ABSTRACT

Background: Fibromuscular dysplasia (FMD) is a disease of medium-sized arteries that leads to beading, stenosis, dissection or aneurysm. The use of imaging for initial diagnosis and subsequent follow-up of patients with FMD has not been well-described.

Methods: Imaging data for initial diagnosis based on study date, further evaluation, and subsequent follow-up is reported for the 340 patients (pts) with renovascular or cerebrovascular FMD diagnosis enrolled in the FMD registry from 7 U.S. sites.

Results: Among pts with renal artery involvement alone, ultrasound was the most common initial diagnostic modality used (77% of patients underwent ultrasound), followed by catheter-based angiography (66.7%), MR angiography (39.7%), and CT angiography (38.7%), or both (41.4%), and intravascular ultrasound (5.6%). Among pts with extracranial or vertebral involvement alone, ultrasound remained the most commonly used imaging modality (79.2%); however, fewer pts underwent catheter-based angiography (37.5%). Patients with both renal and extracranial/vertebral involvement underwent more imaging overall, with ultrasound (63.8%) and catheter-based angiography (64.1%) being the most common modalities. At follow-up, ultrasound remained the most commonly used modality among pts with renal involvement alone (72.3%), extracranial/vertebral alone (86.2%), or both (71.1%). Catheter-based angiography was also commonly used for renal alone (38.3%), extracranial/vertebral alone (20.7%), or both (40%). 74.5% of patients who had renal FMD underwent ultrasound/vertebral artery imaging, and 83.7% of patients who had extracranial/vertebral FMD underwent renal artery imaging. Of patients diagnosed with extracranial FMD, 63.7% also underwent imaging of the intracranial vasculature.

Conclusions: Multiple imaging modalities are used to diagnose FMD, but ultrasound remains the most commonly used modality at the time of initial imaging and at subsequent follow-up. The majority of pts with renal artery FMD also had imaging of the extracranial/vertebral arteries, and vice versa. However, approximately 13% of patients with extracranial FMD did not undergo an imaging study of the intracranial circulation to rule out intracerebral aneurysms. Further study is required to standardize the optimal diagnostic and follow-up approach in this disorder.

BACKGROUND

• Fibromuscular dysplasia (FMD) is a non-inflammatory disease of medium-sized arteries that can affect any arterial bed.
• Renal and carotid arteries are the most frequently involved vessels.
• Disease can lead to beading, stenosis, dissection or aneurysm.
• Diagnosis relies heavily on the use of imaging of the affected vasculature.
• Current practices for the selection of imaging modality have not been well-described.
• Additionally, the frequency of imaging other commonly affected vascular beds once a primary diagnosis of FMD is made has not been investigated.

OBJECTIVES

• Determine the frequency of imaging modality use at the time of initial diagnosis and at subsequent follow-up for patients with renovascular and cerebrovascular FMD.
• Examine the frequency of imaging performed on additional vascular beds once FMD is diagnosed in either the renal or carotid arteries.

METHODS


Michigan Cardiovascular Outcomes Research and Reporting Program (MCORRP) serves as the coordinating center.

A standardized data collection form including diagnostic imaging tests performed is completed for each patient both at time of enrollment and at subsequent follow-up visits.

Summary statistics presented as total number and percentages of patients.

RESULTS

Vascular Bed Involvement vs. Imaging Modality Used at Time of Initial Diagnosis and Follow-Up

<table>
<thead>
<tr>
<th>Imaging Modality</th>
<th>Renal</th>
<th>Extracranial or vertebral</th>
<th>Renal and extracranial/vertebral</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ultrasound</td>
<td>Diagnosis</td>
<td>97 (77%)</td>
<td>57 (79.2%)</td>
</tr>
<tr>
<td></td>
<td>Follow-up</td>
<td>34 (72.3%)</td>
<td>25 (86.2%)</td>
</tr>
<tr>
<td>CT angiogram</td>
<td>Diagnosis</td>
<td>50 (39.7%)</td>
<td>29 (40.3%)</td>
</tr>
<tr>
<td></td>
<td>Follow-up</td>
<td>7 (14.9%)</td>
<td>6 (20.7%)</td>
</tr>
<tr>
<td>MR angiogram</td>
<td>Diagnosis</td>
<td>27 (21.4%)</td>
<td>24 (33.3%)</td>
</tr>
<tr>
<td></td>
<td>Follow-up</td>
<td>4 (8.5%)</td>
<td>7 (24.1%)</td>
</tr>
<tr>
<td>Catheter-based angiogram</td>
<td>Diagnosis</td>
<td>84 (66.7%)</td>
<td>27 (37.5%)</td>
</tr>
<tr>
<td></td>
<td>Follow-up</td>
<td>18 (38.3%)</td>
<td>6 (20.7%)</td>
</tr>
<tr>
<td>Intravascular ultrasound</td>
<td>Diagnosis</td>
<td>7 (5.6%)</td>
<td>1 (1.4%)</td>
</tr>
<tr>
<td></td>
<td>Follow-up</td>
<td>7 (14.9%)</td>
<td>1 (3.4%)</td>
</tr>
</tbody>
</table>

Frequency of Combined Imaging of the Renal and Extracranial/Vertebral Arteries

• Of the 294 patients with renal FMD, 219 also underwent imaging of the extracranial and vertebral arteries (74.5%).
• Of the 263 patients with extracranial/vertebral FMD, 220 also underwent renal artery imaging (83.7%).

Frequency of Combined Imaging of the Extra- and Intracranial Vasculature

• Of the 251 patients with extracranial FMD, 160 also underwent intracranial vascular imaging (63.7%).
• Of the 35 patients with intracranial FMD, 28 also underwent extracranial imaging (80%).

CONCLUSION

• Ultrasound is the most commonly used imaging modality at time of initial diagnosis and at subsequent follow-up.
• The majority of patients with renal artery FMD also had imaging of the extracranial/vertebral arteries, and vice versa.
• However, over one-third of patients with extracranial/vertebral FMD did not undergo imaging of the intracranial vasculature to rule out intra-cerebral aneurysm.
• Further study is required to determine the optimal diagnostic and follow-up approach to FMD.

Disclosures: None