Using a mixed linear regression model the association among the fatigue, disability and pain perception with clinical activity was conducted, corrected by age, smoking habits, time of disease evolution, BMI, previous biological/anti-JAK therapy administration and current dose of steroids. We observed a significant association among clinical activity and fatigue (P<0.001), disability (P<0.001) and pain perception (P<0.001). The statistical analyses showed a significant association where a high fatigue is increased in cases with high pain perception (P<0.001) and high number of swollen joints (P=0.002), but not in high levels of CRP and ESR. Fatigue was higher in those cases whom discontinued treatment (P=0.044) regardless of which therapy was chosen. No effect of age, time of disease evolution, steroid dose, BMI or previous therapy and smoking habits in the PROs values was observed.

Conclusion: PROs would be helpful in the disease control in those cases where a remote monitoring is needed, since HAQ or FACIT-FATIGUE index showed a significant association with clinical activity index in RA. Because of its ease for shipping and handling, and in the current health professional, PROs could be a useful tool in the disease control. Its implementation in the remote monitoring of RA patient, as has been the case of Covid-19 pandemic, results in an improvement of the clinical evaluation of RA patient, due to required information to clinical management is reported, avoiding presence consultation in those situations when it is required.

Disclosure of Interests: None declared.


POS0545
A NEURAL NETWORK BASED CLUSTERING MODEL OF A COLOMBIAN COHORT OF RHEUMATOID ARTHRITIS PATIENTS

K. J. Franco-Cuervo1, K. Maldonado-Calderón2, L. F. Niño Vásquez3, G. Quintana Lopez2,3,4,5,6; 1Universidad Nacional de Colombia, Reumatismos Research group, LSI research group, Bogotá, Colombia, 2Fundacion Santa Fe de Bogota University Hospital, Reumatismos research group, Department of Internal Medicine, Bogotá, Colombia, 3School of Engineering - Universidad Nacional de Colombia, LSI research group, 4Department of Systems and Industrial Engineering, Bogotá, Colombia, 5School of Medicine - Universidad de los Andes, Department of Internal Medicine, Bogotá, Colombia, 6School of Medicine - Universidad Nacional de Colombia, Department of Internal Medicine, Bogotá, Colombia

Background: Rheumatoid Arthritis (RA) is a chronic disease characterized by inflammation and joint pain. In daily clinical practice, it is usual to have multiple variables of different nature to define the current state of the disease, the patient’s risk profile, and the subsequent optimal treatment.

Objectives: We aimed to identify the most influential variables from a suitable multi-variable clustering and its labeling for an outpatient clinic-based cohort of Colombian RA patients.

Methods: We execute a clustering model (Kohonens self-organizing map – SOM), applied to 23 variables (17 continuous and 6 discrete) obtained from 14,811 related follow-up visit records hosted on a previously preprocessed database of a cohort with data prospectively collected between 2013 and 2020. The included variables were the disease activity indexes (DAS28-ESR/CRP, CDAI, and SDAI; as outcome variables), serological status (autoantibodies positivity), and patients’ sociodemographic and clinical characteristics. Clustering method used for generating the groups was SOM with a size of 25 x 25 neurons and 10000 iterations. SOM allows us to generate the groups by the comparison of the Euclidean distance in the hyperspace generated by the dimensions composed by the variables. After clustering, a discrete label built upon the categorization of the disease activity allowed us to identify the behavior of the included variables regarding the aforementioned outcomes, without affecting the clustering process. We evaluated the corresponding weights and their influence on the proposed neural network.

Results: Data from a total of 1,277 patients were included in the analysis. When both continuous and discrete variables were integrated, discrete data were transformed using the one-hot encoding method, creating new variables according to the corresponding number of categories. Dissimilarity between groups was very low when considering only the continuous variables, and it increases when adding all the other variables; likewise, regardless of the clinimetric index used for labeling, the clustering organization remains (Figure 1a).

Figure 1. Clusters and heatmaps of variables’ weights

In the construction of the groups, the influence of the RF and ACPA positivity was confirmed; furthermore, the antinuclear antibodies (ANAs) delivered a significant effect, especially those with negative ANAs or positive ANAs with a homogeneous pattern, on disease activity (Figure 1b).

Conclusion: SOM, as well as other artificial neural networks (ANN) are important methods for clustering and 2D visualization, due to the multivariate nature of the clinical data and its difficult visualization in the generated n-dimensional hyper-space. The utilized labels confirm that the clustering is adequate when considering that there was an identical grouping behavior for those registers with similar characteristics and an equivalent disease activity score. The findings of this research provide insights into a potentially pivotal role of the influence of RF, ACPA, and ANAs and their interaction with the proposed outcome variables in the understanding and development of future classification or prediction models; based on artificial intelligence and big data methods rather than on classical epidemiological approaches.

Disclosure of Interests: None declared.


POS0546
URINARY METABOLOMIC BIOMARKER CANDIDATES FOR SKELETAL MUSCLE WASTING IN PATIENTS WITH RHEUMATOID ARTHRITIS

M. De Oliveira1, R. Cavaleiro Do Espirito Santo1, R. Xavier1, P. Alabarse2, J. Miranda de Souza Silva1 on behalf of Laboratory of Autoimmune Diseases - HCFA, 1Clinicas Hospital, Rheumatology, Porto Alegre, Brazil, 2University of California, Rheumatology, San Diego, United States of America, 3University Hospital Münster, University Hospital Münster, Munster, Germany

Background: Rheumatoid arthritis (RA) is an autoimmune disease that affects the joints, leading to chronic synovial inflammation and local tissue destruction. Extra-articular manifestations may also occur, such as changes in body composition. Skeletal muscle wasting is often observed in patients with RA, but methods for assessing loss of muscle mass are expensive and not widely available, limiting their use in clinical practice and their evaluation in longitudinal studies. Metabolic analysis has shown great potential for identifying changes in the metabolite profile of patients with autoimmune diseases and can advance our understanding of pathogenic mechanisms, early diagnosis, treatment, and follow-up. In this setting, urine metabolic profiling in patients with RA may be a useful tool to identify skeletal muscle wasting.

Objectives: To evaluate the urinary metabolic profile of patients with rheumatoid arthritis and associate it with skeletal muscle loss.

Methods: We recruited patients aged 40–70 years with RA according to the 2010 ACR/EULAR classification criteria. We measured disease activity by the
A.

Disease Activity Score in 28 joints using the C-reactive protein level (DAS28-CRP). We determined muscle mass according to DXA-derived appendicular lean mass index (ALMI) by summing the lean mass measurements for both arms and legs and dividing them by height squared (kg/m²). We performed urine metabolic analysis by nuclear magnetic resonance (NMR) spectroscopy using the BAYESIL and MetaboAnalyst software packages. We performed principal component analysis (PCA) and partial least squares-discriminant analysis (PLS-DA), followed by Spearman’s correlation analysis. We set the significance level at p<0.05 for all analyses. We combined Receiver Operating Characteristic Curve (ROC) and logistic regression analyses to establish a diagnostic model.

**Results:** We included 90 patients with RA. Most patients were women (86.7%), with a mean age of 56.5 (SD, 7.3) years and a median DAS28-CRP of 3.0 (IQR, 1.0–3.0). We identified 15 metabolites that showed high variable importance in projection (VIP scores) by MetaboAnalyst. Of these, dimethylglycine (r=−0.203; p=0.055), oxoisovalerate and isobutyric acid (r=−0.249; p=0.055) were significantly correlated with ALMI. Based on low muscle mass (ALMI ≤6.0 m² for women and ≤8.1 m² for men), we established a diagnostic model with dimethylglycine (Area Under the Curve - AUC=0.65), oxoisovalerate (AUC=0.49) and isobutyric acid (AUC=0.83), with significant sensitivity and specificity.

**Conclusion:** Isobutyric acid, oxoisovalerate and dimethylglycine from the samples were associated with low skeletal muscle mass in patients with RA. These findings suggest that this group of metabolites may be further tested as biomarkers for identification of skeletal muscle wasting.

**REFERENCES:**


**Disclosure of Interests:** None declared.

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B.

Table 1.

<table>
<thead>
<tr>
<th></th>
<th>TC+T2T group (n=95)</th>
<th>Controls (n=61)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Swollen 28 joint count</td>
<td>6.6 (4)</td>
<td>5.1 (5)</td>
</tr>
<tr>
<td>Tender 28 joint count</td>
<td>8.2 (5)</td>
<td>6.2 (6)</td>
</tr>
<tr>
<td>ESR</td>
<td>48.1 (29)</td>
<td>37.1 (25)</td>
</tr>
<tr>
<td>CRP</td>
<td>21.3 (29)</td>
<td>16.9 (25)</td>
</tr>
<tr>
<td>DAS28</td>
<td>5.5 (1)</td>
<td>4.6 (1)</td>
</tr>
<tr>
<td>CDAI</td>
<td>24.5 (11)</td>
<td>18.3 (11)</td>
</tr>
<tr>
<td>HAQ</td>
<td>1.91 (0.6)</td>
<td>0.98 (0.7)</td>
</tr>
<tr>
<td>Fatigue (VAS)</td>
<td>50.1 (29)</td>
<td>46.6 (30)</td>
</tr>
<tr>
<td>Pain (VAS)</td>
<td>579 (24)</td>
<td>473(30)</td>
</tr>
<tr>
<td>ACPA positive (%)</td>
<td>77%</td>
<td>53%</td>
</tr>
<tr>
<td>Radiographic changes in hands or feet at inclusion (%)</td>
<td>12%</td>
<td>18%</td>
</tr>
<tr>
<td>Smoker (%)</td>
<td>16%</td>
<td>7%</td>
</tr>
<tr>
<td>Methotrexate started at inclusion (%)</td>
<td>78%</td>
<td>85%</td>
</tr>
<tr>
<td>Prednisolone started at inclusion (%)</td>
<td>100%</td>
<td>97%</td>
</tr>
</tbody>
</table>

Mean and standard deviation (SD) if not otherwise stated.

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**Figure 1.** The advantage of tight control and treatment to target in new-onset RA patients in daily rheumatology practice: results from a contemporary university clinic inception cohort.

**Background:** Since 2018, all patients with new-onset rheumatoid arthritis (RA) at the Department of Rheumatology, Skane University Hospital, Lund, Sweden, are offered to participate in a "tight control and "treat to target" (TC+T2T) follow-up strategy. This strategy includes regular follow-up visits to a rheumatologist (at diagnosis and 3, 6, 12, 18, 24 months) plus physical/telephone consultations with a rheumatology nurse between physician visits, both with disease activity assessments and, if needed, adjustment/intensification of anti-rheumatic treatment aiming for remission.

**Objectives:** To explore the possible advantages of integrating this TC+T2T strategy over routine care, aiming more systematically for remission (DAS28<2.6 or CDAI<2.8), in clinical practice of new-onset RA.

**Methods:** Patients followed by the TC+T2T strategy were compared to new-onset RA patients followed according to routine care at the same department and during the same period. Data on disease and treatment characteristics, as well as outcome measures during follow-up were retrieved from the Swedish Rheumatology Quality register (SRQ). In total, 156 patients with at least 3 months follow-up between 2018 and 2021 were included; 95 followed according to the TC+T2T strategy and 61 according to routine care. Percentage females/mean age at onset/mean symptom duration at diagnosis were 79%/57 years/4 months (TC+T2T) and 62%/62 years/7 months (routine care). The change in DAS28 and CDAI from baseline to 12 months follow-up were compared between the two strategies by linear regression analyses, adjusted for sex, age, symptom duration, and DAS28 or CDAI, respectively, at baseline. In addition, changes in patient-reported outcomes (fatigue, pain and HAQ) are calculated.

**Results:** Disease and treatment characteristics at inclusion (diagnosis) are summarized in the Table 1.