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Original research article

SIMBOSPROST: Prevalence of metabolic syndrome and osteoporosis in prostate cancer patients treated with radiotherapy and androgen deprivation therapy: A multicentre, cross-sectional study

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ABSTRACT

Aim: To assess the prevalence of metabolic syndrome (MetS) and osteoporosis in patients with prostate cancer (PCa) treated with radical radiotherapy (RT) with or without androgen deprivation therapy (ADT).

Background: Worldwide, the prevalence of MetS is estimated to range from 20% to 25% of the adult population. However, prevalence rates are much higher in PCa patients (pts) who undergo ADT.

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Materials and methods: Multicentre cross-sectional study of 270 pts in Spain with PCa. Patients were divided into 3 groups based on the duration of ADT (6, 12–18, ≥24 months) and compared to a control group without ADT. MetS was defined according to NCEP ATP III criteria. Osteoporosis was assessed by DEXA.

Results: A total of 270 pts, treated from November 2011 to October 2012, were included. Of these, 122 pts (47%) fulfilled the criteria for MetS. The median age of this group was significantly higher (71.3 vs. 69.38 years, $p = 0.028$). MetS prevalence was 50% in the control group. In pts who received ADT, prevalence was 44.8% after 6 months of ADT, 45.3% after 12–18 months, and 50% after ≥24 months (pns). Most pts (168/270; 62%) underwent DEXA. Of those tested, 78 (46.4%) had osteopenia and only 11 (6.5%) had osteoporosis.

Conclusions: The prevalence of MetS in pts with PCa treated with radical RT was higher (47%) than in the general population. However, there were no significant differences in the duration of ADT administration. The prevalence of osteoporosis was low. These findings suggest that the prevalence of MetS in PCa patients may be higher than previously reported.

1. Background

Most patients diagnosed with prostate cancer (PCa) will be treated with surgery and/or radical radiotherapy. In many cases, these patients will also receive androgen deprivation therapy (ADT), which, when combined with radical radiotherapy, has been shown to modestly improve survival in locally advanced and high-risk disease.[1,2] However, despite its beneficial effects on survival, ADT may also induce numerous adverse effects, including sexual and cognitive dysfunction, bone mass loss, insulin resistance, dyslipidemia, and anaemia.[3]

Several of these adverse effects overlap with the metabolic syndrome (MetS), a combination of interrelated risk factors (hyperglycemia, hypertension, hypertriglyceridemia, low levels of high-density lipoproteins (HDL) cholesterol, and central obesity) for the development of cardiovascular disease (CVD) and type 2 diabetes. While the worldwide prevalence of MetS in the general population is estimated to range from 20% to 30%,[4] MetS prevalence is reported to be approximately 50% in PCa patients treated with ADT.[5] Rates of osteoporosis are also higher in this patient population (35.4–49.2%) versus the general population.[6,7]

In most cases of PCa, the disease progresses relatively slowly, even without treatment. As a consequence, a large percentage of these patients will ultimately die of causes unrelated to the cancer itself. In some cases, however, the cause of death has been attributed to the treatment itself,[8] particularly ADT, which has been linked to the development of MetS and diabetes.[6,9] Nevertheless, the question of whether ADT induces the development of MetS remains uncertain. A recent report[10] found that although ADT appears to induce changes in some of the components of MetS after 12 months of administration, it does not appear to increase rates of full MetS. However, other studies have reported that prevalence may increase as a function of the duration of ADT administration.[11–13] As a result, the long-term association between MetS, osteoporosis, and ADT remains controversial and poorly understood, as a recently reported meta-analysis found.[5]

2. Aim

Given the knowledge gap described above, the present study was carried out in a large cohort of PCa patients to determine the prevalence of MetS and osteoporosis after short-term (<6 months), medium-term (12–18 months), and long-term (≥24 months) administration of ADT. The main aim was to determine whether the prevalence of these conditions increases with duration of ADT administration. The data presented here provide an update to our interim analysis, reported in the year 2013.[14]

3. Materials and methods

This was a multicenter cross-sectional study of 270 patients diagnosed with localized intermediate or high risk PCa according to NCCN criteria. All patients were treated with radical RT without ADT (50 pts) or with ADT (220 pts). Patient characteristics at diagnosis are shown in Table 1.

The inclusion criteria were as follows: (1) histologically confirmed PCa, (2) localized intermediate or high-risk PCa according to NCCN criteria, (3) scheduled for treatment with radical RT. Patients with nodal involvement, metastasis, or previous prostatectomy with adjuvant RT were excluded. The 270 patients who met the inclusion criteria during the study period (November 2011 to October 2012) were included.

The patient cohort was divided into four groups according to the duration of ADT administration, as follows: group 1, no ADT (50 pts); group 2, 6 months of ADT (60 pts); group 3, 12–18 months of ADT (99 pts); and group 4, ≥24 months ADT (61 pts).

All patients were interviewed to obtain detailed information regarding family and personal history of hypertension, hyperglycemia, hypercholesterolemia, hypertriglyceridemia and specific treatment for those conditions. Waist circumference, blood pressure, weight, and height were measured and levels of glucose, total and HDL-cholesterol, triglycerides and testosterone were assessed and monitored.

The presence of MetS was defined according to the updated NCEP ATP III[4] by the presence of 3 or more of the following