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## Radial diffusivity role in classification of patients with antiphospholipid syndrome and “normal” radiological exams

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**Statement of the Problem:** Antiphospholipid syndrome is defined as an autoimmune disease which is associated to thrombosis with common impact on MRI. However non-thrombotic 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-b2- 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.

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