



Response to the comment on “Assessment of cerebral glucose metabolism in patients with heart failure by 18F-FDG PET/CT imaging”

Response to the comments by Qian Wang MD

1. Patients should fast for at least 4 hours to allow optimal cerebral FDG uptake not influenced by increased serum glucose levels before cerebral FDG-PET imaging while glucose loading procedure should be prepared before cardiac FDG-PET. Therefore, two different protocol is required. Two separate injections of FDG and scans seem necessary.

Reply:

In the procedure of Cardiac PET scans, the pre-injection blood glucose level was 6.57 ± 0.93 mmol/L, which is optimal for ^{18}F -FDG cardiac uptake according to the guidelines for PET cardiology procedures of ASNC (5.55 - 7.77 mmol/L at time of injection of ^{18}F -FDG)¹.

As recommended in the EANM guidelines for PET brain imaging,² pre-injection of FDG, blood glucose levels should be checked prior to FDG administration to avoid cerebral FDG uptake influenced by increased serum glucose levels before cerebral FDG-PET imaging.² When hyperglycemia (> 8.89 mmol/L) is present, there is competition of elevated plasma glucose with FDG at the carrier enzyme. Then, FDG uptake is reduced in whole brain and stochastic noise is increased.² While the blood glucose level of 6.57 ± 0.93 mmol/L at the time of ^{18}F -FDG injection in our study was significantly lower than the level of > 8.89 mmol/L recommended by EANM procedure guidelines. Thus, it is not necessary with two separate injections of FDG, which not only increase the radiation but also prolong procedure time.

For another reason of ethic restriction, which minimized the examinational harm for heart failure patients.

All in all, two times injection could enhance risk for HF patients, also not feasible in clinical setting. The protocol used in our current study has been optimized to

acquire both cerebral and cardiac metabolism images by a single ^{18}F -FDG injection with one day protocol.

2. It is not clear that how healthy volunteers were involved in the study. Only brain scan data was demonstrated. Whether cardiac scan is performed for this normal control group is not introduced. The baseline characteristic data for this group is also lacking. Method of this study needs to be clarified.

Reply:

As for the volunteers in our study, fifteen healthy volunteers (age 50 (29-58) years, 10 men, BMI 24.5 ± 1.9 kg/m²) were recruited with a low probability ($< 5\%$) of cardiovascular disease (CVD) based on absence of symptoms and coronary risk factors, a normal physical examination. In our current study, we just want to have cerebral metabolism in normal volunteers as control, to compare the cerebral metabolism with that in patients with heart failure. So it is not necessary to get cardiac imaging in normal controls.

3. The procedure demonstrated from the flow chart in Figure 1 contradicted the method in the article.

Reply:

We carefully checked the flow chart in Figure 1 and method in our manuscript, we did not find discordance of the procedural orders with description.

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References

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2. Varrone A, Asenbaum S, Vander Borgh T, Booij J, Nobili F, Nagren K, et al. Eanm procedure guidelines for pet brain imaging using [^{18}F]fdg, version 2. *Eur J Nucl Med Mol* 2009;1:2103-10. doi:10.1007/s12350-021-02525-w

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