Generating paramatric images in Carimas using plugin of “Parametric image filter”

Key points:

1. All models implemented in Carimas can be used to generate parametric image (pixel-based parametric image).
2. Only pixels inside of selected ROIs/VOIs are calculated.
3. Output is dicom file, each of model parametres locates in its own folder.
4. It may be a time-consuming process, depending number of selected pixels, model and hardware system.

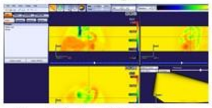
Download and installation of plugin of “Parametric image filter”.

1. This plugin is not default in Carimas.
2. It is a free-downloadable plugin from Carimas website.
3. Carimas->Help->Download plugins.
4. Select “Parametric image filter”.
5. Download and save it in a folder.
6. Carimas->Edit->Extra plugin folder: select plugin-saved folder
7. Restart Carimas.

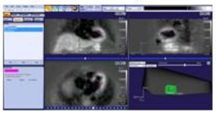
Step of “Parametric image filter”.

1. Load image.
2. Core->Segment->Define ROIs or VOIs. These include regions or volumes not only as parametric outputs, but also as input function.
3. Core->Analysis->Select a model, and define input function ROI or VOI.
4. Core->Segment->select ROIs or VOIs, in which parametric will be generated.
5. Core->Load: in image list, on select an image to click left button. On drop-down list, select “Parametric image filter”
6. On file dialog: select a folder for saving output parametric image.
7. Results: parametric images will be outputted in two ways:
    - Saved in selected folder as dicom files. Each subfolder holds a parametric. Subfolder name is parametric name.
    - Parametric images are added to image list.

Step 1 Load image

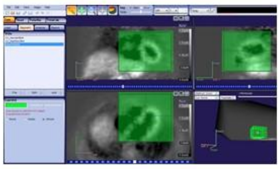


Step 2 Define ROIs/VOIs



Step 3 Select a model

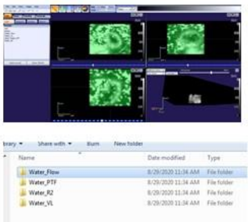
Step 4 Select ROIs/VOIs



Step 5 To run parametric image filter

Step 6 Select folder for output

Step 7 Results



Name	Date modified	Type
Water_Flow	8/29/2020 11:34 AM	File folder
Water_PTF	8/29/2020 11:34 AM	File folder
Water_R2	8/29/2020 11:34 AM	File folder
Water_VL	8/29/2020 11:34 AM	File folder

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Figure S1. Generating parametric images in Carimas using plugin of “Parametric image filter”.

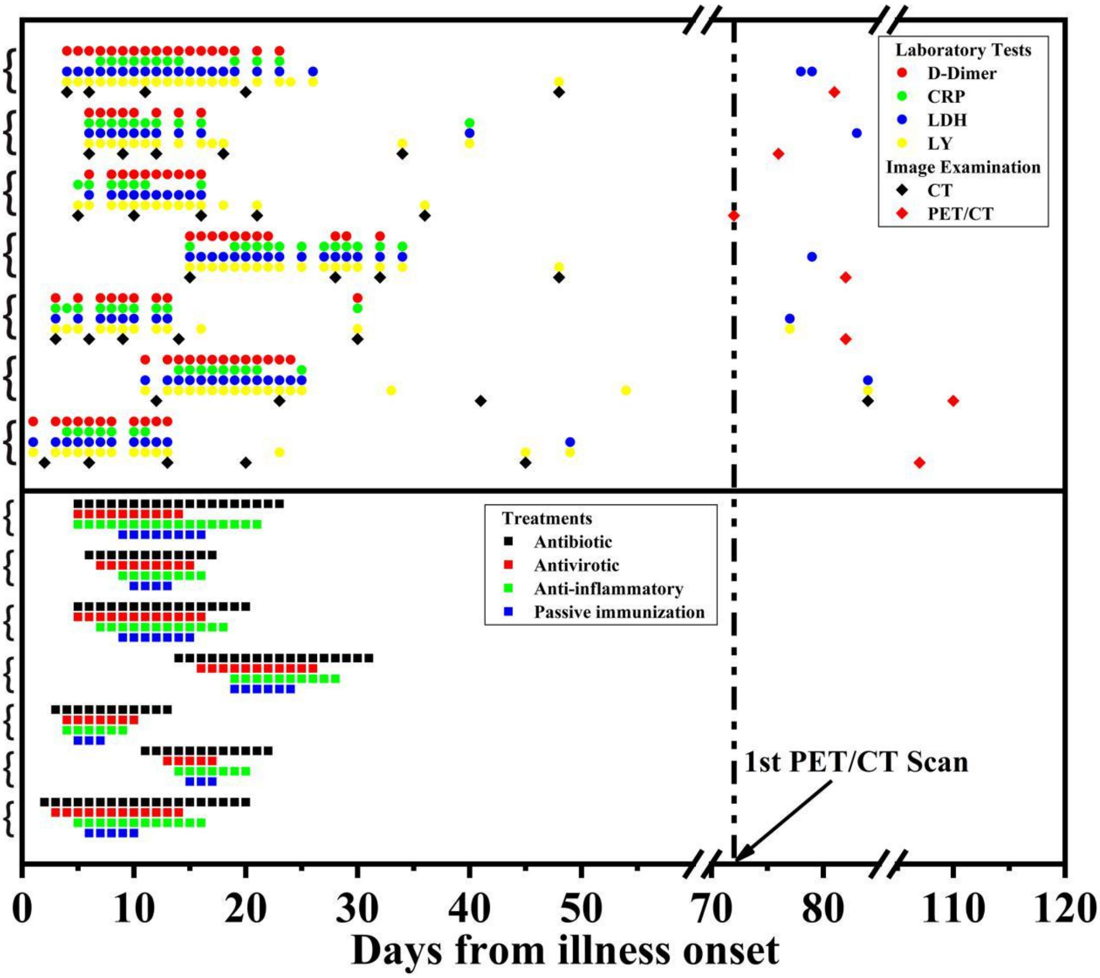

Figure S2. presents how the examinations were performed, and treatments were managed for each COVID-19 patient during the study period (e.g., given as time from illness onset to the day of last follow up). The dashed line indicates when the first PET/CT was performed. CRP, C-reactive protein; LDH, lactate dehydrogenase; LY, lymphocyte.

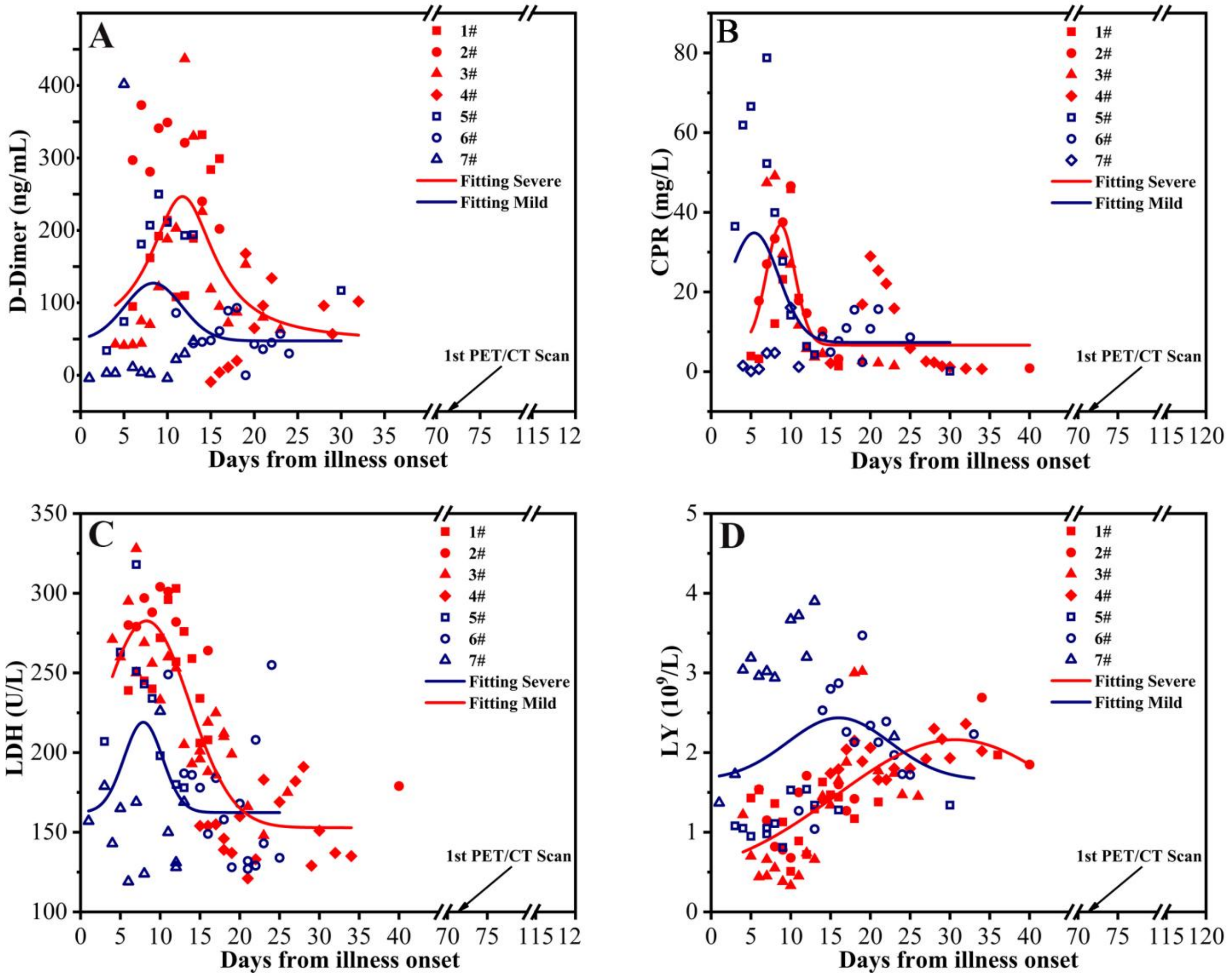

Figure S3. Laboratory tests indicates the full recovery states when the PET/CT were performed. (A). Among severe COVID-19 patients, D-Dimer increased notably and peaked 9–11 days after illness onset, followed by a rapid decreasing trend. Similar patterns were observed among mild COVID-19 patients within the first week after illness onset. However, the peak D-Dimer for mild was lower than that of severe COVID-19 and began to decline 3-4 days in advance. (B). CRP increased rapidly after illness onset among severe and mild COVID-19, and peaked at the 9th and 5th days, respectively. From there, declined rapidly and returned to normal range within 13-15 days. (C). Among mild COVID-19 patients, LDH increased in the first week after illness onset, and downward thereafter. Compared with mild COVID-19, the peak of LDH tended to occur at the illness onset for patients with severe COVID-19, followed by a long-term continuously decreasing trend. (D). LY increased rapidly after illness onset among severe and mild COVID-19, and peaked at 15-17 days and 29-31 days, respectively.

Table S1. Results of pulmonary function test at three months after discharge for the Case 1 patient.

Case 3	Spirometry			Diffusion capacity		Lung volume	
Parameter[#]	FVC%pred	FEV1%pred	FEF50%pred	DLCO%pred	DLCO/VA%pred	TLC%pred	RV%pred
	≥80% pred	≥80% pred	≥65%pred	≥80%pred	≥80%pred	≥80%pred	≥65%pred
	86.1	88.20	106.40	95.3	127.4	83..40	70.50

Values are presented as mean±standard deviation (SD). FVC, forced vital capacity; FEV1, forced expiratory volume in the first second; FEF_{50}, forced expired flow at 50% of FVC; DLCO, carbon monoxide diffusing-capacity; DLCO/VA, carbon monoxide diffusing-capacity corrected for alveolar volume; TLC, total lung capacity; RV, residual volume.

[#] The normal range of pulmonary parameter in each organ is indicated in parentheses.