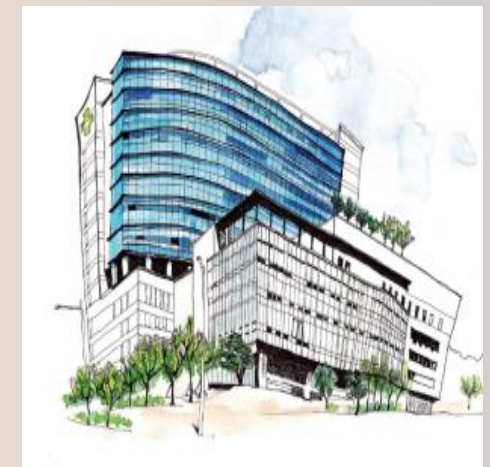


# Reduction of Bone Mineral Density and Risk of Osteoporosis in Gynecologic Cancer Patients



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## Objective

The purpose of this study is to evaluate the risk of osteopenia and osteoporosis in patients with cervical cancer, endometrial cancer and ovarian cancer without bone metastasis through lumbar and femoral bone mineral density and to research the impact of surgical treatment, chemotherapy and radiotherapy on bone mineral density (BMD) in gynecologic cancer patients.

## Materials and Methods

From March 2010 to December 2016, this study retrospectively reviewed the medical records of women who were treated at Haeundae Paik Hospital Obstetrics and Gynecology. We compared lumbar spine and femur neck BMD of 243 patients with gynecologic cancer and 240 controls. Patients with cervical cancer (n=105), endometrial cancer (n=63) and ovarian cancer (n=75) among gynecologic cancer patients (n=243) were treated with radical hysterectomy with bilateral salpingo-oophorectomy, chemotherapy and radiotherapy. 6 patients who had bone metastasis, had no surgical treatment due to advanced stage of cancer, and 3 patients who did not undergo oophorectomy to preserve fertility were excluded. As a control group, women with postmenopausal not diagnosed with gynecologic malignancy were selected.

BMD was measured by dual energy X-ray absorptiometry (DXA) (Lunar Radiation Corp, Madison, WI, USA) in lumbar spine and femur neck. According to the criteria of the World Health Organization, osteopenia was diagnosed as T-score of -1.0 to -2.5, and osteoporosis was diagnosed as T-score below -2.5. Diagnosis was based on lower one among T-scores of lumbar spine or femur neck.

## Results

As a result of the research, the mean T-scores of lumbar spine in gynecologic cancer group was -0.7 (SD=1.5), which was significantly lower than that of control (-0.3, SD=1.5) ( $P = 0.001$ ). Compared each level of lumbar spine, 1<sup>st</sup> and 2<sup>nd</sup> lumbar spine (L1-2) show a significantly lower bone density in gynecologic cancer group than control. Also, T-score of femur neck was -0.9 (SD=1.1) in gynecologic cancer group and -0.6 (SD=1.1) in control group ( $P = 0.01$ ).

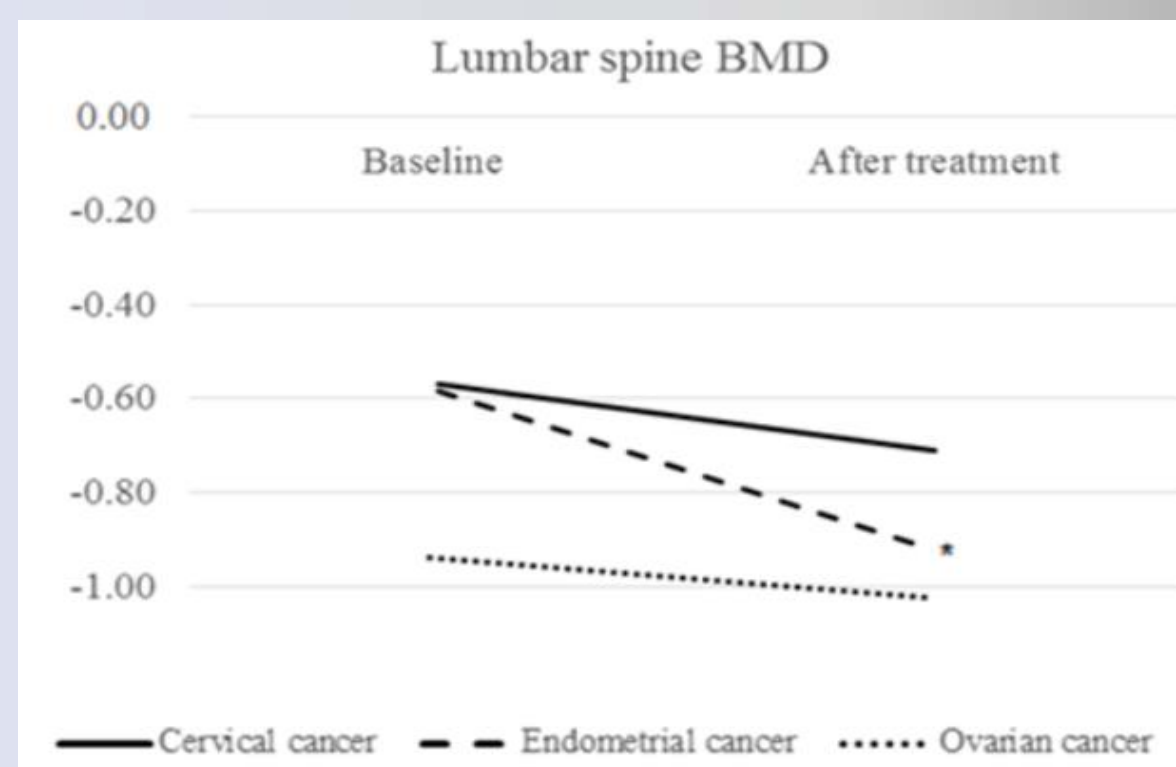
Of the 243 patients with gynecologic cancer, 114 (46.9%) were diagnosed with osteopenia and 33 (13.6%) were diagnosed with osteoporosis, of the 240 control group, 100 (41.7%) were diagnosed with osteopenia and 22 (9.2%) were diagnosed with osteoporosis.

**Table 1.** Demographic and anthropometric characteristics, T-scores of lumbar spine and femur neck

	Gynecologic cancer (n=243)	Control (n=240)	P-value
Age (years)	56.6 ± 11.1	55.3 ± 9.6	0.140
Height (cm)	156.5 ± 5.7	157.8 ± 5.3	0.010
Weight (kg)	58.2 ± 9.2	58.1 ± 10.0	0.856
BMI (kg/m <sup>2</sup> )	23.8 ± 3.7	23.3 ± 3.8	0.104
Parity	1.9 ± 1.1	2.0 ± 1.3	0.291
Lumbar spine BMD	-0.7 ± 1.5	-0.3 ± 1.5	0.001
L1	-1.0 ± 1.4	-0.6 ± 1.3	0.019
L2	-0.9 ± 1.5	-0.6 ± 1.5	0.049
L3	-0.6 ± 1.6	-0.4 ± 1.6	0.166
L4	-0.4 ± 1.7	-0.2 ± 1.6	0.228
Femur neck BMD	-0.9 ± 1.1	-0.6 ± 1.1	0.010

According to the type of cancer, BMD of cervical cancer patients was significantly lower in L1, L2 and femur neck compared with control group before cancer treatment. In ovarian cancer, BMD of each level of lumbar spines and the mean value of lumbar spines were significantly lower than control group. On the other hand, endometrial cancer patients were not significantly different with control group. Changes of T-scores before and after cancer treatment were significant in patients with endometrial cancer.

There were significant differences in BMD of L3, L4 and femur neck before and after treatment according to treatment method. T-scores change was the smallest in patients who underwent only surgical treatment including bilateral salpingo-oophorectomy and T-scores decreased most in patients who underwent postoperative concurrent chemoradiotherapy.



**Figure 1.** T-scores of lumbar spine and femur neck in patients with gynecologic cancer before and after treatment

## Conclusion

The prevalence of osteopenia and osteoporosis in gynecologic cancer patients was significantly higher than control group in lumbar spine and femur neck.