Exercise training in prostate cancer patients on androgen deprivation therapy

Valorization

Prostate cancer is the most frequently diagnosed type of cancer in European men. Due to an increasing incidence and decreasing mortality risk, it is expected that prostate cancer prevalence will further increase the upcoming years (1), resulting in a substantial number of men living with prostate cancer for several years. This puts increasing pressure on the healthcare system and society. Therefore, from the patients', healthcare, and societal perspective, strategies are warranted to prevent prostate cancer and its progression, and to counteract treatment-related adverse effects.

Many patients with prostate cancer will be treated with androgen deprivation therapy (ADT), the cornerstone in advanced prostate cancer treatment. Though ADT can substantially improve survival, it causes serious adverse effects. In our exercise training study, we showed that resistance exercise training effectively counteracts many of these adverse effects. Furthermore, we showed that resistance exercise training is feasible and can be performed safely in this population. As we included a broad range of prostate cancer patients on ADT, including patients with (bone) metastases, our results are representative for actual clinical practice. Therefore, we recommend implementation of resistance exercise training in standard prostate cancer care. To achieve implementation, our results have been or will be published in international, peer-reviewed journals. Furthermore, we started and will continue to inform healthcare professionals about our results at local meetings, conferences and symposia, as well as patients via the prostate cancer patients' organization. An extensive description regarding the preferred implementation of exercise training during ADT, including recommendations, is already provided in the general discussion (**chapter 8**) of this thesis.

Despite the impressive results of the supervised resistance exercise training program, we showed that the exercise-obtained benefits were not effectively preserved after cessation of the program. Although a large number of patients reported exercise continuation, patients were unable to maintain the obtained effects. This is an important finding for science as well as clinical practice, as many studies only evaluate the acute effects of a fixed exercise training intervention, whereas ADT is often prescribed for many years. Our findings highlight the importance of more research to develop more effective and feasible long-term exercise intervention strategies in prostate cancer patients during ADT.

Next to the ability of exercise training to counteract treatment-related side effects, we made a first attempt to elucidate whether physical activity level has the potential to influence prostate cancer progression. Our intervention, one week with a relatively low versus high daily physical activity level, did not result in differences between groups on prostate tumor protein synthesis rates, nor on healthy prostate or skeletal muscle protein synthesis rates. Studies with a more vigorous or longer exercise intervention are possibly required to actually induce an effect. However, our study does provide first insight in tissue protein metabolism of tumor and healthy prostate tissue. In addition, we showed that it is actual possible to assess the effect of a lifestyle

intervention on tumor metabolism in cancer patients outside a laboratory setting. This prompts further research in this interesting, and from many perspectives relevant, area.

References

1. Praagman J, Slotman E, van Disseldorp L, Lemmens V. Kanker in Nederland - trends & prognoses tot en met 2032. Utrecht: Integraal kankercentrum Nederland; 2022.