

The role of plant-food components in pelvic-organ cancer survivors – From feasibility to effects in randomized controlled dietary interventions

Akademisk avhandling

Som för avläggande av medicine doktorexamen vid Sahlgrenska akademien, Göteborgs universitet kommer att offentligens försvaras i Arvid Carlson, Medicinaregatan 3, fredagen den 19 maj, klockan 09.00.
av Rebecca Ahlin

Fakultetsopponent:

Keren Papier, Senior Nutritional Epidemiologist, PhD
Oxford University, Storbritannien

Avhandlingen baseras på följande delarbeten

- I. Ahlin R, Bergmark K, Bull C, Devarakonda S, Landberg R, Sigvardsson I, Sjöberg F, Skokic V, Steineck G, Hedelin M. A Preparatory Study for a Randomized Controlled Trial of Dietary Fiber Intake During Adult Pelvic Radiotherapy. *Frontiers in Nutrition*. 2021; 8: 756485.
- II. Ahlin R, Nybacka S, Josefsson A, Stranne J, Steineck G, Hedelin M. The effect of a phytoestrogen intervention and impact of genetic factors on tumor proliferation markers among Swedish patients with prostate cancer: study protocol for the randomized controlled PRODICA trial. *Trials*. 2022; 23(1): 1041.
- III. Ahlin R, Josefsson A, Nybacka N, Landberg R, Skokic V, Stranne J, Steineck G, Hedelin M. Effects of a phytoestrogen intervention and estrogen receptor β genotype on prostate cancer proliferation and PSA concentrations – a randomized controlled trial. Manuscript.
- IV. Ahlin R, Nørskov P. N, Nybacka N, Landberg R, Skokic V, Stranne J, Josefsson A, Steineck G, Hedelin M. Effects on Serum Hormone Concentrations after a Dietary Phytoestrogen Intervention in Patients with Prostate Cancer: A Randomized Controlled Trial. *Nutrients* 2023, 15, 1792.
- V. Ahlin R, Sigvardsson, I, Skokic, V, Landberg, Steineck G, Hedelin M. Development and Validation of a Mobile Phone Application Developed for Measuring Dietary Fiber Intake. *Nutrients*. 2021; 13: 2133.

SAHLGRENSKA AKADEMIN
INSTITUTIONEN FÖR KLINISKA VETENSKAPER



GÖTEBORGS
UNIVERSITET

The role of plant-food components in pelvic-organ cancer survivors – From feasibility to effects in randomized controlled dietary interventions

Rebecca Ahlin

Department of Oncology, Institution of Clinical Sciences, Sahlgrenska Academy, University of Gothenburg, Sweden, 2023.

Abstract

The aim of this thesis was to test the feasibility of a dietary fiber intervention prior to conducting a large randomized controlled trial in patients with pelvic organ cancer. Secondly, to investigate the effect of a diet high in phytoestrogens on tumor proliferation and if the effect differs between men with different genotypes of estrogen receptor beta (ER β) in a large randomized controlled trial in patients with prostate cancer. Lastly, to develop and evaluate a new digital dietary assessment method for measuring dietary fiber intake.

Methods/Results: A dietary fiber intervention, using a fiber supplement and a moderate fiber intake from the regular diet, was tested in a feasibility study in patients with gynecological cancer ($n = 57$, Paper I). A study-specific food frequency questionnaire and a digital application were used, and blood and fecal samples were collected. The effects of a phytoestrogen intervention, using soybeans and flaxseeds, were tested in a randomized trial with patients with prostate cancer ($n = 140$, Papers II–IV). Tumor proliferation was measured as a Ki-67 index in tumor specimens. A randomized crossover trial was used to validate the digital application against a 3-day dietary record to measure dietary fiber intake in a randomly selected female population ($n = 26$, Paper V). In the Feasibility study, expected burden of the study or acute side effects of radiotherapy were the most common reasons for declining participation or dropping out (Paper I). The participation rate was highest for blood sampling and lowest for fecal sampling. The phytoestrogen intervention decreased the risk of a higher Ki-67 index, and the effect was most pronounced among men with a specific genotype of ER β (Paper III). In the Dietary validation study, a ~ 2 g difference in measured fiber intake was found between the dietary record and the digital application (Paper V).

Conclusions: Dietary interventions with dietary fiber supplements and phytoestrogen-rich foods are feasible in patients with pelvic-organ cancer and digital tools can be used for the assessment of dietary fiber intake. The design of interventions needs to be carefully adapted to the targeted group to be feasible. The effects of the plant-food components need further investigation.

Keywords: gynecological cancer, prostate cancer, pelvic radiotherapy, dietary fiber, phytoestrogens, digital application, validation

ISBN 978-91-8069-209-0 (TRYCK)

ISBN 978-91-8069-210-6 (PDF)