

Density Spectral Array of BIS VISTA Monitoring System during Wada study

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Introduction

Amobarbital is a very short acting barbiturate which is injected in an internal carotid to perform Wada test for patients eligible for epilepsy-surgery. Using Density spectral array (DSA) of Bispectral index (BIS) VISTA™ Monitoring System (BVMS), we observed alpha oscillations in frontal areas, a characteristic event of general anaesthesia known as “anteriorization”¹. To confirm these findings, we initiated a retrospective study analyzing the EEG recordings with 10-20 system during Wada. The aim of the study was to compare alpha power between posterior and anterior areas.

Method

Six patients underwent intracarotid amobarbital (IA) administration were included in the study. The EEG was recorded during five stages:

- Epoch 1: baseline EEG, awake patient
- Epoch 2: left or right anaesthetized hemisphere (affected hemisphere)
- Epoch 3: washout period (30 min)
- Epoch 4: right or left anaesthetized hemisphere (healthy hemisphere)
- Epoch 5: washout period

For each EEG channel the mean alpha absolute power was calculated obtaining a single value for each Epoch. Wilcoxon signed rank test has been used to assess statistical significance for alpha power between each study brain zone and epoch.

Results

Although the administration of barbiturate, the posterior alpha power remains significantly higher than in anterior area. (**fig. 1**). A significantly increase in frontal alpha power has been observed during the administration of barbiturate. (**fig. 2**).

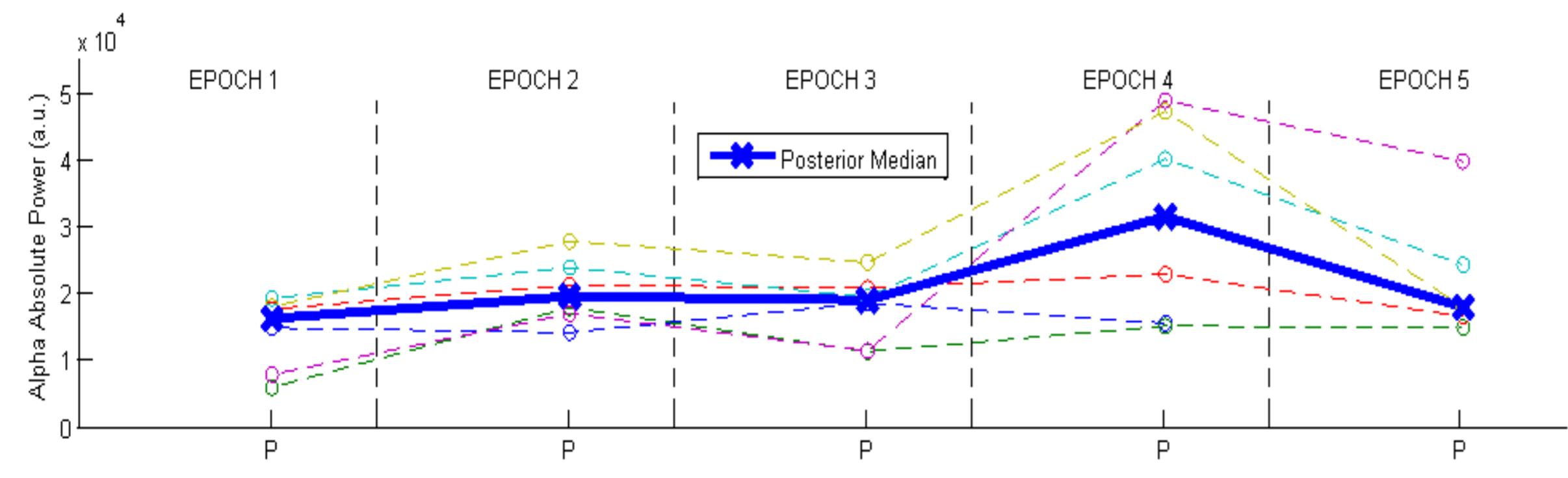
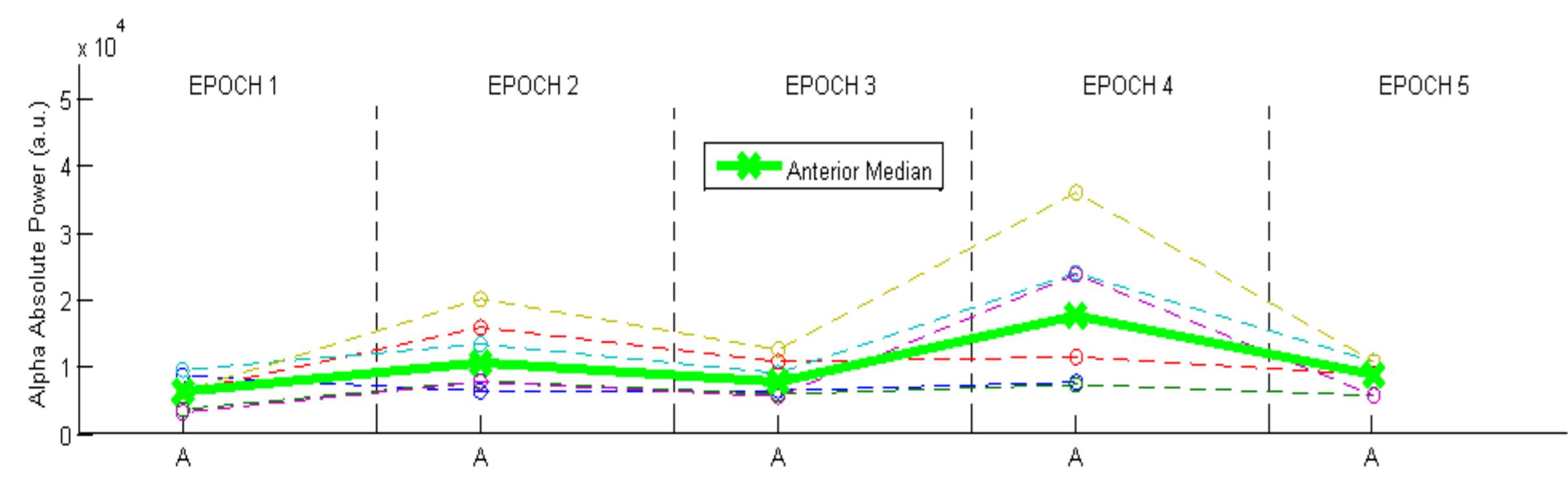
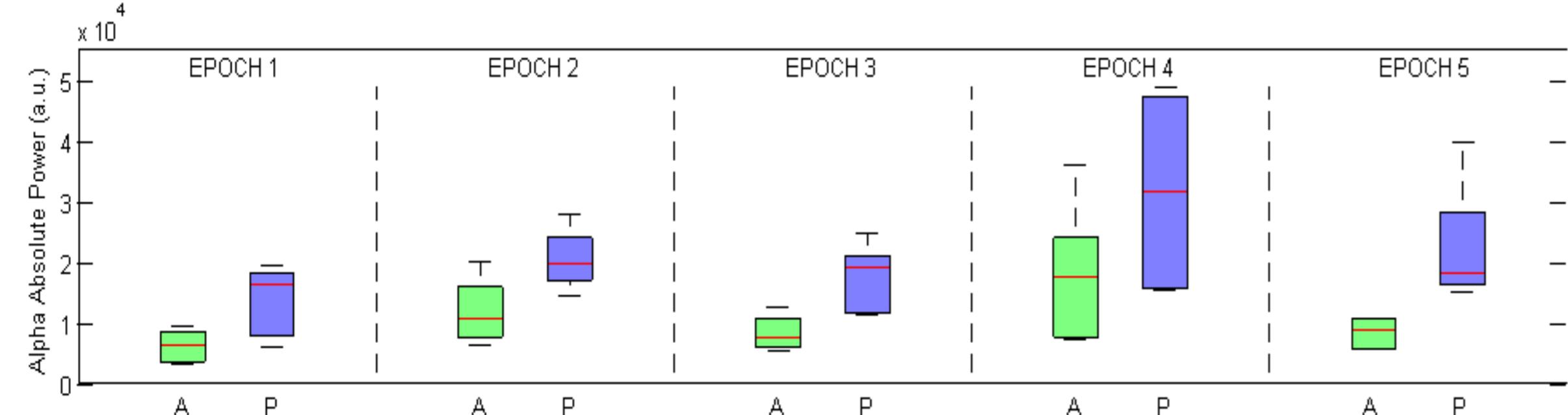


Fig. 1. Anterior and posterior absolute alpha power distribution during 5 epochs.

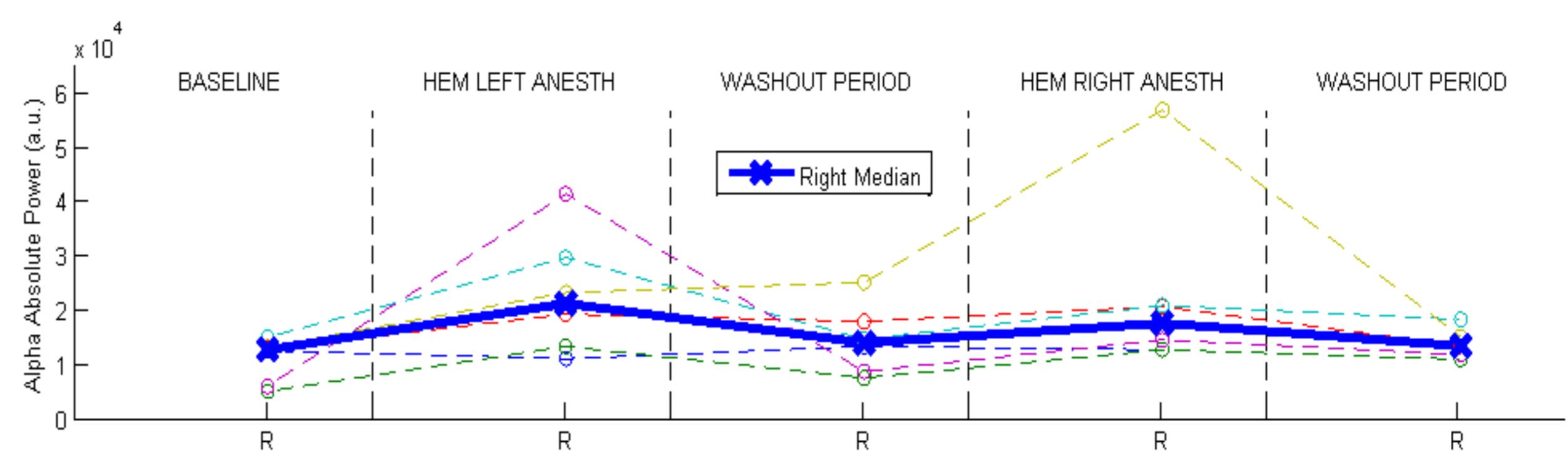
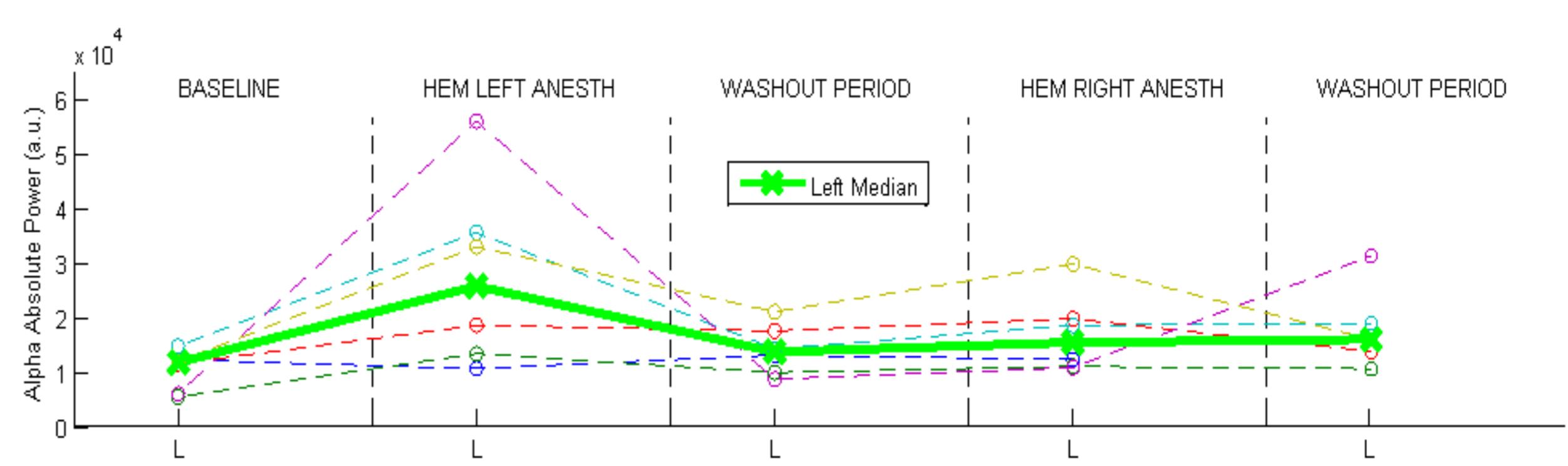
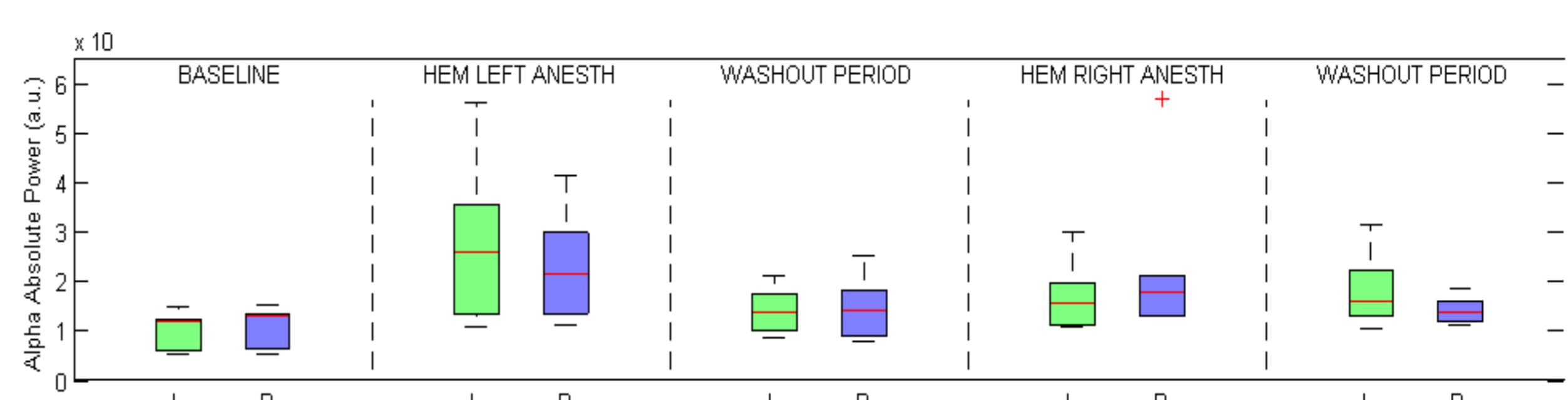


Fig. 2. Left and right absolute alpha power distribution during 5 epochs.

Discussion-Conclusion

DSA of BIS showed that the administration of IA in one hemisphere produced alpha oscillations in the EEG that are more evident in posterior position (There is not anteriorization, may be because they did not loss the consciousness). No statistical significance has been found between hemispheres due to sample size.

The presence of this EEG pattern could be produced by cross-flow of the amobarbital and/or to an altered connectivity in the non-anaesthetized hemisphere due to a transient functional disconnection from the injected hemisphere². This can be the cause of the alpha power difference between Epoch 2 and 4 too (**Fig 1**). It can difficult the cognitive performance evaluation of the second hemisphere, so it may be necessary more time in washout period (Epoch 3).

References

- 1- Purdon P et al. Clinical Electroencephalography for anesthesiologists. Anesthesiology 2015, October;123(4):1-24.
- 2- Douw L, Baayen JC, Klein M et al. Functional connectivity in the brain before and during intra-arterial amobarbital injection (Wada test). Neuroimage 2009;46:584-8.

Acknowledgements

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