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SYSTEMS-LEVEL QUALITY IMPROVEMENT

An Integrated Soft Computing Approach to Hughes Syndrome Risk Assessment

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Abstract The *AntiPhospholipid Syndrome* (*APS*) is an acquired autoimmune disorder induced by high levels of antiphospholipid antibodies that cause arterial and veins thrombosis, as well as pregnancy-related complications and morbidity, as clinical manifestations. This autoimmune hypercoagulable state, usually known as *Hughes* syndrome, has severe consequences for the patients, being one of the main causes of thrombotic disorders and death. Therefore, it is required to be preventive; being aware of how probable is to have that kind of syndrome. Despite the updated of antiphospholipid syndrome classification, the diagnosis remains difficult to establish. Additional research on clinically relevant antibodies and standardization of their quantification are required in order to improve the antiphospholipid syndrome risk assessment. Thus, this work will focus on the development of a diagnosis decision support system in terms of a formal agenda built on a *Logic Programming* approach to knowledge representation and reasoning, complemented with a computational framework based on *Artificial Neural Networks*. The proposed model allows for improving the diagnosis, classifying properly the patients that really presented this pathology (sensitivity higher than 85%), as well as classifying the absence of *APS* (specificity close to 95%).

Keywords Antiphospholipid syndrome · Systemic autoimmune diseases · Artificial neuronal networks · Knowledge representation and reasoning · Logic programming

This article is part of the Topical Collection on *Systems-Level Quality Improvement*.

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