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

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Background and study aims

Whether surveillance imaging is associated with survival benefit and what burden surveillance places on patients, families or healthcare services, is unknown. This systematic review examines the survival benefits and harms, including radiation dose and psychological impact of routine off-treatment surveillance imaging in paediatric patients after childhood cancer treatment.

Methods

Literature reporting a programme of surveillance imaging used to detect relapse in patients up to age 25 who were in first remission from a malignant extra-cranial solid tumours, published from 1990 onwards, were systematically identified and reviewed.

Data on survival benefit, harms associated with imaging, cost-effectiveness and the quantity, frequency and type of scanning were extracted and synthesised from 55 studies. All studies were assessed for risk of bias. Registration: PROSPERO (CRD42018103764).

Patient and parent involment (PPI)

The PPI group members informed the focus and design, interpretation and dissemination of the systematic review and included young people previously treated for childhood cancer and parents of children who had been treated. Some parents' children had died from their cancer and others had experienced relapse of thier child's cancer. Cancers experienced by the PPI group varied.

Members of this PPI group had a range of baseline opinions on whether surveillance imaging is a good idea or not.

Findings

Studies were observational and and reported on 10,207 patients across 48 cohorts. Literature wasjudged as moderate, serious or critical risk of bias for all expect one study. Paediatric surveillance strategies are varied, involve many scans (range: 3.5-55 per patient) and substantial radiation exposure. For most tumours, surveillance imaging was not consistent with increased survival (Table 1).

In no case did data allow for meaningful meta-analysis. No data regarding the psychological impact of surveillance or the experience of patients were available and cost-effectiveness data were lacking.

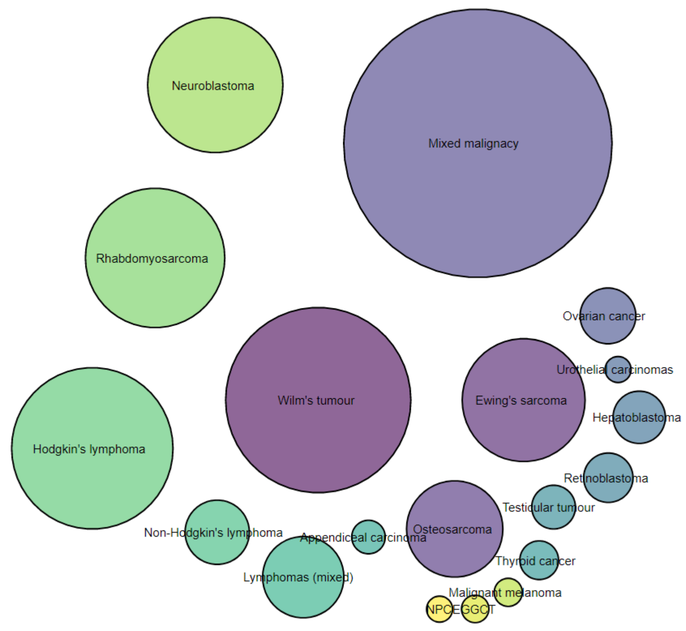

Figure 1. Data identified for patients with each tumor type (circle radius is proportional to the number of patients) NCP: Nasopharyngeal cancer, EGCT: extragonadal germ cell tumor.

Table 1. Summary of patients numbers, evidence of survival benefit and or harms by cancer type.

	Number of studies (participants)	Evidence of survival benefit?	Harms
Non-Hodgkin's lymphoma	4(110)	✗	Lots of scans, high radiation dose, false positive images
Hodgkin's lymphoma	4(693)	✗	Lots of scans, false positive images
Osteosarcoma	5(247)	✗	Lots of scans
Ewing's sarcoma	4(355)	?	No data
Wilm's tumour	6(5057)	✓	Lots of scans, high cost
Hepatoblastoma	3(73)	✗	Lots of scans, AFP was better than scans
Neuroblastoma	5(487)	✗	Lots of scans, high radiation dose
Retinoblastoma	2(65)	✗	Lots of scans, false positive images
Soft tissue sarcoma	5(560)	✗	Lots of scans

Discussion and conclusive statement

At present, no conclusive statement regarding the survival benefit of surveillance imaging within this patient population can be made. The evidence gaps identified, suggest that both high quality, randomised evidence and qualitative research are required to determine the true survival benefit of surveillance imaging and to provide the data on patient experience that is needed to inform policy and practice.

Limitations include the exclusion of studies where most participants were over 25. Future reviews may instead focus on disease specific surveillance across the population.

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