Home-monitoring of late effects after breast cancer to enable early detection

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BACKGROUND

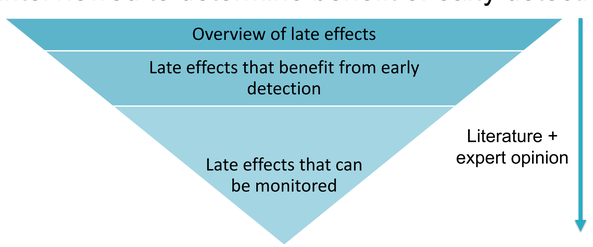
Problem

- Number of cancer survivors increasing
- >90% breast cancer patients experience late effects
- Late effects highly negative impact on QoL, social/work participation and society
- Despite scheduled visits, high unmet needs

Solution – Timely treatment through early surveillance can reduce the burden and prevent worsening. eHealth and monitoring have great potential here. **Aim of this study was to identify possibilities for non-invasive home-monitoring of late effects after breast cancer**.

METHODS

Based on a literature review (PubMed, Google Scholar, Scopus) and the study of de Ligt et al.[1], an overview was made for late effects per physiological subsystem. Factors included were symptoms, monitoring options, prevalence, behavior over time, prevention and treatment options, and risk factors. An oncologist was interviewed to determine benefit of early detection.



Late effects that can be monitored in the home setting

[1] de Ligt, K., Heins, M., Verloop, J., Smorenburg, C. H., Korevaar, J. C., & Siesling, S. (2019). Patient-reported health problems and healthcare use after treatment for early-stage breast cancer. The Breast, 46, 4-11.

RESULTS

For the 11 physiological subsystems, main categories (figure below) and their specific complaints (not shown) were identified.

Possibilities for monitoring include measuring the respiratory rate, mean arterial blood pressure, circulatory information and ECG data using wearables, and behavioral markers through mobile phone use and self-reporting.

Two promising examples for home-monitoring are cardiotoxicity and depression:

CARDIOTOXICITY

- *Relevance*: Chemotherapeutic agents, including anthracyclines and targeted therapies can lead to cardiotoxicity. Similarly, radiation therapy poses cardiovascular risks.
- *Monitoring*: self-reporting (e.g., chest pain and fluid retention) and unobtrusive monitoring (e.g., palpitations and shortness of breath).

DEPRESSION

- *Relevance*: depression frequently accompanies cancer, complicating clinical management. Prevalence estimated to be between 10-20% and is likely to be underestimated due to under detection of mental disorders.
- *Monitoring*: self-reporting and digital phenotyping using a smart phone or watch

CONCLUSIONS

We identified possibilities for monitoring and early detection of late effects after breast cancer. This overview can be used to prioritize research for prediction of late effects, after which high-risk patients could be selected for home-monitoring. Future research should explore integration of digital biomarkers in monitoring, providing innovative solutions for personalized survivorship care.

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