P030 Osteoporosis: Is it really a side effect of ADT?

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Introduction & Objectives: To investigate the occurrence rate and risk factors of bone loss in prostate cancer patients.

Materials & Methods: This study was conducted on 783 subjects from 2011 to 2018. Lumbar spine and femoral neck BMD testing were performed using dual-energy x-ray absorptiometry in all patients. We first compared the occurrence rate of bone loss in the hormone-naïve prostate cancer patients (n=288), and ADT-treated patients (n=136), and control group (n=359). In sub-analysis, we analyzed the risk factors in each hormone-naïve prostate cancer patients and ADT-treated patients.

Results: The hormone-naïve prostate cancer patients and ADT-treated patients had significantly lower BMD values and T-scores than the control group ($p < 0.001$). For patients who were hormone-naïve prostate cancer, ADT-treated for more than 1 years, and control group, the osteoporosis prevalence was 8.7% (25/288), 14.7% (20/136), and 5.6% (20/359), respectively.
In hormone-naïve prostate cancer patients, multiple logistic regressions showed that body mass index and neutrophil were significant risk factors ($p = 0.013$ and $p = 0.038$). In addition, in ADT-treated patients, HbA1C was only significant risk factor ($p = 0.033$)

Table1. Patient characteristic.

	Control group	Hormone-naïve prostate cancer patients group	ADT-treated patients group	*p*- Value
Patient, n	359	288	136	
Mean (SD) age	70.2 ± 4.6	72.8 ± 6.4	73.1 ± 6.0	< 0.001
Waist circumference	88.1 ± 9.3	86.0 ± 7.2	88.5 ± 6.5	0.562
Body mass index	23.9 ± 3.2	23.7 ± 2.4	22.9 ± 4.5	0.084
HbA1C	7.8 ± 31.9	6.2 ± 0.7	6.4 ± 1.1	0.622
WBC	6.1 ± 1.8	6.4 ± 1.8	6.3 ± 1.8	0.083
Hb	14.7 ± 1.4	13.4 ± 1.7	12.7 ± 1.2	< 0.001
Platelet	230.2 ± 61.6	226.6 ± 58.0	220.8 ± 45.9	0.161
Neutrophil	3.4 ± 1.6	3.7 ± 1.4	3.6 ± 1.4	0.073
AST	26.2 ± 10.4	25.6 ± 7.6	25.6 ± 13.0	0.497
ALT	25.7 ± 13.2	25.2 ± 11.5	23.3 ± 10.9	0.122
BUN	16.4 ± 4.9	22.6 ± 13.8	31.7 ± 44.3	< 0.001
Cr	0.9 ± 0.2	3.1 ± 9.6	10.9 ± 22.4	< 0.001
Cholesterol	178.3 ± 35.5	172.3 ± 86.6	84.5 ± 119.5	0.004
Glucose	99.4 ± 24.4	133.9 ± 56.3	-	0.013
Low density lipoprotein	118.8 ± 33.5	121.9 ± 34.7	111.5 ± 36.9	0.240
Triglycerides	99.6 ± 58.2	154.5 ± 97.6	153.0 ± 89.0	< 0.001
High density lipoprotein	52.9 ± 14.1	55.4 ± 16.5	55.5 ± 17.5	0.053
CRP	0.2 ± 0.5	0.2 ± 0.4	0.7 ± 3.2	0.030
PSA	1.6 ± 1.6	109.0 ± 504.6	5.6 ± 33.3	0.140
testosterone	3.9 ± 3.6	2.5 ± 1.2	0.4 ± 1.0	< 0.001
Lumbar spine				
T-score	-0.5 ± 1.5	-0.8 ± 1.8	-1.2 ± 1.8	< 0.001
Femoral neck				
T-score	-0.4 ± 1.0	-0.7 ± 1.3	-0.9 ± 0.9	< 0.001
Bone loss				0.013
Normal	191 (53.2%)	137 (47.6%)	58 (42.6%)	
Osteopenia	148 (41.2%)	126 (43.8%)	58 (42.6%)	
Osteoporosis	20 (5.6%)	25 (8.7%)	20 (14.7%)	

Table 2. Risk factors for bone loss in hormone-naïve prostate cancer patients in multivariable analysis.

Factors	Multivariate analysis		
	P-value	HR	95% CI
Body mass index	**0.013**	**0.74**	**0.57-0.92**
Neutrophil	**0.038**	**0.67**	**0.44-0.94**

Table 3. Risk factors for bone loss in ADT treated prostate cancer patients in multivariable analysis.

Factors	Multivariate analysis		
	P-value	HR	95% CI
Waist circumference	0.108	1.31	1.00-2.03
HbA1C	**0.033**	**0.01**	**0.00-0.22**
Low density lipoprotein	0.869	1.00	0.97-1.03
Triglycerides	0.184	0.98	0.93-1.00

Conclusions: Bone loss is seen in prostate cancer patients regardless of ADT treatment, and then ADT treatment accelerates bone loss. Therefore, BMD testing should be considered in lower BMI and neutrophil hormone-naïve prostate cancer patients before initiating ADT.