Technical background of ASL in dementia
Training School in Toulouse/FR, Sept 30 – Oct 2, 2013

Auto-evaluation Monday courses

ASL acquisition basics

1. You acquire pCASL scans with identical parameters in a healthy subject and a patient. In the healthy subject, no macrovascular signal is visible, whereas you observe bright vessels in the ASL images of the patient. What does this tell you about perfusion in the patient?

2. Why is pCASL less prone to underestimation of CBF than PASL in a subject with strongly increased global CBF?

ASL quantification

3. You acquire two pCASL scans: one with a PLD of 1900 ms, the other with a PLD of 2400 ms. Hereafter, you use the quantification formula of the white paper to quantify CBF. Which of the two scans will show the largest perfusion? Why?

4. For registration purposes somebody acquires a PD-weighted M0 scan with double the number of slices and half the slice thickness. How should the quantification be adopted to still provide correct quantification of CBF?

5. Assume that males and females have equal CBF. A large cohort of normal subjects is scanned with ASL and the white paper quantification is employed. Do you expect a gender effect in this dataset? If so, who will show a higher measured CBF, males or females?

Post-processing basics

6. In realignment parameters from ASL data, an artifactual effect of label/control on the parameters can sometimes be observed. What could this be due to? Which effects may this have on the measured CBF maps?

7. You analyze data from a cohort of AD patients, and compare mean CBF maps to those from an age-matched healthy control group. You hypothesize regional perfusion differences. Which post-processing step requires particular attention in this scenario? Why?

Pseudo-continuous labeling

8. Does a PCASL sequence have a higher or lower SAR than its counterpart based on CASL?

9. Why does a PCASL sequence make a lot of noise? How could you influence the noise level?

10. A patient has a dental implant on his left side. Subsequently, you notice a hypo-perfusion in the left ICA territory on the PCASL CBF map. What can cause this and how could you investigate this?