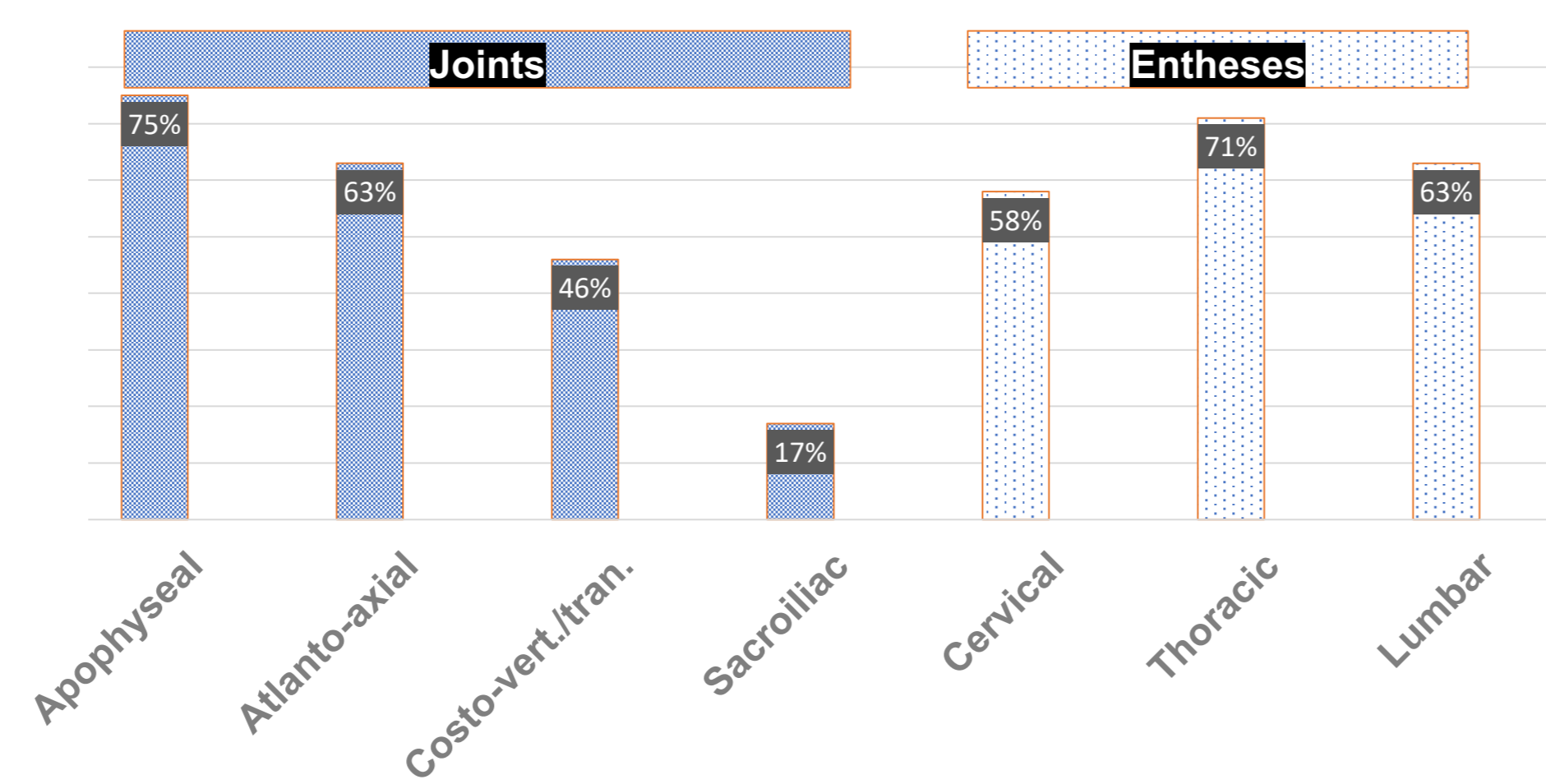


Fig.1: Frequency of Joint & Enthesal Positivity on Total-Body 18F-FDG PET/CT

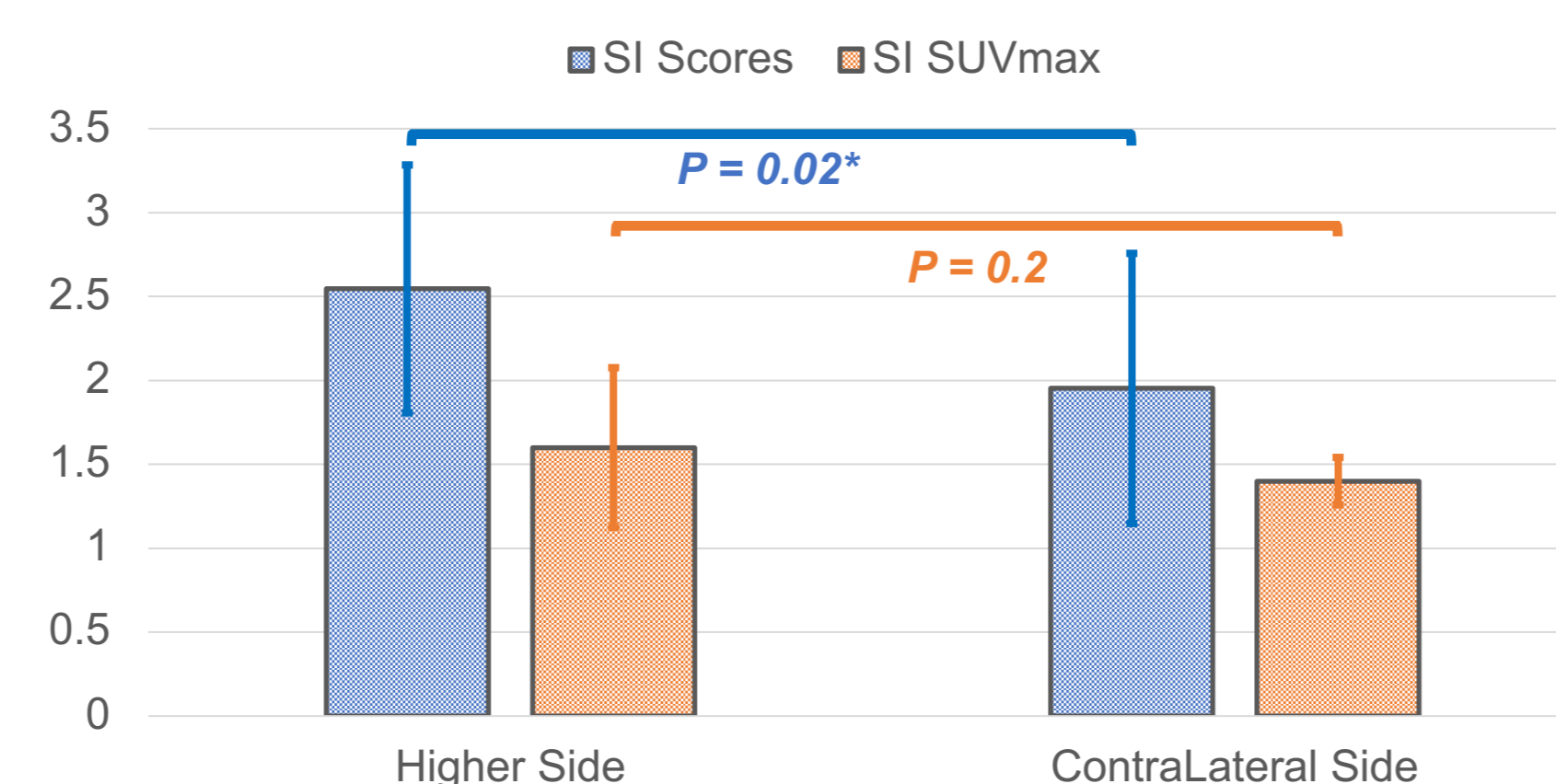


Fig.2: Asymmetric Sacroiliac Scores and SUVs

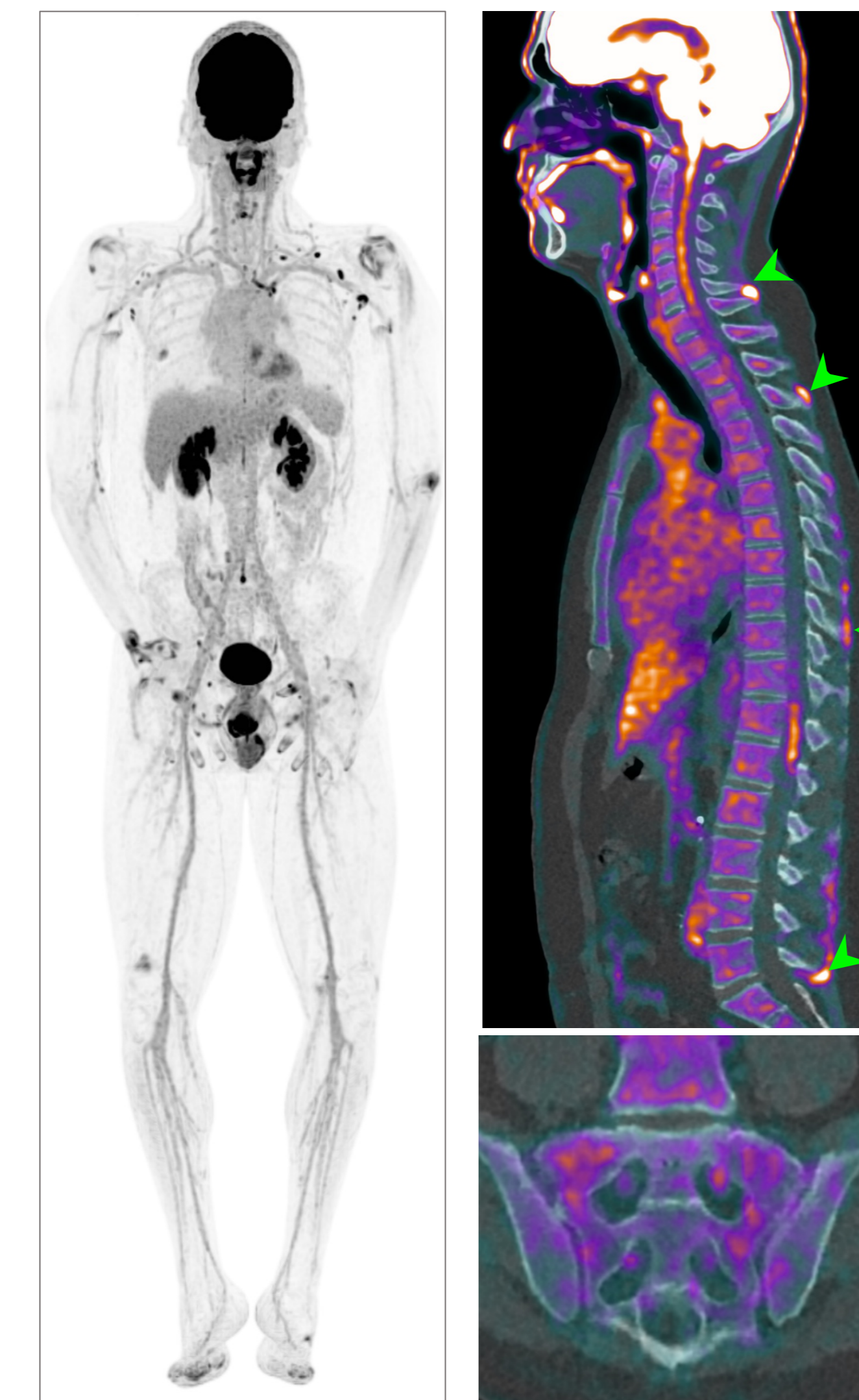


Fig.3: Supra-/inter-spinous enthesitis. TB-PET in a 33-year-old man with PsA. The total-body image (left) shows numerous joint abnormalities. Multiple active spinal entheses are seen in cervical, thoracic, and lumbar spine (arrowheads), albeit with no evidence of SIJ involvement.

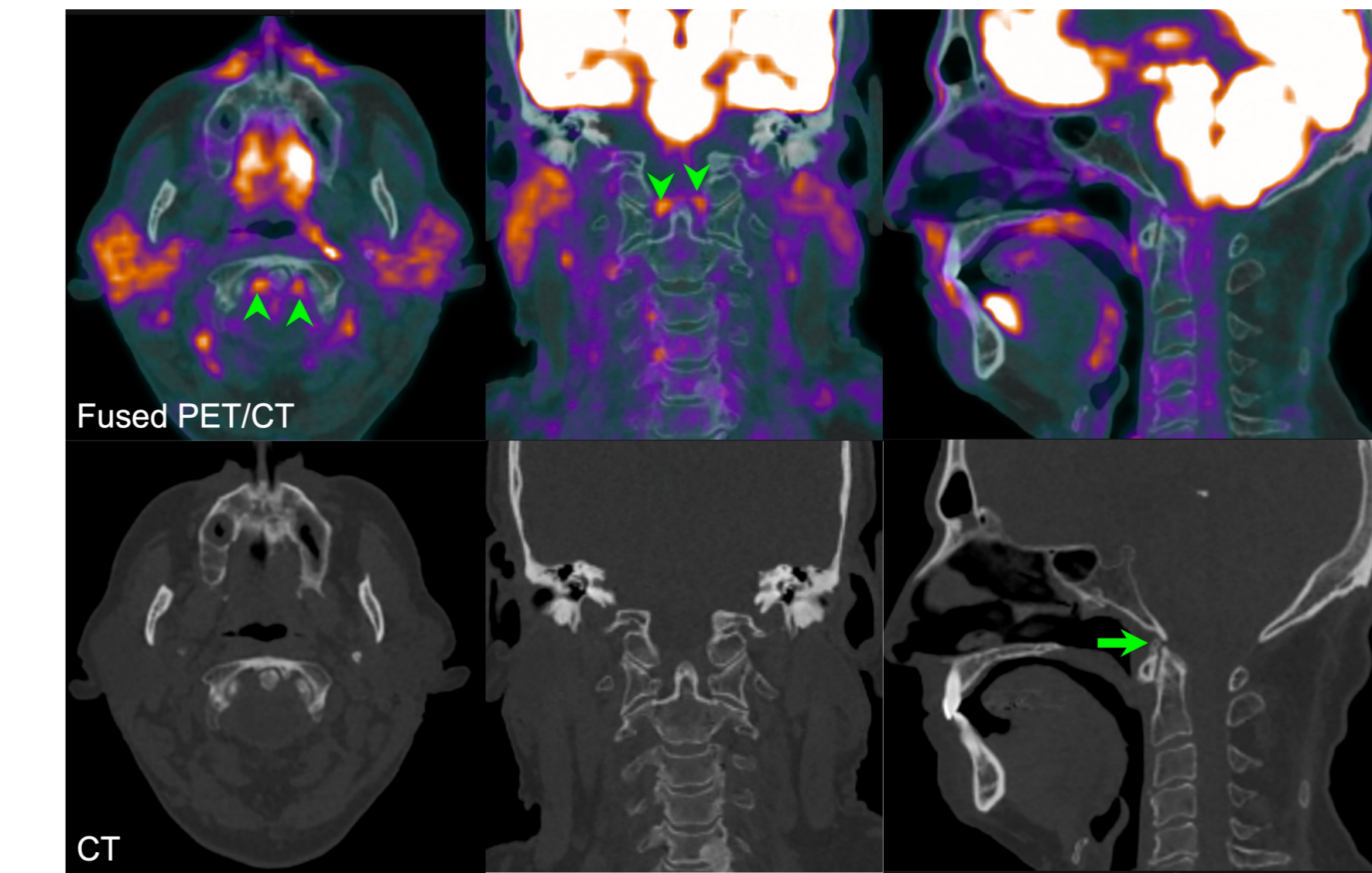


Fig.4: Changes in atlanto-axial articulation. TB-PET/CT of a 62-year-old female with PsA demonstrating intense ¹⁸F-FDG uptake with rSUVmax 1.7 at the alar ligaments (arrowheads) with evidence of ossification of the anterior atlanto-occipital membrane on the CT (arrow).

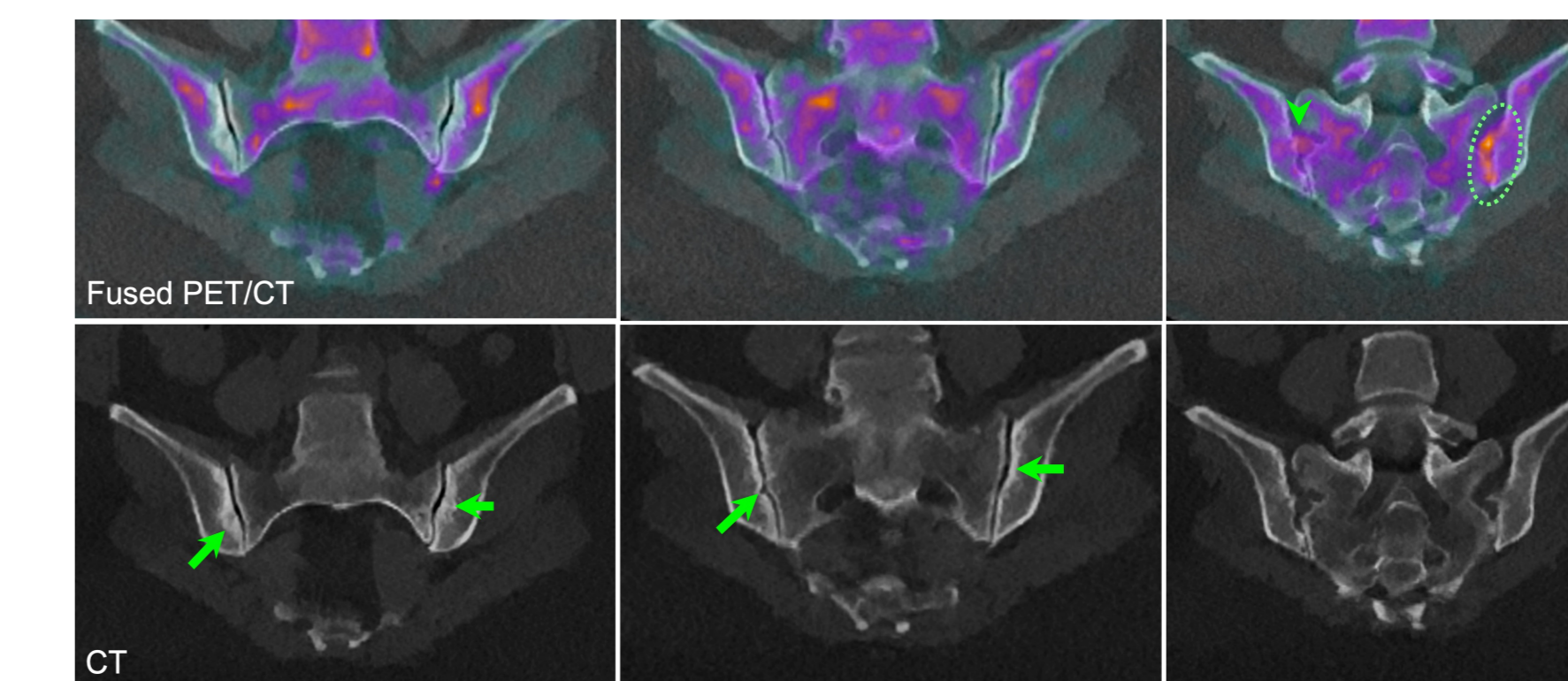


Fig.6: Asymmetric sacroiliac changes. TB-PET/CT of a 36-year-old female participant with PsA demonstrating asymmetrically increased ¹⁸F-FDG on the left side (dashed circle) with minimal uptake on the right side (arrowhead). Coregistered CT images demonstrate rather symmetric SIJ sclerosis, more pronounced on the iliac side of the joints bilaterally (arrows).

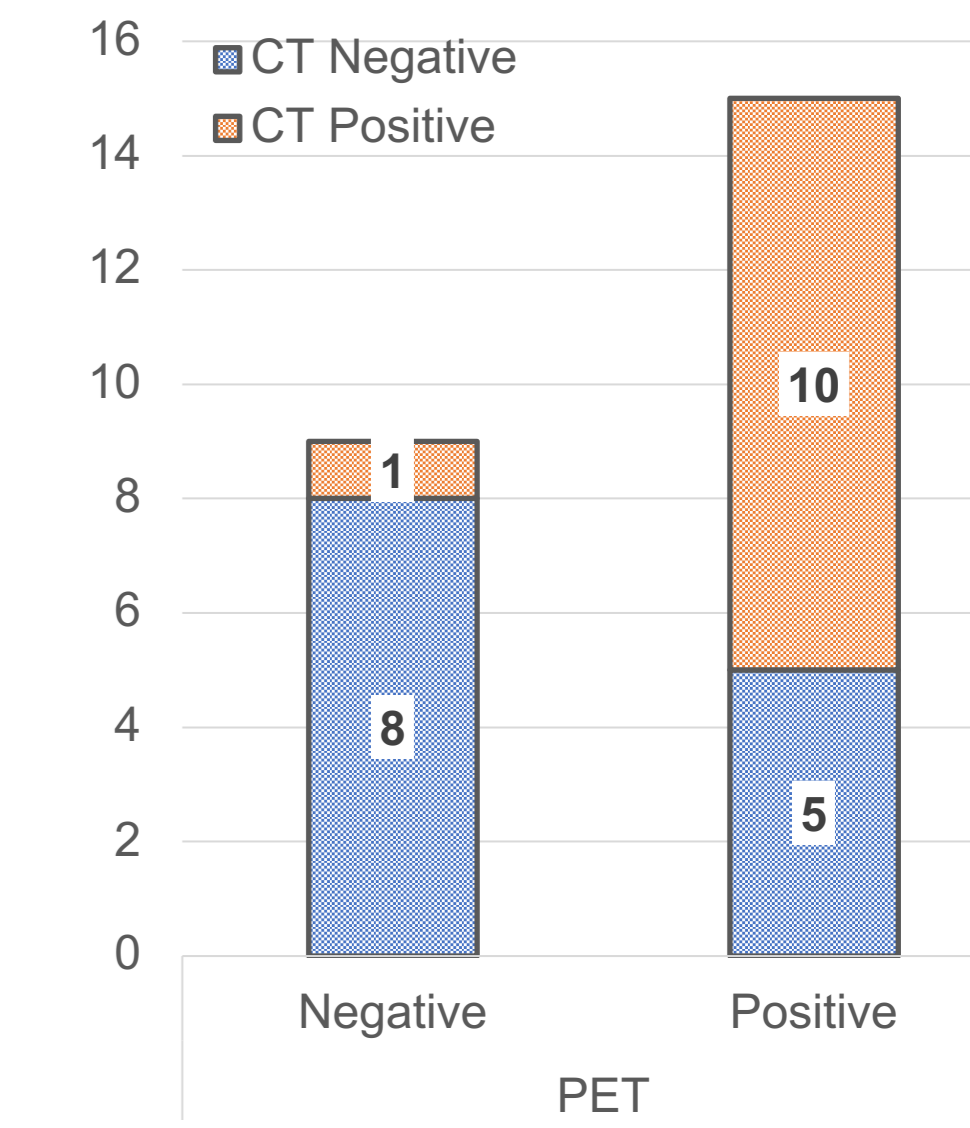


Fig.5: Atlanto-Axial Joint Changes

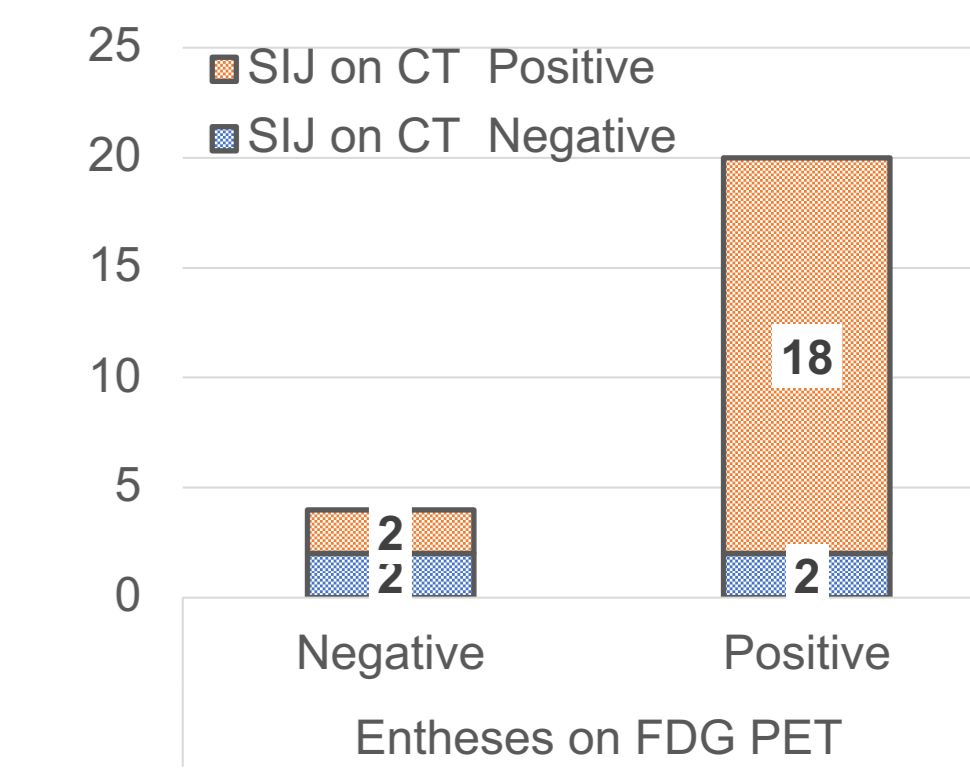


Fig.7: SIJ CT Changes in relation to PET Entheses Positivity

Conclusions

- Spondylitic changes are prevalent** among patients with PsA. Significant findings from our study utilizing the highly sensitive Total-Body PET/CT are:
 - ✓ Marked enthesitis in over 70% of patients, suggesting that **enthesitis could be the primary pathology for axial inflammation** in PsA. In majority of the patients this pathology was clinically occult, as only about one third of the patients reported back pain.
 - ✓ Potential for identifying **non-radiographic axial SpA** demonstrating the capability of TB-PET/CT as a potential diagnostic tool for this condition; and
 - ✓ **Quantification of the total inflammatory burden (rSUVmax)** of the whole spine thus demonstrating the ability of TB-PET/CT for assessing disease severity and therapeutic response.
- Further validation of these results is ongoing.

References

1. Abdelhafez YG, et al. (2022) J Nucl Med.

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