Incidental Findings and the Minimal Risk Standard in Pediatric Neuroimaging Research

Table 1. A Glossary of Reported IFs in Healthy Pediatric Research Participants

Mucosal inflammation of the sinuses and middle ear
- sinusitis (Seki et al., 2010)
- acute sinusitis (Kim et al., 2002)
- chronic sinusitis (Kim et al., 2002)
- otitis media (Seki et al., 2010)
- polyp in maxillary sinus (Seki et al., 2010)
- inflammatory disease in ethmoid air cells (Kumra et al., 2006)

Focal white matter hyperintensities
- foci of increased signal intensity in the cerebral white matter (Rachmiel et al., 2013)
- focal white matter lesion of uncertain etiology (Kim et al., 2002)
- focus of increased FLAIR signal (Kumra et al., 2006)
- unidentified bright object (Kumra et al., 2006)

Pineal gland cysts
- pineal cyst (Gur et al., 2013; Rachmiel et al., 2013; Seki et al., 2010; Kim et al., 2002)

Other cysts
- other cyst (Gur et al., 2013)
- calcar avis cystic structure (Rachmiel et al., 2013)
- choroidal cyst (Rachmiel et al., 2013)
- arachnoid cyst (Kim et al., 2002)

IFs related to blood vessels (including findings suggestive of infarct)
- asymmetric prominence of artery or vein (Gur et al., 2013)
- developmental venous anomaly (Gur et al., 2013)
- venous angioma (Kim et al., 2002)
- tortuous artery (Gur et al., 2013)
- possible infarct (Gur et al., 2013)
- possible aneurysm (Gur et al., 2013)
- encephalomalacia from remote ischemic event (Rachmiel et al., 2013)
- prominent flow voids (Kumra et al., 2006)
- gliosis (Kumra et al., 2006)

IFs of the posterior fossa
- low-lying cerebellar tonsils (Gur et al., 2013; Kumra et al., 2006)
- cerebellar tonsillar ectopia (Gur et al., 2013)
- tonsillar ectopia (Kim et al., 2002)
- cerebellar ectopia (Rachmiel et al., 2013)
- Chiari I malformation (Gur et al., 2013; Kumra et al., 2006)
- prominent retrocerebellar space (Gur et al., 2013)
- mega cisterna magna (Gur et al., 2013; Kumra et al., 2006)
- cerebellar cyst (Gur et al., 2013)
IFs of the pituitary gland
  • hypoplastic gland (Rachmiel et al., 2013)
  • partial empty sella (Rachmiel et al., 2013)
  • pars intermedia cyst (Rachmiel et al., 2013)

IFs of the cerebrospinal fluid spaces
  • cavum septum pellucidum (Gur et al., 2013)
  • prominence or asymmetry of ventricle or CSF (Gur et al., 2013)
  • ventricular asymmetry (Kim et al., 2002)
  • prominent VR [Virchow-Robin] perivascular spaces (Rachmiel et al., 2013)
  • enlarged perivascular space (Seki et al., 2010)
  • enlarged cavum septi pellucidi and cavum vergae (Seki et al., 2013)

Syringomyelia
  • syringomyelia (Seki et al., 2010)

Hypoplasia or atrophy
  • hypoplastic corpus callosum (Rachmiel et al., 2013)
  • hypoplasia pons (Kim et al., 2002)
  • nonspecific mild generalized parenchymal loss (Kumra et al., 2006)

Unspecified lesions
  • cystic lesion in the sphenoidal sinus (Seki et al., 2010)
  • petrous apex lesion (Kim et al., 2002)
  • cerebellar tonsil lesion uncertain etiology (Kim et al., 2002)
  • subcentimeter focus of T2 weighted and FLAIR hyperintensity within the left cerebellar hemisphere (Kumra et al., 2006)
Table 2. Reported Incidence of IFs in Healthy Pediatric Research Participants

<table>
<thead>
<tr>
<th>Reported incidental findings in healthy pediatric research participants</th>
<th>Gur et al. (N = 1400)</th>
<th>Rachmiel et al. (N = 38)</th>
<th>Seki et al. (N = 110)</th>
<th>Kim et al. (N = 225)</th>
<th>Weighted mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mucosal inflammation of the sinuses and middle ear</td>
<td>0</td>
<td>0</td>
<td>31 (28.2%)</td>
<td>29 (12.9%)</td>
<td>17.92%1</td>
</tr>
<tr>
<td>Focal white matter hyperintensities</td>
<td>0</td>
<td>1 (2.6%)</td>
<td>0</td>
<td>5 (2.2%)</td>
<td>1.59%2</td>
</tr>
<tr>
<td>Pineal cysts</td>
<td>34 (2.4%)</td>
<td>2 (5.3%)</td>
<td>2 (1.8%)</td>
<td>1 (0.4%)</td>
<td>2.17%</td>
</tr>
<tr>
<td>Other cysts</td>
<td>19 (1.4%)</td>
<td>4 (10.5%)</td>
<td>0</td>
<td>3 (1.3%)</td>
<td>1.50%</td>
</tr>
<tr>
<td>IFs related to blood vessels</td>
<td>36 (2.6%)</td>
<td>1 (2.6%)</td>
<td>0</td>
<td>2 (0.9%)</td>
<td>2.22%</td>
</tr>
<tr>
<td>IFs of the posterior fossa</td>
<td>33 (2.4%)</td>
<td>3 (7.9%)</td>
<td>0</td>
<td>5 (2.2%)</td>
<td>2.34%</td>
</tr>
<tr>
<td>IFs of the pituitary gland</td>
<td>0</td>
<td>3 (7.9%)</td>
<td>0</td>
<td>0</td>
<td>0.17%</td>
</tr>
<tr>
<td>IFs of the cerebrospinal fluid spaces</td>
<td>49 (3.5%)</td>
<td>3 (7.9%)</td>
<td>7 (6.4%)</td>
<td>1 (0.4%)</td>
<td>3.38%</td>
</tr>
<tr>
<td>Syringomyelia</td>
<td>0</td>
<td>0</td>
<td>1 (0.9%)</td>
<td>0</td>
<td>0.06%</td>
</tr>
<tr>
<td>Hypoplasia or atrophy</td>
<td>0</td>
<td>1 (2.6%)</td>
<td>0</td>
<td>1 (0.4%)</td>
<td>0.11%</td>
</tr>
<tr>
<td>Unspecified lesions</td>
<td>0</td>
<td>0</td>
<td>1 (0.9%)</td>
<td>2 (0.9%)</td>
<td>0.17%</td>
</tr>
</tbody>
</table>

1 Based on Kim et al. and Seki et al.
2 Based on Kim et al., Seki et al., and Rachmiel et al.
Figure 1.
Proposed Schema for the Categorization of Incidental Findings in Pediatric Magnetic Resonance Neuroimaging Research

Possible implications for participant health?

Yes

Disclosure and management are mandatory.

Benefit

Minor harm

Major harm

No

Disclosure is optional.