AUDIT 2017/18

The assessment of Bone health in cancer treated patients.

Commenced November 16th 2017

AIM

The aim of this audit is to assess and raise the awareness of bone health in cancer treated patients and to start and monitor treatment . Cancer patients experience osteoporosis resulting from accelerated loss of bone mineral density caused by their treatment. Such bone loss greatly increases the risk for fractures namely hip fractures and spinal compression fractures which can have serious effects on the quality of their life with serious pain, posture changes, and loss of height and the increased risk of mortality. The true incidence of bone fracture in older cancer patients is likely to be underestimated as a result of the occurrence of undetectable or silent fractures- 2/3 of spinal fractures are painless 1/3 cause severe pain

Bone turnover is an active process.

In normal men bone mineral density decreases at a rate of 0.5-1% per year starting at mid life

Women have a higher rates of loss around the menopause -- an average 2% per year for 5-10 years which declines over time. Men receiving chemotherapy can have bone loss of the order of 4-5%. Marked changes are detectable at 6 months after initiation of hormonal therapy in men with prostate cancer. Breast Cancer patients with osteopaenia pre treatment are more at risk of developing osteoporosis with treatment and are therefore a high risk group . Osteoporosis is a common condition effecting 1 in3 females and 1 in 5 males, however cancer patients are more at risk, consequently detection and prevention of bone loss are important clinical goals of therapy. Internationally bone density testing is performed in 3 -32 % of high risk patients.[The Oncologist Journal] Cancer patients are surviving longer therefore we need to plan and anticipate the care needs .

Many cancer patients develop cancer related bone loss and subsequently develop osteoporosis in their lives and these results are mainly caused by;

Effect of cancer on bone

1 Osteolytic factor by cancer cell lines themselves

2 Bone loss induced by anti cancer treatment which is called Cancer Treatment Induced Bone Loss [CTIBL].

3 Radiotherapy

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1 How cancer cells affect bone

Bone health is a balance between osteoblast and osteoclast activity. Osteoblast produces 2 compounds

1 RANKL which stimulates the precursor of the osteoclast to become active and absorb bone [ligand of RANK –RANK—Receptor Activator Nuclear factor Kapa B]

2 Osteoprotegerin which blocks RANKL

It is the balance of these 2 which determines the net rate of bone growth /loss

Cancer cells increase RANKL and reduces Osteoprotegerin increasing osteoclast activity and hence bone loss especially noted in breast cancer. The osteoclast mature and cause osteolytic which causes bone demineralisation liberating TGFB, Ca, IGF. These 2 -Ca and Insulin like growth factor [IGF]allow cancer cells into the bone matrix where there is a rich source of trophic and mitogenic factors which facilitates proliferation and survival, this commences the vicious cycle of osteolytic metastases .

In prostate cancer osteoblast activity is increased causing mineralised bone to accumulate in the vicinity of the metastases both breast and prostate activate these systems to a lesser/greater degree1/4 of breast cancer patients have osteoblastic lesions and prostate cancer patients have osteolytic lesions .

A variety of neoplasm's without bone metastasis are also known to be related osteoporosis by producing circulating bone resorption stimulating factors leading to bone destruction and hypercalcaemia

2 Cancer treatments

Rates of bone loss occurring with cancer therapy is generally more rapid and severe then post menopausal bone loss in women or normal age related osteoporosis in men. Rates of bone loss can be up to 10 fold higher than normal. ; therefore prevention early diagnosis and treatment are essential to decrease the risk of fracture

A variety of hormonal and non hormonal treatments have the potential to promote bone loss by inducing hypogonadism which increases bone resorption and bone turnover

As oestrogens act through direct and indirect mechanisms to retain bone resorption, all oncology therapies that induce hypogonadism cause osteoporosis in a large percentage of patients.

Cancer therapy induced bone loss is most common in patients with breast or prostate cancer who receive chemotherapy, hormone therapy , or surgical castration .

3 Radiotherapy this reduces blood in bone which is dose related and hence the development of osteopaenia

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Sources

The Oncologist Aug 2006

Bone loss and fracture risk associated with cancer therapy

Journal of Cancer 2015 6[1];82-89

Changes in bone density after cancer treatment in patients with cervical and endometrial cancer conclusion results suggests cancer treatment increases bone loss in postmenopausal women with cervical /endometrial cancer

Radiation therapy effects on bone Med Pead Oncology 2003 Sept 4

Guidelines

1. US Surgeon Generals Office

All post menopausal women over 65 ,Young women with multiple risk factors, women with fragility fractures and those taking medications that can increase fracture risk.

2. American Society of clinical oncology have guide lines for breast cancer patients women over 65 women 60-64 with a family history of fractures , body wt < 70 kg prior non traumatic fractures or other risk factors e.g. smoking.

All women at high risk for osteoporosis should have BMD [Bone mineral density]

3. National Comprehensive Cancer network Clinical practice guidelines recommend screening for men with prostate cancer who under go surgical or chemical castration.

4. US preventative task force for breast cancer patients recommends all women over 65 should have BMD carried out.

5. Nice Guidelines for osteoporosis treatment

Collection of data

All 29 patients were post treatment female ; they were identified from the cancer register that we keep in the practice.

I checked all the charts for a DEXA scan report in the past 2- 5 years

Age range 56-84

Types of cancer

18 breast cancers, 2 ovarian, 2 uterine, 1 cervical, 1 bladder, 2 bowels, 1 thyroid, 1 pancreatic, 1 melanoma.

Analysis of data

6/ 29 or 20 .6% had a DEXA in the past 2 years.

10 / 29 or 34.4% had a DEXA in the past 5 years.

5 / 29 or 17 .2% had a DEXA more then 5 years

8 / 29 or 27.5% had no record of a DEXA Scan.

It is clear from these figures there is a significant gap in the care of these patients both in general practice and at hospital level. In fact bone health is never mentioned in post treated cancer patients. All the DEXA scans that were carried out were initiated in general practice.

My results are within the international recorded figures of 3-32 %.

Changes introduced to my practice

All patients were contacted either when visiting the practice or by post with the aim of getting an up to date DEXA scan carried out . [We are now aware VHI cover a DEXA scan every 2 years]

All patients need education on the importance of not just survival from their cancer but of their bone health status and what interventions are needed pre and post treatment and the importance of follow up in order to reduce their morbidity and mortality. I encourage patients to request a DEXA scan. I am having ongoing discussions with my hospital colleagues on the importance of bone health and requesting they include a DEXA scan as part of their protocol for cancer patients pre chemotherapy/ radiotherapy.

Patients need to educated to take an active role in promoting bone health through better diet, supplementation, exercise and stopping smoking and addressing alcohol intake.

Re-audit March 2018

The population had increased to 30 with a new breast cancer in Jan 18 [age 61]. She is the only patient to date that had a DEXA pre treatment, and she does have osteoporosis and on treatment

46.6 % or 14/30 now have an up to date DEXA scan, of these 6.6% or 2/30 are normal.

39.9% or 12/30 having osteopaenia or osteoporosis requiring treatment.

53.3% or 16/30 have all been given or sent a letter to have a DEXA scan carried out.

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Plans for the future

Continue to monitor all cancer patients and update their DEXA scan every 2 years.

I have set up a DEXA recall system on the computer.

Include all male cancer patients, all patients on long term steroids /Immune suppression therapy and all female patients who are /who had undergone fertility treatment where steroids were used.

All post menopausal females and men over 60 are educated about bone health and the importance of an up to date DEXA scan.

Assessing that all 30 patients are on the correct therapy and are compliant with their medication.

Apply the existing guidelines

Treatment

Bisphosphonates are the first line

They can be used in conjunction with chemotherapy, endocrine and radiotherapy

Risedronate and Ibandronate are approved for post menopausal women

Alendronate and Risedronate are approved for steroid induced osteoporosis in men and women

Calcium 12000-1500mg daily VitD 800IU daily

How Bisphosphonates and Denosumab work .

Bisphosphonates orally are absorbed onto the apatite crystals that form mineral bone and they persist there for up to 10 years and when they are dissolved by the osteoclast they poison the cell and it dies hence they are effective in reducing the burden of osteolytic lesions in various types of metastatic cancer .

Denosumab binds to RANKL and blocks osteoclast activity

June 2018 update re-audit

Population 37 [39--- 2 died 1 renal cell ca 1 melanoma] all female Age 54-93

Types of cancers: 21 breast, 3 bowel, 3 uterine, 1 melanoma, ,2 bladder , 2 ovarian 1 thyroid 1 pit adenoma 1 cervical ,1 pancreatic and 1 acoustic neuroma

15/37 40.5 % are up to date; of this 2/37 5.4% are normal.

13/37 35.1% needs treatment

22/37 59.4% Have all been contacted and given letters , a significant number of these- 5 or 12 % had been given letters in the past and never got a DEXA carried out .