Radial diffusivity role in classification of patients with antiphospholipid syndrome and "normal" radiological exams

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Abstract (300 word limit)

Statement of the Problem: Antiphospholipid syndrome is defined as an autoimmune disease which is associated to thrombosis with common impact on MRI. However non-thrombolitic APS patients usually present "normal" routine MRI examinations. So, there is an interest to find a way to diagnostic them. Methodology & Theoretical Orientation: Diffusion-Tensor MRI (DT-MRI) was performed on 30 women with recurrent pregnancy loss (15 controls [C]; 15 antiphospholipid patients [APS] with high blood titre of Lupus Anticoagulant or Anti-β2-Glicoprotein-I antibodies). Assessed with Radial Diffusivity (RD), preceding study has demonstrated microstructural brain disruption in APS patients. Here, RD values were extracted within the significant clusters, in which voxels were considered attributes to perform Hoeffding tree classification. This is an incremental decision-tree learning model that assumes the distribution of data don't change over time. Thus, small samples may be enough for optimal splitting threshold. Findings: A total of 5225 attributes were found significant to produce 96.67% of accuracy (29 instances). Kappa statistics was 0.93, mean absolute error was 0.03 and the relative absolute error was 6.59%. All, but one control, subjects were correctly classified, resulting sensitivity of 1 and specificity of 0.93. Conclusion & Significance: Radial Diffusivity index is an efficient attribute to classify patients with Antiphospholipid syndrome by means of Hoeffding tree algorithms. Moreover, RD values can be used as markers to follow the progression of the disease.

Image

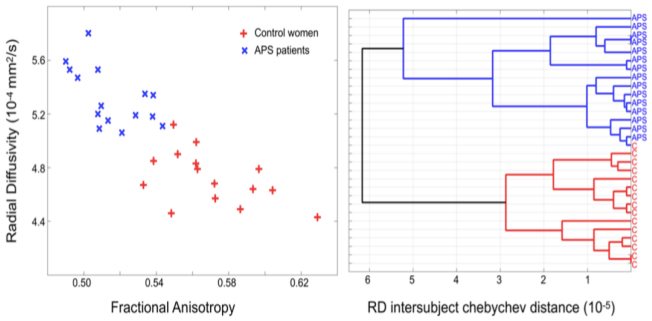


Figure 1: Classification of APS patients and Control women

Conferences:

1. March 2019 – European Congress of Radiology (ECR) – Oral presentation: Radial diffusivity role in classification of patients with antiphospholipid syndrome and "normal" radiological exams
2. October 2018 – Journées Françaises de Radiologie (JFR) – Oral presentation: Radial diffusivity role in classification of patients with antiphospholipid syndrome and "normal" radiological exams

Photograph



Biography (150 word limit)

Shridevi SANDIRAMOURTY is an engineer in computer science specialized in radiological imaging. She is currently completing a PhD thesis in Artificial Intelligence methods applied to radiological exams. More specifically, she develops and applies machine learning algorithms to MRI exams of obstetrical Antiphospholipid syndrome (APS) patients. She is involved in a long-term follow-up research study at the University Hospital of Nimes in France. She is also an Electromagnetism teaching assistant at the University of Nimes. The preliminary results of her ongoing research have been presented in several radiological conferences In Europe.

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Notes/Comments: