A comparison of the P300 and PET in patients with disorders of consciousness in absence of response to command

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Study design

• 12 DOC patients without response to command
  – 8 UWS, 4 MCS-

• FDG-PET
  → Glucose metabolism

• P300 BCI
  – 70% True pos = good performance
  – VT2: 2 stimuli, 1 deviant
    → Not related to consciousness
  – VT3: 3 stimuli, 2 deviants of which 1 attended upon request
    → Command following, eventually communication

False positives?
Signs of covert command following and preserved glucose metabolism

One patient (8%) with covert signs of command following (>70%)  
1/6 correct (and detected) answer for communication

Average SUV of patients with MCS-like PET, no covert command following

SUV of patient with signs of covert command following

More preserved left language network in patient with signs of covert command following as compared to patients with MCS-like PET and healthy controls

Right hemisphere  Left hemisphere
Conclusion

• 1/12 UWS/MCS- patients showed covert signs of command following

• Neuroimaging can confirm BCI results & reduce false positives
  → Clinical perspectives

• Future studies:
  – Repeated BCI acquisitions
  – Test communication paradigms in more patients
Thank you