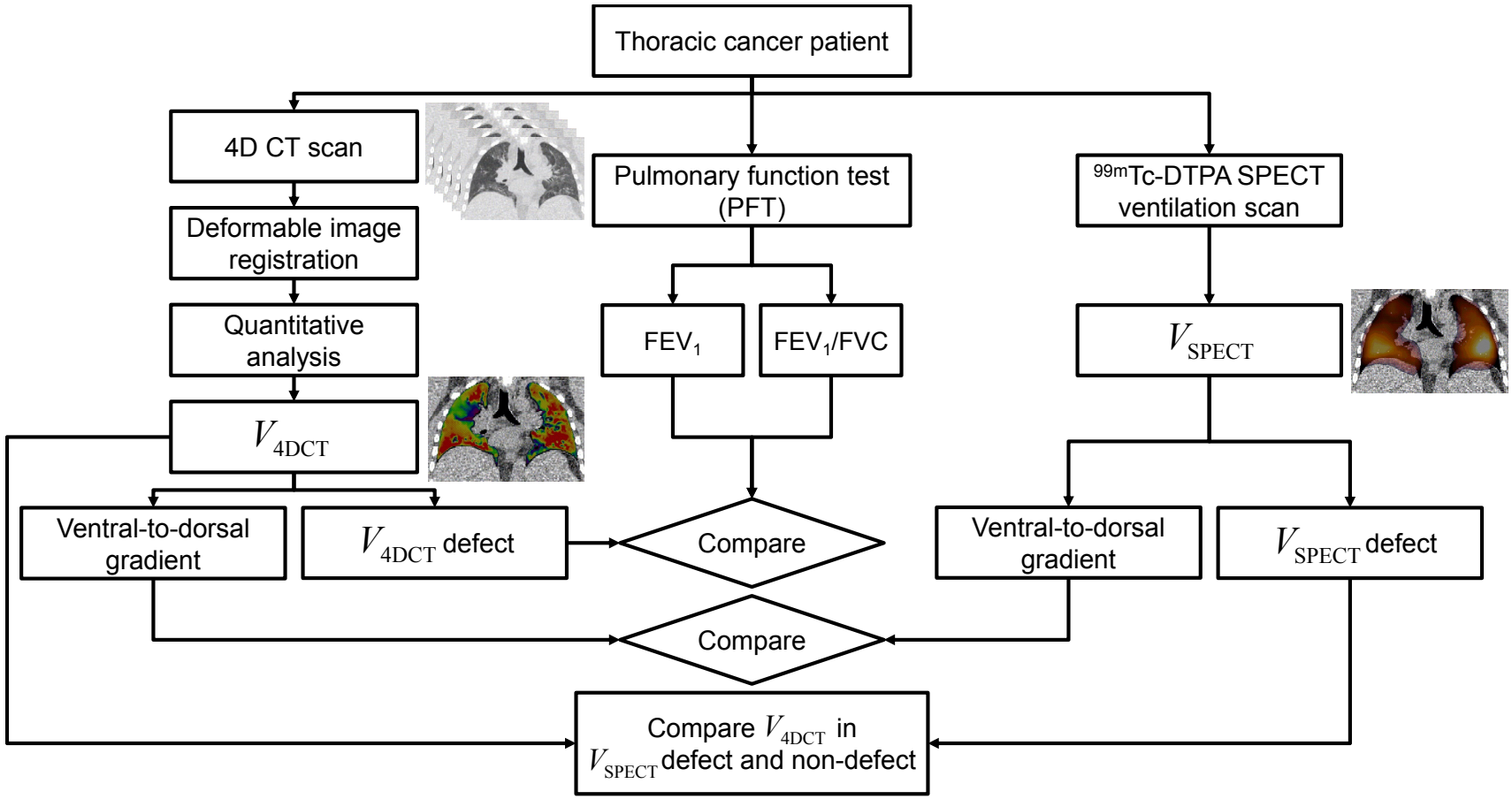


**Figure e1.** A schematic diagram for creating a 4D-CT ventilation image ($V_{4DCT}$) and comparing with pulmonary function test (PFT) (clinical reference for global lung function) and a SPECT ventilation image ($V_{SPECT}$) (clinical reference for regional ventilation). First, $V_{4DCT}$ defect parameters were quantified and compared with PFT measurements. The $V_{4DCT}$ defect parameters include: (a) the lowest 25$^{th}$ percentile $V_{4DCT}$ value, (b) absolute defect volume (l), and (c) % defect volume. The PFT measurements include: (1) forced expiratory volume in 1 s ($FEV_1$) (% predicted), and (b) $FEV_1$/forced vital capacity (FVC) (%). Second, the $V_{4DCT}$ images were aligned with the $V_{SPECT}$ images to compare $V_{4DCT}$ in $V_{SPECT}$ defect regions and non-defect regions. Finally, $V_{4DCT}$ was analyzed for a ventral-to-dorsal gradient and compared with that of $V_{SPECT}$.