Dots & Spots: What do white matter lesions mean?

Elizabeth Ackley MD1, Philip Asamoah MD3, Ilana Neuberger MD2, David Mirsky MD2, Marcy Yonker MD1

1Division of Child Neurology, Department of Pediatrics, University of Colorado School of Medicine and Children's Hospital Colorado, 2Department of Radiology, University of Colorado School of Medicine, 3Department of Radiology, University of Colorado School of Medicine

BACKGROUND

Magnetic resonance imaging (MRI) of the brain is commonly obtained in the workup of pediatric headache to rule out secondary causes of headache. Incidental findings on pediatric brain MRI are common, with T2 hyperintense white matter lesions (WML) representing one of the most frequently encountered features [1,2,3]. Among adult populations, such lesions are closely linked with cardiovascular risk factors and appear to be more common among individuals with migraine [4,5,6]. The significance of these WML in the pediatric population is not well understood. Thus, encountering such lesions on brain MRI may prompt ordering providers to repeat imaging or pursue additional workup. We predicted that WML would be equally prevalent in pediatric patients with primary headache disorders (such as migraine), compared with controls, which would support that these lesions are less likely clinically significant.

METHODS

RESULTS

Subject categorization

- Migraine (n=144)
- Non-Migraine Primary HA (n=42)
- Headache NOS (n=62)
 HA = Headache

Incidence of WML, by group

<table>
<thead>
<tr>
<th>Group</th>
<th>Incidence of WML (%)</th>
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<tbody>
<tr>
<td>Controls (n=490)</td>
<td>265 (54.1%)</td>
</tr>
<tr>
<td>Migraine (n=144)</td>
<td>71 (49.3%)</td>
</tr>
<tr>
<td>Non-migraine primary headache (n=42)</td>
<td>17 (40.5%)</td>
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<tr>
<td>Headache NOS (n=62)</td>
<td>29 (46.8%)</td>
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</tbody>
</table>

Comparison of WML incidence between headache groups and controls

<table>
<thead>
<tr>
<th>Group</th>
<th>IRR (95% CI)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Migraine vs controls</td>
<td>0.99 (0.68-1.4)</td>
<td>0.96</td>
</tr>
<tr>
<td>Non-migraine primary headache vs controls</td>
<td>0.63 (0.33-1.2)</td>
<td>0.16</td>
</tr>
<tr>
<td>Headache-NOS vs controls</td>
<td>0.77 (0.45-1.3)</td>
<td>0.34</td>
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Average number of WML per year of life, by group

Key Points

- WML are a common finding on pediatric brain MRI, noted in approximately half of our sample overall.
- There was no significant difference between incidence of WML in patients with headaches compared to controls.
- There was no significant difference in incidence of WML between males and females.
- WML were most commonly located in frontal regions.
- Incidence of WML did not differ among different age groups.
- Number of WML does not correlate with migraine-associated disability score (PedMIDAS).

DISCUSSION

WML are a common incidental finding on brain MRI within the pediatric age group. Children and adolescents with primary headache disorders do not have increased rates of such lesions compared to controls, and thus, such lesions are unlikely to be of clinical significance. Among pediatric subjects with headaches, there is no significant correlation between number of WML and headache-associated disability score, which is closely tied to disease burden. Discovery of incidental findings, including WML, can often lead to further testing, medical visits and repeat imaging. We propose that such additional workup is unnecessary. Radiologists should be aware that such lesions are encountered frequently in pediatric populations, including those without headaches. Radiologists should also be mindful of how these lesions are described in radiologic reports, so as to not inadvertently suggest to the ordering clinician that the imaging contains abnormal or concerning findings.

REFERENCES


Disclosure: Dr. Yonker is a principal investigator for trials with Amgen, Teva, Biohaven, Upsher Smith, NIH, Lilly, Abbvie. She has been a consultant for Allergan, Theranica, Upsher Smith.