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EFFECTS OF PROSTATE RADIOTHERAPY ON PELVIC FLOOR MUSCLES ACTIVITY AND SYMPTOMS OF URINARY INCONTINENCE: PRELIMINARY RESULTS

Hypothesis / aims of study

The pelvic floor muscles (PFM) is a group of muscles whose integrity has a fundamental role in maintaining urinary and faecal continence. The radiotherapy treatment (RT) for prostate cancer can result in adverse effects on the bladder, bowel and sexual functions. The hypothesis of this study is that men with prostate cancer who received RT present lower PFM activity and a higher prevalence of lower urinary tract symptoms (LUTS), bowel and sexual symptoms than those who did not receive RT. The longer is the post RT, lower is PFM activity. The primary aim of this study was to evaluate the pelvic floor muscle activity in men with prostate cancer that received or not RT. The secondary aims were to evaluate the prevalence of LUTS, anorectal and sexual symptoms.

Study design, materials and methods

It was a cross-sectional study including three groups of patients diagnosed with prostate cancer and indication to receive RT: (1) Pre-radiotherapy group: patients before RT; (2) RT Acute effect group: patients from 6 months to one year after RT; (3) RT Late effect group: patients from 2,5 years up to 4 years post-treatment. The sample size for this study was calculated based on the surface electromyography (sEMG) data. For a type I error (α=0.05), type II error (β=0.20), a standard deviation of 1.6, the calculated sample size was 31 cases in each group. Only one physiotherapist performed all PFM function exams using an EMG device (Miotool Uro – Miotec®) with anal probe. The sEMG protocol consisted in five contractions of two seconds with a rest of ten seconds between each one; five contractions of ten seconds with a rest of ten seconds between each one and a unique contraction of the sixty seconds with a rest of ten seconds before and after the contraction. The maximum voluntary contraction was used to the normalization of the sEMG data. The presence of urinary incontinence (UI), its characteristics and impact in the activities of daily living (ADL) were assessed in all three groups using the ICIQ-SF questionnaire. The Kruskal-Wallis test was used for statistical analyses, considering significant $p<0.05$.

Results

Thirty-eight men were assessed: Pre-radiotherapy group (n=12); RT Acute effect group (n=14) and RT Late effect group (n=12). The prevalence of LUTS (particularly, urgency and nocturia) was higher in the RT Acute effect group with 57.1% of patients presenting nocturia with a frequency of three times or more episodes during the night. The RT Late effect group patients showed the highest prevalence of UI (41.7%). The erectile dysfunctions post RT were present in 33.3% patients in RT Late effect group and in 35.7% in RT Acute effect group. In the Pre-radiotherapy group 100% of the men presented sexual symptoms and they associated this complaints with the hormone therapy before RT. Anorectal symptoms were not frequent with 7.1% of patients in the RT Acute effect group with sporadic reports of anal incontinence and faecal urgency. The Pre-radiotherapy and RT Late effect groups did not present anorectal or bowel complaints. sEMG analysis demonstrated that RT Late effect group had the lower PFM electromyography activity especially in slow twitch fibers when compared with other groups (p=0.09) (Table 01). ICIQ-SF questionnaire scores found that RT Late effect group had the worse total score (Pre-radiotherapy group: 9.6, RT Acute effect group: 9.7, RT Late effect group: 11.8) and a higher negative impact of UI in ADL when compared with other groups (80% of patients reported moderate to severe impact in the RT Late effect group versus 33.3% of patients that reported mild impact in the RT Acute effect group).

Table 01 – sEMG analysis data collection between groups

sEMG data	**Pre-radiotherapy group**	**RT Acute effect group**	**RT Late effect group**	***p* value**
Fast twitch fibers (%)				
01	19.1±3.2	19.2±2.7	17.1±2.8	
02	22.1±3.7	22.3±2.8	21.2±3.0	
03	22.4±4.3	24.6±3.5	19.9±2.6	
04	23.0±5.0	24.3±3.2	21.3±3.3	
05	22.1±5.1	22.0±2.7	21.1±3.3	
Slow twitch fibers (%)				
01	19.5±3.6	18.7±2.4	14.8±1.7	*p*=0.09
02	18.3±3.9	17.0±2.3	13.9±1.7	
03	19.2±4.6	17.9±2.4	14.0±1.7	
04	18.5±4.0	17.8±2.3	13.3±1.5	
05	17.4±3.8	16.9±2.1	12.4±1.5	
Slow twitch fibers (%)				
	12.9±2.2	14.1±1.9	9.9±1.1	

Interpretation of results

Some researchers reported the radiotherapy effects on the muscle activity in some types of cancer. However, the radiotherapy effects in the PFM activity are scarcely investigated. A research assessed the RT impact in the soft tissues of the larynx and they found decreased number of muscles fibers in the sample of irradiated larynx[1]. Another study observed a decreased electromyographic activity and smaller muscle size in the muscles responsible for the active movement of shoulder in irradiated

breast of women after breast cancer treatment. The same authors concluded that the muscles affected are the same muscles associated with pain and decreased limb function[2]. These results corroborate our hypothesis that men with prostate cancer who received RT present lower PFM activity. Another study, 147 women survivors of the cervical cancer between 1997 and 2007 were studied after they underwent to RT after surgery (hysterectomy) or as a first line treatment for cancer. UI and obstruction symptoms were frequents. Women underwent to RT complained of LUTS related to PFM dysfunction. Women underwent to RT how first line treatment complained of the faecal incontinence more than other women. However, this study did not assess the PFM function in these women[3].

Concluding message

Acute RT toxicities was characterized how a higher prevalence of urgency and nocturia in RT Acute effect group. PFM activity results were worse in patients of RT Late effect group measured by sEMG. The RT Late effect group demonstrated a higher negative impact in the ADL due to higher presence of UI.

References

1. Tedla M,Valach M,Carrau RL,Varga I,Profant M,Mraz PandWeismann P. Impact of radiotherapy on laryngeal intrinsic muscles. Eur Arch Otorhinolaryngol. 2012;269(3):953-8.
2. Shamley DR,Srinanaganathan R,Weatherall R,Oskrochi R,Watson M,Ostlere SandSugden E. Changes in shoulder muscle size and activity following treatment for breast cancer. Breast cancer research and treatment. 2007;106(1):19-27.
3. Hazewinkel MH,Sprangers MA,van der Velden J,van der Vaart CH,Stalpers LJ,Burger MPandRoovers JP. Long-term cervical cancer survivors suffer from pelvic floor symptoms: a cross-sectional matched cohort study. Gynecologic oncology. 2010;117(2):281-6.

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