Does routine surveillance imaging after completing treatment for childhood extra-cranial solid tumours cause more harm than good? A systematic review

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Methods
Standard systematic review methodology
PROSPERO CRD42018103764
13 databases, conference proceedings, and trial registries searched alongside reference lists and forward citations, from 1990 onwards.

Inclusion criteria:
- Patients up to age 25 who have completed treatment for malignant extra-cranial solid tumour
- Study evaluating a programme of routine surveillance imaging aiming to detect relapse
- High income countries only
- Quantitative or qualitative research

Exclusion criteria
- Patients with cancer predisposition syndromes
- Studies evaluating side effects of treatment

Risk of bias assessed using modified ROBINS-I

Included studies
n=55, 10,207 participants
Majority retrospective cohort, no RCTs
Moderate to high risk of bias in almost all studies

Exclusion criteria
- Patients with cancer predisposition syndromes
- Studies evaluating side effects of treatment

Risk of bias assessed using modified ROBINS-I

Patient and parent involvement in study
Mixed group of people: different cancer types, some had experience of relapse, some children had died.
Varied baseline opinions on whether surveillance imaging is a good idea or not.
Informed focus and design, interpretation and dissemination of systematic review

<table>
<thead>
<tr>
<th>Tumour Type</th>
<th>No of studies (pts)</th>
<th>Evidence of survival benefit?</th>
<th>Harms?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Hodgkin’s lymphoma</td>
<td>4 (110)</td>
<td>✗</td>
<td>Lots of scans, high radiation dose, false positive images</td>
</tr>
<tr>
<td>Hodgkin’s lymphoma</td>
<td>4 (693)</td>
<td>✗</td>
<td>Lots of scans, false positive images</td>
</tr>
<tr>
<td>Osteosarcoma</td>
<td>5 (247)</td>
<td>No data</td>
<td>Lots of scans</td>
</tr>
<tr>
<td>Ewing’s sarcoma</td>
<td>4 (355)</td>
<td>?</td>
<td>No data</td>
</tr>
<tr>
<td>Wilm’s tumour</td>
<td>6 (5057)</td>
<td>+</td>
<td>Lots of scans, high cost</td>
</tr>
<tr>
<td>Hepatoblastoma</td>
<td>3 (73)</td>
<td>No data</td>
<td>Lots of scans, AFP was better than scans</td>
</tr>
<tr>
<td>Neuroblastoma</td>
<td>5 (487)</td>
<td>✗</td>
<td>Lots of scans, high radiation dose</td>
</tr>
<tr>
<td>Retinoblastoma</td>
<td>2 (65)</td>
<td>No data</td>
<td>Lots of scans, false positive images</td>
</tr>
<tr>
<td>Soft tissue sarcoma</td>
<td>5 (560)</td>
<td>✗</td>
<td>Lots of scans</td>
</tr>
</tbody>
</table>

Key findings
- Paediatric surveillance strategies are varied, involve many scans and substantial radiation exposure
- For most tumours, surveillance imaging was not consistent with increased survival
- There is insufficient evidence to support routine surveillance imaging in most paediatric extra-cranial solid tumours
- The paediatric oncology community should focus on high quality RCTs and qualitative data to understand if routine surveillance imaging is doing more harm than good

Figure: number of patients included with each tumour type