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Blood flow restriction training in advanced prostate cancer –a case study

Background: Advanced prostate cancer is frequently associated with bone metastases and a decline in skeletal muscle mass (SMM), with the latter partly attributable to androgen deprivation therapy (ADT). Although higher SMM has been linked to improved quality of life (QoL), resistance training at high loads is often not feasible in patients lacking an anabolic androgen stimulus. Blood flow restriction (BFR) training may offer a viable alternative by stimulating muscle adaptations via activation of the potentially anabolic adenosine pathway at low and safe loads.

Methods: A 53 year old man with stage IV prostate cancer undergoing ADT and initially presenting with lumbar vertebral bone metastasis and degenerative disc disease was recruited. Fitness and body composition were assessed at baseline and every 3 months. VO_2peak and hypothetical one repetition maximum from five exercises are reported. Consequently, measurements across four time points were examined to identify changes over time, without applying inferential statistics. The patient followed a supervised progressive resistance training with BFR twice weekly, with pressure adjustments over time. Additionally, acute BFR sessions were conducted to obtain conditions serum samples, which will be applied to C2C12 and PC3 cell lines to explore underlying cellular mechanisms.

Results: Data were analyzed descriptively. One adverse event was reported at 11 months. No substantial changes were observed over time as exemplified by the following variables: Δ φ(T0-T3)= 0, Δ SMM(T0-T3)= 0, Δ VO2peak(T0-T3) = 2 (ml/min/kg). Analyses of the cellular experiments are ongoing and pending.

Discussion: Preserving SMM and muscle function is a key therapeutic goal in patients undergoing ADT. Findings from this ongoing case study indicate that clinically relevant parameters remained stable over 12 months. These preliminary results suggest that BFR training may represent a feasible and promising intervention to maintain body composition and functional capacity in prostate cancer patients with bone metastases under ADT.

Keywords

bone metastasis, resistance training, androgen deprivation therapy, adenosine pathway

Conflict of Interest & Ethical Approval

yes

Abstract submitters declaration

yes

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