

# Spatial registration on PET-CT scans and quantitative structured report for treatment response evaluation on lymphoma patients.

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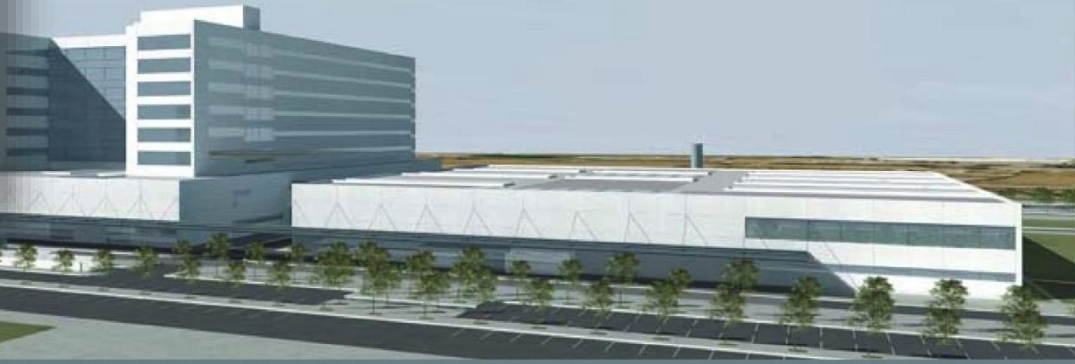
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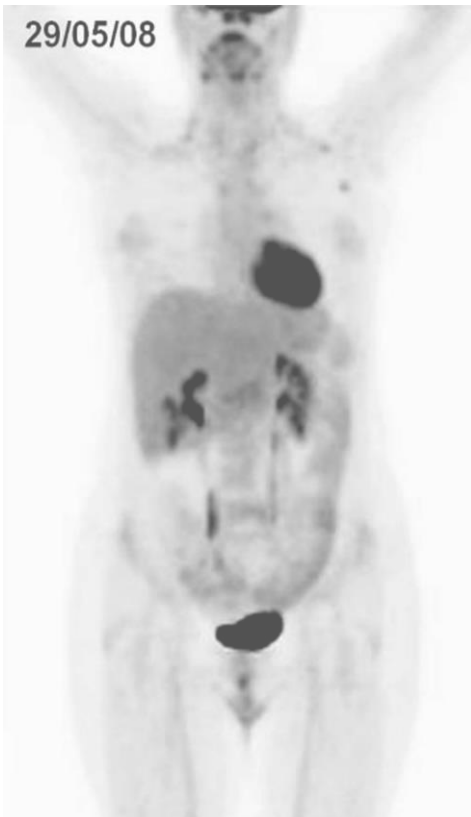


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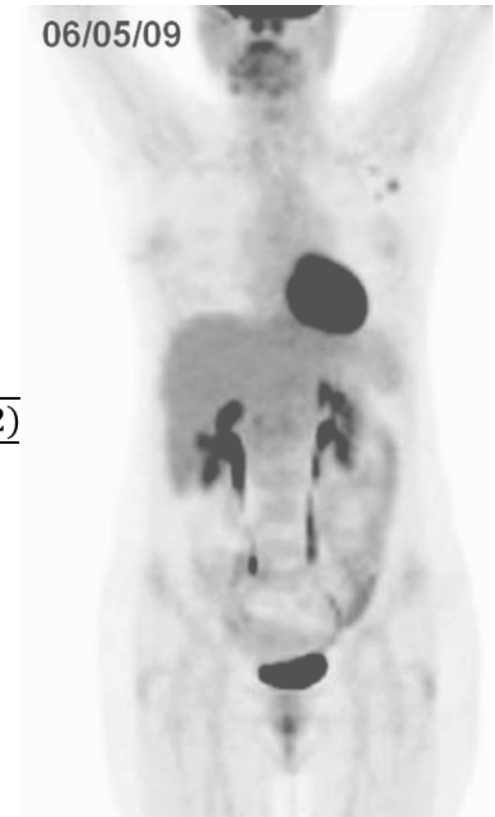




- Introduction
- Purpose
- Materials and methods
  - Elastic co-registration
  - SUV Quantification
  - Liver normalization
  - Thresholding
  - $\Delta$ SUV Quantification
- Results
- Conclusions



$$SUV(i) = c(i) \times \frac{W}{td \times df \times e^{\frac{-et \times \ln(2)}{hl}}}$$



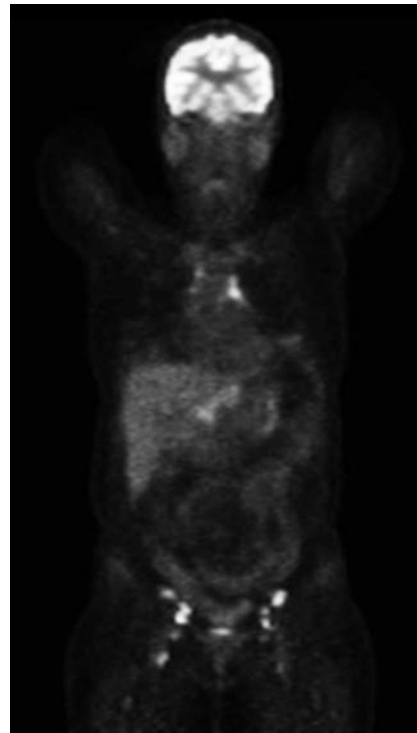


- Develop a semi-automatic voxelwise  $\Delta$ SUV quantification algorithm.
- Imaging biomarker extraction: metabolic tumor volume.

## Elastic co-registration



Timepoint 1 PET



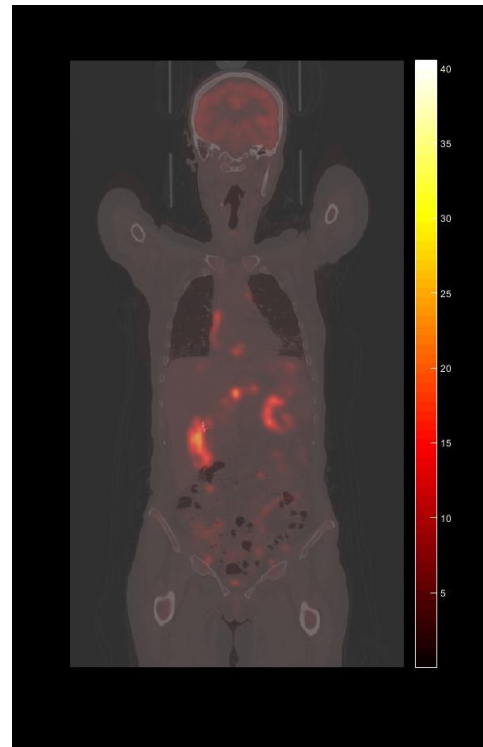
Timepoint 2 PET



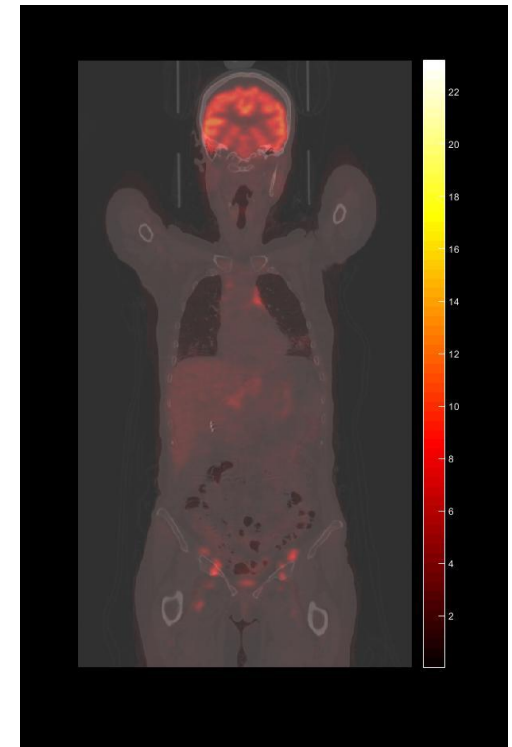
Timepoint 1 CT

## SUV Quantification

$$SUV(i) = c(i) \times \frac{W}{td \times df \times e^{\frac{-et \times \ln(2)}{hl}}}$$



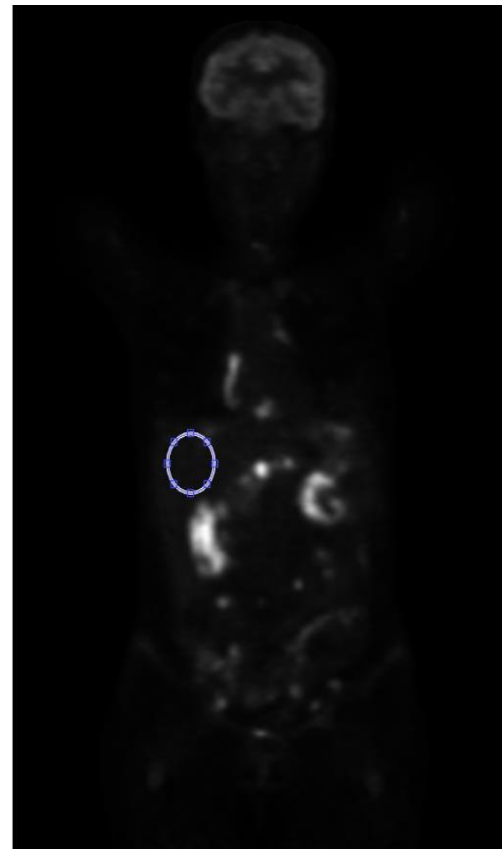
Timepoint 1



Timepoint 2

## Liver normalization

$$SUV_H(i) = \frac{SUV(i)}{SUV_{LIVER}}$$



# Thresholding

$$SUV_H(i) > 1.5 \times \overline{SUV_{H-LIVER}}$$

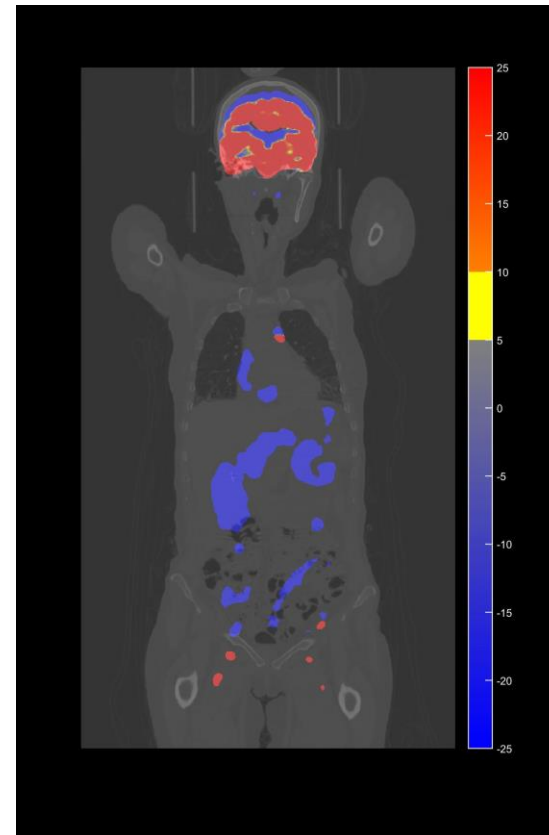
Metabolic Tumor Volume





## $\Delta$ SUV Quantification

$$\Delta SUV(i) = \frac{SUV_{H2}(i) - SUV_{H1}(i)}{SUV_{H1}(i)} \times 100$$





## Report

- Patient data
- Image: new/disappearing lesion voxels
- SUV Histogram
- $\Delta$ SUV Statistics
- SUV Statistics
- Metabolic Tumor Volume

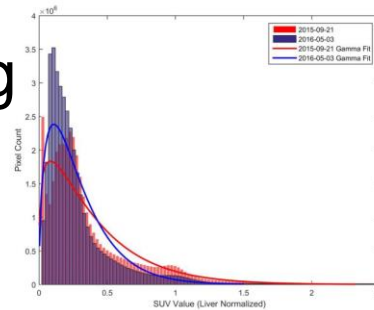
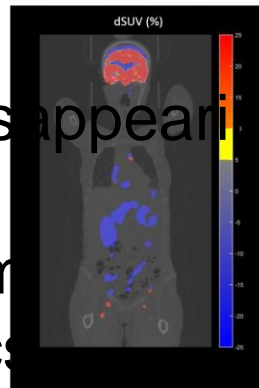


Body  
SUV & dSUV



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Imaging Center	Hospital Clinico de Valencia	Patient Name	AMS
Modality	MR	Patient ID	-
Study Description	PET - TAC	Patient Sex	F
Study Date	2016/05/03	Birthdate	-



dSUV		dSUV (%)
Mean		-8.98
Std		20.33
Median		-23.46

	Timepoint 1 (2015-09-21)	Timepoint 2 (2016-05-03)
Mean	0.499	0.388
Std	0.587	0.673
Median	0.271	0.206

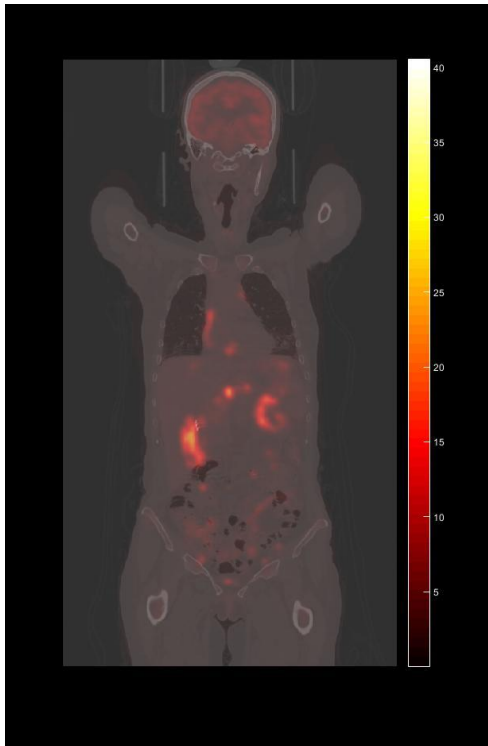
Metabolic Tumor Volume		Timepoint 1 (2015-09-21)	Timepoint 2 (2016-05-03)
Volume (mL)		2509.60	1749.40
Corrected Volume (mL)		1315.60	387.84

Data from this quantification report should be considered as the results of research with an evidence level 2 (Centre for Evidence-based Medicine) in phase of clinical approval.

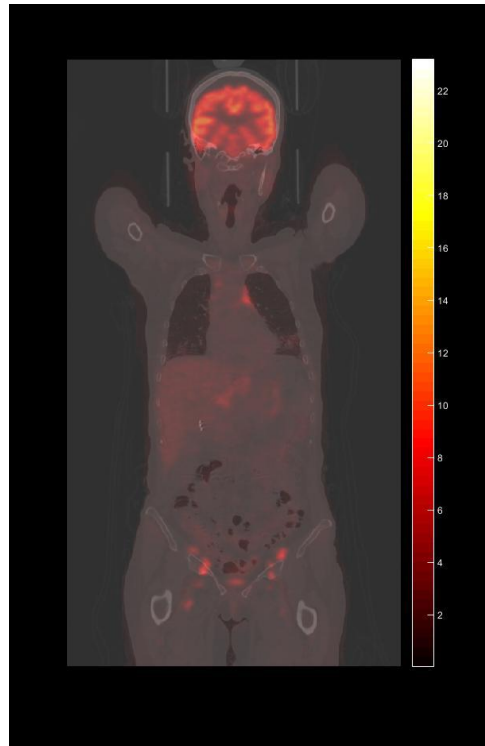
QUIBIM S.L. - Quantitative Imaging Biomarkers in Medicine. Av. Fernando Abril Martorell 106, Torre A, Biopolo La Fe, 46026, Valencia, SPAIN



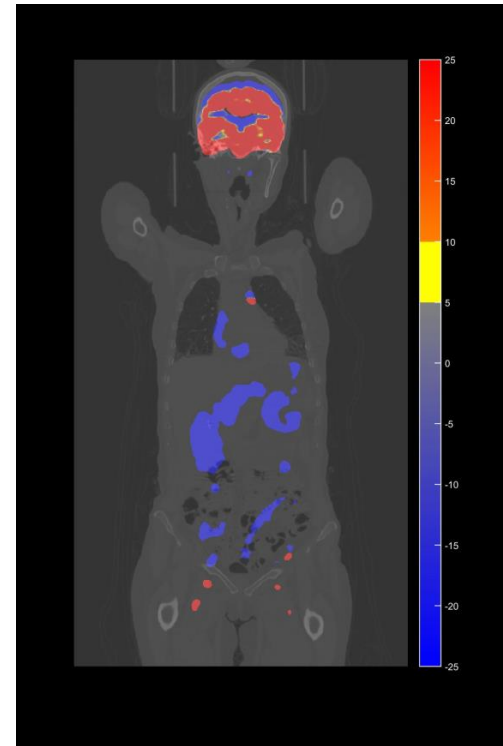
## Case 1



Timepoint 1 SUV



Timepoint 2 SUV



$\Delta$ SUV



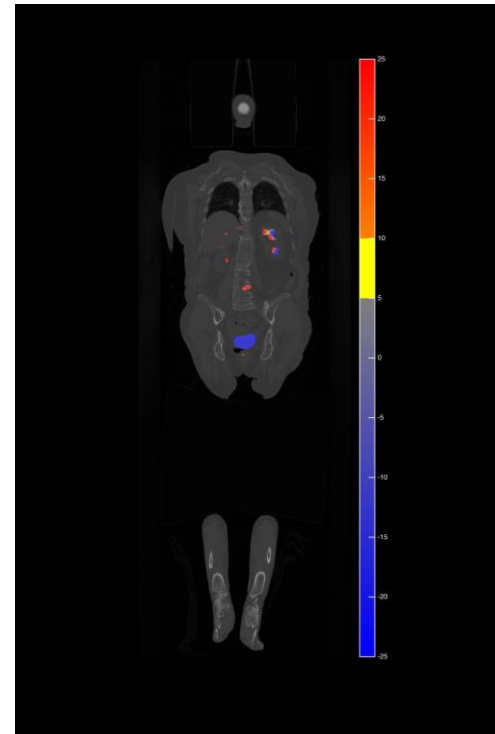
## Case 2



Timepoint 1 SUV



Timepoint 2 SUV



$\Delta$ SUV

- SUV can be a very useful tool for lesion assessment in oncologic diseases when its inherent biases are normalized and corrected.
- Elastic registration of the datasets is crucial for an accurate voxelwise  $\Delta$ SUV quantification.
- Structured reports are needed to offer radiologists and nuclear medicine physicians quantitative information to help their diagnostics.

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Ángel Alberich-Bayarri – PhD. GIBI Director and QUIBIM CEO



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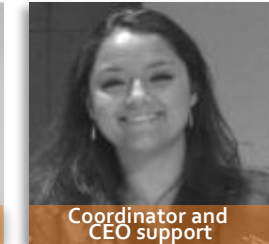
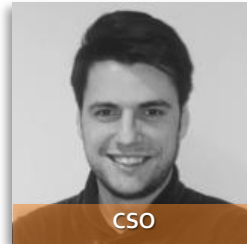
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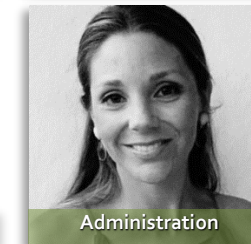
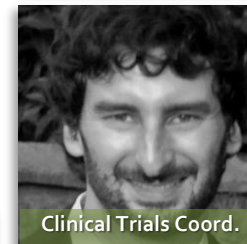
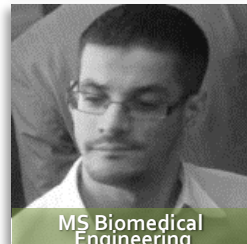


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