

PROSTATE CANCER AND BONE HEALTH

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In men with prostate cancer, their bone health can be affected in more than one way. Many men with prostate cancer are treated with ADT (androgen deprivation therapy). This is a form of testosterone suppression that can be accomplished in different ways (surgical castration or medically with medications such as leuprolide/Lupron and degarelix/Firmagon). ADT is associated with a greater risk for bone fractures. Longer treatment durations increase fracture risk. Older age and the presence of other illnesses also are associated with higher fracture incidence. ADT increases bone turnover and decreases bone mineral density (bone strength). Bone mineral density is a surrogate for fracture risk in patients with non-metastatic prostate cancer. Bone mineral density of the hip and spine decreases by approximately 2% - 3% per year during initial therapy. Loss of bone mineral density can be detected after 6-9 months of ADT. Other factors contributing to decreased bone mineral density can include reduced intake of calcium, low vitamin D levels, alcohol abuse, smoking, and chronic use of corticosteroids.

So what preventative measures can men take?

- They first need to talk to their doctor before doing anything. Things that may be discussed or considered are listed below:
 - Beneficial lifestyle modifications including smoking cessation, limiting alcohol and caffeine consumption, vitamin D and calcium supplementation, and regular weight bearing or resistance exercises can all help.
 - The NCCN (National Comprehensive Cancer Network) recommends screening and treatment for osteoporosis according to guidelines for the general population from the National Osteoporosis Foundation.
- The National Osteoporosis Foundation guidelines include:
 - 1) Supplemental calcium (1200 mg daily) and vitamin D3 (800-1000 IU daily) for all men older than age 50 years.
 - 2) Additional treatment for men when the 10-year probability of hip fracture is $\geq 3\%$ or the 10-year probability of a major osteoporosis-related fracture is $\geq 20\%$.
- Fracture risk can be assessed with a baseline DEXA scan to check your bone density. This is recommended at the start of ADT therapy.
- Treatment with denosumab, zoledronic acid, or alendronate may be recommended if your risk for fracture is high.
- Bisphosphonates (zoledronic acid and alendronate) increase bone mineral density during ADT.
- Denosumab increases bone mineral density and decreases fracture risk in patients with non-metastatic prostate cancer undergoing ADT.

A man's bone health can also be adversely affected when prostate cancer spreads to the bones (called bone metastasis). The bones are the most common site of metastasis (spread) of prostate cancer. When prostate cancer spreads to the bones it can not only cause pain, but can create weak spots in the bones that are more prone to fracture. There are treatment options beyond just treating the cancer that can help.

Treatment options to discuss with your doctor include:

- External beam radiation.
- Bone-targeted radiopharmaceuticals (Radium-223).
- Bisphosphonates (zoledronic acid).
- RANK-ligand inhibitors (denosumab).

The goals of treatment are to relieve pain, improve mobility, prevent complications (ie: fractures), and improve longevity.

If you have any questions, please discuss this further with your doctor.

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