Rheumatologic autoimmune disease patients associated with metabolic syndrome and cardiovascular disease
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Results

Table 1. Demographics Table

<table>
<thead>
<tr>
<th>Type of RAID</th>
<th>Mean Age (years)</th>
<th>Male, n (%)</th>
<th>White, n (%)</th>
<th>Mean BMI</th>
</tr>
</thead>
<tbody>
<tr>
<td>non-RAID</td>
<td>52.1 ± 19.9</td>
<td>142 (35.1%)</td>
<td>304 (75.2%)</td>
<td>27.7</td>
</tr>
<tr>
<td>RA only</td>
<td>67.1 ± 15.2</td>
<td>185 (23.9%)</td>
<td>492 (63.5%)</td>
<td>28.9</td>
</tr>
<tr>
<td>RA w/others only</td>
<td>62.3 ± 15.5</td>
<td>33 (19.9%)</td>
<td>110 (66.3%)</td>
<td>28.7</td>
</tr>
<tr>
<td>CT disease w/others only</td>
<td>59.4 ± 17.4</td>
<td>46 (21.1%)</td>
<td>139 (63.8%)</td>
<td>27.5</td>
</tr>
<tr>
<td>CT disease only</td>
<td>72.4 ± 15.7</td>
<td>50 (28.9%)</td>
<td>135 (78.0%)</td>
<td>27.2</td>
</tr>
<tr>
<td>Psoriasis and Lupus</td>
<td>58.9 ± 14.0</td>
<td>48 (52.2%)</td>
<td>80 (87.0%)</td>
<td>30.4</td>
</tr>
<tr>
<td>Multiple RAID</td>
<td>69.1 ± 14.0</td>
<td>22 (26.5%)</td>
<td>67 (80.7%)</td>
<td>28.1</td>
</tr>
</tbody>
</table>

**Objective**

To determine association between particular RAID groupings and prevalence of NAFLD, metabolic syndrome (hypertension, type II diabetes, and hyperlipidemia), and CVD.

**Methods**

- A retrospective, descriptive study was conducted with the use of Epic data for patients with RAID admitted to the five Inova Hospitals: 1,935 patients (over the age of 18) admitted 2017-2018.
- Data at admission include: diagnoses, medical history, demographics, laboratory values, co-morbidities and all other health-related information.
- Patient information regarding diagnosis (of RAID, hypertension, type II diabetes, hyperlipidemia, and cardiovascular disease) was identified via ICD 10 code, and the BMI and AST/ALT ratio was identified with lab values.
- Patients with NAFLD were identified with the use of metabolic syndrome (type II diabetes, hypertension, and hyperlipidemia).
- All forms of RAID were placed into six sub-categories of RAID: RA only (for Rheumatoid Arthritis only), RA w/others (for Rheumatoid Arthritis with co-occurrence of other forms of RAID), CT disease only (for autoimmune connective tissue disease only), CT disease w/others (for connective tissue disease with co-occurrence of other forms of RAID), Psoriasis and Lupus (for Psoriasis and Lupus only), and multiple RAID (for patients with three or more types of RAID diagnoses).

**Background**

- Individuals with rheumatologic disease have serological markers of inflammation which suggests immune system abnormalities.
- Rheumatologic autoimmune disease (RAID) has a high prevalence of cardiovascular disease (CVD).
- Non-alcoholic fatty liver disease (NAFLD) involves inflammation of the liver, and has a high prevalence of CVD, particularly NAFLD is an independent predictor of coronary artery disease.
- Furthermore, preliminary data suggests that there might be an association between RAID and NAFLD; however, it has not been definitively proven.
- It is hypothesized that RAID patients are predisposed to NAFLD due to the inflammatory environment of RAID or RAID medications (e.g., steroids).
- Therefore, if this RAID population presents a high prevalence of NAFLD, this suggests that these patients might be at risk of metabolic syndrome and CVD.

**Figure 1. Prevalence of Hypertension, Type II Diabetes, Hyperlipidemia, and Cardiovascular Disease in RAID Patients**

**Figure 2. Distribution of BMI in RAID Subgroups**

**Figure 3. Distribution of AST/ALT Ratio in RAID Subgroups**

**Conclusions**

- Particular types of RAID are strongly associated with the metabolic risk factors and/or cardiovascular disease, especially "RA only" sub-group with hypertension, type II diabetes, and hyperlipidemia as well as "CT disease only" with type II diabetes and hyperlipidemia.
- These findings suggest that particular types of RAID (rather than all forms of RAID) can be predisposed to metabolic syndrome and/or cardiovascular disease.
- The AST/ALT ratio was not consistent with NAFLD diagnosis.

**Results**

- Statistical significant association (p<0.001) between RAID patient population with hypertension, type II diabetes, hyperlipidemia, and CVD.
- Statistical significant association between rheumatoid arthritis and hypertension (p<0.001), vasculitis/other necrotizing vasculopathies and hypertension (p<0.035), rheumatoid arthritis and type II diabetes (p<0.001), AI connective tissue disease and type II diabetes (p=0.014), rheumatoid arthritis and hyperlipidemia (p<0.001), vasculitis/other necrotizing vasculopathies and hyperlipidemia (p=0.011), rheumatoid arthritis and cardiovascular disease (p=0.011), and AI connective tissue disease and cardiovascular disease (p=0.033).
- 53.52% of patients had a normal AST/ALT ratio, and 46.48% had elevated/high AST/ALT ratio. However, there was no statistically significant association between AST/ALT ratio (a component of NAFLD diagnosis) and RAID.