Background

- Takayasu’s arteritis (TAK) is a rare large vessel vasculitis predominantly affecting young women
- Early detection of disease activity may reduce the risk of vascular complications
- Various imaging modalities may assist clinicians in assessing disease activity

Objective

Our objective was to determine the effectiveness of imaging modalities in patients with suspected or diagnosed TAK for early diagnosis and accurate disease activity assessment

Methods

- We searched MEDLINE and EMBASE databases
- Inclusion criteria: studies reporting on the test performance of various imaging modalities in TAK (diagnosis by physician or classification criteria)
- Exclusion criteria: case reports, case series with < 5 patients and reviews
- Two authors independently screened articles, assessed risk of bias, reviewed references for additional studies (hand search) and extracted data
- Studies were of the following imaging modalities: sonography, magnetic resonance angiography (MRA), computed tomography angiography (CTA) and fluorodeoxyglucose-positron emission tomography (FDG-PET)
- A random effects model with inverse-variance weighting was performed to determine sensitivity and specificity of imaging modalities for the diagnosis and assessment of disease activity in TAK

Results

Table 1. Studies of Sonography for Diagnosis of TAK Compared to Clinical Diagnosis

<table>
<thead>
<tr>
<th>Characteristics of Studies</th>
<th>Publication Year, range</th>
<th>Study Design, N of studies</th>
<th>Cross-sectional</th>
<th>Prospective</th>
<th>Sample Size, N</th>
<th>% Female, range</th>
<th>Mean age in years, range</th>
<th>Sensitivity (%) CI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1991-2006</td>
<td>4</td>
<td>32-125</td>
<td></td>
<td>51-100</td>
<td>35-47</td>
<td>1.0 (0.98-1.00), 0%</td>
<td>0.83 (0.73-0.90), 0%</td>
</tr>
</tbody>
</table>

Figure 2. Meta-Analysis of Sonography Studies for Diagnosis of TAK

- Table 2. Studies of MRA and CTA for Diagnosis of TAK Compared to Conventional Angiography

<table>
<thead>
<tr>
<th>Characteristics of Studies</th>
<th>Publication Year, range</th>
<th>Study Design, N of studies</th>
<th>Cross-sectional</th>
<th>Prospective</th>
<th>Sample Size, N</th>
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<th>Mean age in years, range</th>
<th>Sensitivity (%) CI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1997-2011</td>
<td>1</td>
<td>10-30</td>
<td></td>
<td>70-100</td>
<td>25-44</td>
<td>0.92 (0.90-0.95), 89%</td>
<td>0.92 (0.90-0.95), 76%</td>
</tr>
</tbody>
</table>

Figure 3. Meta-Analysis of Positron Emission Tomography (PET) Studies for Assessing Disease Activity in TAK

- Table 3. Studies of CTA and MRA for Identifying Disease Activity in TAK Compared to Clinical Assessment

<table>
<thead>
<tr>
<th>Characteristics of Studies</th>
<th>Publication Year, range</th>
<th>Study Design, N of studies</th>
<th>Prospective</th>
<th>Sample Size, N</th>
<th>% Female, range</th>
<th>Mean age in years, range</th>
<th>Sensitivity (%) CI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1995-2012</td>
<td>2</td>
<td>10-24</td>
<td>70-80</td>
<td>28-38</td>
<td>0.88 (0.80-0.97)</td>
<td>0.48 (0.40-0.56), 92%</td>
</tr>
</tbody>
</table>

- Table 4. Studies of PET for Identifying Disease Activity in TAK Compared to Clinical Assessment

<table>
<thead>
<tr>
<th>Characteristics of Imaging Procedure</th>
<th>Publication Year, range</th>
<th>Study Design, N of studies</th>
<th>Cross-sectional</th>
<th>Prospective</th>
<th>Sample Size, N</th>
<th>% Female, range</th>
<th>Mean age in years, range</th>
<th>Sensitivity (%) CI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2004-2014</td>
<td>2</td>
<td>6</td>
<td>70-75</td>
<td>28-48</td>
<td>0.51 (0.43-0.60)</td>
<td>0.67 (0.58-0.76), 82%</td>
<td></td>
</tr>
</tbody>
</table>

Figure 4. Results

- Figure 5. Conclusions

- Figure 6. Limitations

- Figure 7. Acknowledgements

Figure 1. Search Results

- Few studies of imaging modalities for TAK diagnosis with standard comparator
- Studies examined populations with established TAK
- There were no studies that included patients with suspected TAK
- MRA was highly sensitive for TAK
- Sonography and CTA was moderately sensitive for TAK diagnosis

Conclusions

- All studies examining the utility of imaging for diagnosis of TAK were of patients with a clinical diagnosis of TAK
- MRA was highly sensitive and sonography and CTA were moderately sensitive for TAK diagnosis
- The role of imaging modalities in assessing disease activity in TAK remains unclear: PET and MRA are neither sensitive nor specific, but more studies of MRA are needed
- The rarity of TAK and lack of standardized measures of disease activity make these studies challenging
- New imaging modalities, such as combination PET with CT or MRA may be better options for assessing disease activity

Limitations

- Studies were small, cross-sectional, single centre studies, and subject to bias
- Inconsistent definitions for imaging and clinical indices of activity as a source of heterogeneity
- The gold standard for assessing disease activity is undefined