Systematic review: surveillance for breast cancer in women treated with chest radiation for childhood, adolescent, or young adult cancer


CRD summary
This review concluded that women previously treated with chest radiation for childhood or adolescent cancer had a substantially increased risk for breast cancer at a young age. There appeared to be a benefit of early detection, although further research on lifelong surveillance is needed. Important differences among included studies make it difficult to determine the reliability of these conclusions.

Authors' objectives
To determine the risk, clinical characteristics and outcomes of breast cancer in women after chest radiation for paediatric or young adult cancer, as well as the benefits and harms associated with breast cancer surveillance in this group of women.

Searching
MEDLINE, EMBASE, CINAHL, DARE, EBM Reviews and the Cochrane Library were searched from inception to December 2008 to identify relevant English-language publications. Search terms were reported. Bibliographies of included studies and relevant reviews were also searched for additional relevant references.

Study selection
Studies including women with a previous diagnosis of cancer as a child or young adult (aged up to 30 years), who had been exposed to moderate/high doses of therapeutic chest radiation, were eligible for inclusion in the review. Retrospective case-control studies were eligible for inclusion if they reported risk estimates or clinical characteristics of breast cancer. Prospective cohort studies and clinical trials were eligible for inclusion if they reported the harms and benefits of breast cancer surveillance. Retrospective studies were eligible if they reported any of these outcomes.

Among the included studies, participants were predominately Hodgkin lymphoma survivors who had received treatment between 1960 and 2000. Fewer than 5% of patients in breast cancer surveillance studies were screened with magnetic resonance imaging (MRI) or ultrasonography.

Three reviewers assessed studies for inclusion, with discrepancies resolved by consensus.

Assessment of study quality
All included studies were assessed according to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) criteria.

Three reviewers independently assessed study quality.

Data extraction
Breast cancer risks were extracted as absolute excess risk by age at primary cancer diagnosis, standardised incidence ratio by age at primary diagnosis, and by years of follow-up. For studies of breast cancer surveillance, data were extracted on the number of breast cancer cases detected per person-year of follow-up.

Three reviewers independently extracted data.

Methods of synthesis
The studies were combined in a narrative synthesis.
Results of the review
Eleven retrospective cohort studies (n=14,067 women) and three case control studies (n=unclear) assessed the risk for breast cancer in the population of interest. Six of the 11 cohort studies were considered to be ‘well-designed’.

Incidence and excess risk: Of the studies reporting single risk estimates, standardised incidence ratio ranged from 13.3 to 55.5 per 10,000 patient-years and absolute excess risk ranged from 18.6 to 79.0 per 10,000 patient-years. Cumulative incidence of breast cancer by age 40 to 45 years ranged from 13 to 20%. Two of the three case-control studies reported an association between breast cancer risk and radiation dose.

Clinical Characteristics and outcomes: Eight cohort studies (three in participants with previous paediatric cancer, five in participants with previous Hodgkin lymphoma at any age) provided ‘fair-quality’ evidence that once breast cancer was diagnosed, women and their type of cancer were similar to the general population.

Benefits and harms associated with breast cancer surveillance: Two retrospective (n=92 women) and three prospective studies (n=320 women) provided information on the benefits and harms of breast cancer surveillance. The two retrospective studies reported that mammography alone detected 38% and 27% of breast cancer cases. Among two of the prospective studies (n=205 women), 58% of breast cancer cases were detected by mammography and 42% by palpation. Two of the prospective studies (n=178 women) reported a 12.3% false-positive rate for mammograms; the third study reported a false-negative rate of annual mammography of 5%.

Authors’ conclusions
Women treated with chest radiation had a substantially increased risk for breast cancer at a young age, which did not appear to plateau. There appeared to be a benefit of early detection, although further research is needed to determine the benefits and harms of lifelong surveillance in this population.

CRD commentary
The review question was reasonably clearly defined in terms of the participants, interventions, outcomes and study designs of interest. Several sources were searched to identify relevant evidence. Efforts were made to minimise errors and bias in the selection, quality assessment and extraction of data from studies. Restricting inclusion to English language studies may potentially mean that relevant evidence was missed.

Included studies were extremely heterogeneous in terms of their recruitment dates, length of follow-up, participant age at first diagnosis and design characteristics.

Consequently, although the authors’ broad conclusions about a increased risk of breast cancer in general appear appropriate, important differences among included studies make it difficult to determine the reliability of these conclusions.

Implications of the review for practice and research
Practice: The authors stated that interventions are needed to inform women and their clinicians of the risks and options for breast cancer surveillance.

Research: The authors stated that further research is required to better define the benefits and harms of lifelong surveillance, and how estimates of risk and outcome might change given the use of lower radiation doses in contemporary treatment.

Funding
National Cancer Institute, grant number U10 CA098543

Bibliographic details

PubMedID
20368650

DOI
10.7326/0003-4819-152-7-201004060-00009

Original Paper URL
http://www.annals.org/content/152/7/444.short

Indexing Status
Subject indexing assigned by NLM

MeSH
Adolescent; Age Factors; Breast Neoplasms /epidemiology; Child; Female; Hodgkin Disease /radiotherapy; Humans; Incidence; Neoplasms, Radiation-Induced /epidemiology; Odds Ratio; Radiotherapy Dosage; Risk Factors; Time Factors; Young Adult

AccessionNumber
12010002111

Date bibliographic record published
07/04/2010

Date abstract record published
14/04/2010

Record Status
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.