

Osteoporosis: The Power of Prevention

- Pharmacology Correlation USUHS
- Presenter :
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- Topics:
 - I. Introduction
 - II. Case Background (S & O)
 - III. Findings & Assess. (A)
 - IV. Resolve & Monitor (P)
 - V. Clinical Course
 - VI. Conclusion
 - VII. Bibliography

I. Introduction

- Osteoporosis - Asymptomatic until fractures occurs
- **Objectives of Case:**
- Identify risk factors
- Recommend non-pharmacologic measures for prevention
- Recommend correct amount of Ca required of varying age
- Design treatment regimen for hormonal therapy postmenopause
- Patient education on need for continued therapy & prevention

II Case Background (S & O)

- Cathy Feamer (C.F.)
- Age 52, Caucasian, F
- Read article re: importance of estrogen therapy in preventing osteoporosis (OP)
- Mentioned interest to take estrogen to MD during clinic visit
- However, concern about side effect which is return of menstruation
- **Side Discussion:**
- Osteoporosis (porous bone) - systemic skeletal disorder characterized by low bone mass and

II. S & O - Con't

- structural deterioration of bone tissue leading to fragility and increased risk to fx of hip, spine, wrist and other bones (enclosr 1)
- Cause: the rate of bone resorption-break down (osteoblast) more rapid than bone formation (osteoclast)
- due to disruption in hormonal activity, decrease or faulty malabsorption of Ca
- Types :
 - Type 1 - develops silently over years and surface in middle age
 - Type II - develops over age 70 (affects M & F)

II. S & O - Con't.

- **Back to our Case**
 1. Thin, caucasian F
 2. Wt. 52 k; Ht. 170 cm
 3. Menopause age 44
 4. Three live birth at age 25, 28, and 33
 5. Comp. Programmer
 6. Smokes 1ppd
 7. Minimal use alcohol
 8. Occa. walks 3 miles
 9. MVI 1 q day
- 9. All exams WNL Except:
 - BP 130/70
 - Na: 147mEq/L (136-145)
 - Cl: 129mEq/L (97-107)
 - CO2: 20mEq/L (22-30)
 Lab significance: close follow-up
- 10. Pap smear : PND
- C.F. is Type I potenti

III. Findings and Assessment

- 1. Problem ID
 - a) Risk comparison-OP Documented /C.F
- I) Genetics: Caucasian & Asian -yes (Black usually less afflicted (>bone mass))
- Female gender - yes
- Small stature, small bones, thin - yes
- Fair complexion - yes
- Northern European- ?
- Family hx of OP, maternal side - yes, Mo & grandma with OP
- II. Medical:
 - Prolonged amenorrhea Yes (Menopause@44)
 - Immobilization from illness/phy. limitations

III. F & A - Con't

- II - Medical - Con't
- Endocrine diseases (Cushing's, hypogonad)
- Transplantation
- GI diseases
- Neoplastic
- DM type 1
- Liver & renal disease
- Chronic drug tx-heparn corticosteroids, immuno suppressants, thyroid tx
- III. Nutritional
- Inadequate Ca & Vit.D intake - yes
- High intake of animal protein & sodium (calciuric bone effect)
- Excess consumption of caffeine - yes

III. F & A - Con't

- IV Lifestyle
- Cigarette smoking-yes
- Excessive phosphoric acid beverages ?
- Lack of exercise -yes
- Excessive exercise
- Restricted mobility (include couch potato)
- Heavy alcohol consumption - yes, although occa.

F & A - Con't

- b) Cardiovascular risk
- Fa, HTN, MI age 53
- Mo, HTN
- Lifestyle: smoker, alcohol, though occa., exercise occasionally
- Early menopause (44)
- Job stress - computer programmer large Co.
- C) Additional info to determine OP risk and design preventive tx
- Diet & health practices
- Lab values : Ca, PO4, estrogen/progesterone,
- Ht. status, hx back pain
- Know bone mineral density index (BMD) (enclosure 2)

F & A - Con't

- **Design Preventive Tx**
- Start bone resorption inhibitor not estrogen (aunt had breast Ca) i.e raloxipene, fosamax
- Daily moderate stretch and walking exercise
- Start dietary Ca & Vit.D supplementation
- Schedule regular MD/Practitioner visit
- Evaluate OP risk assessment (enclosr 3)
- Design sensible eating habit
- Encourage participate in smoking & alcohol cessation program

III. F & A - Con't

- Desired Outcome
- 2. Goals for therapy: prevention, prevention.....
- I. Prevent onset and/ or progression of osteoporosis. Can be accomplished by identifying risk factors
- II. Prevent debilitating sequelae of OP such as bone fx from falls, kyphosis, etc. (enclosr 4)
- Can be accomplished by maintaining healthy habits and lifestyle modifications such as have eyes check regularly, eating sensibly, periodic check-up, exercise
- Institute safety measures e.g. less use of rugs, wet floors, dangerous fixtures, good-fitting shoes - no high heels, etc.

IV Resolution & Monitoring (P)

- **Alternatives tx. & Optimal Plan**
- a) Non-drug therapy for prevention of OP
- Reg. exercise, good diet
- Vit. & mineral (C, D, E, B12, Ca, Mg, Fl)
- Ingestion of phytoestrogens, from natural isoflavones.
- Plants with estrogen-like compounds - under investigation (herbal?)
- Flavone glycosides - are antioxidants, means "clean - up/scavenge" free radicals. Aids in vitamin absorption
- Other herbs: Feverfew, horsetail, oatstraw, etc.

IV. R & M (P)

- B) OP pharmacologic option for prevention (Dose,schedule,cost, adverse effects,etc)
- HRT- Premarin,Ogen .625 mg/day;\$400/yr. >vaginal bleed,breast tenderness,increased risk of breast Ca *Add progesterone if with intact uterus.
- SERM (selective estrogen receptor modulator)Raloxipene producing estrogen-like effects on bone & lipid without stimulating endometrium & breast 60 mg/day;\$750/yr. >hot flushes

IV R & M - Con't

- Biphosphonates , bone resorption inhibitors - Alendronate(fosamax-Merck)5-10mg/day \$750/yr >Strict po guidelines - chemical esophagitis, severe GI ulcerations. Take 30-60min.before food,do not lie down, full glass of H2O,etc
- Calcitonin-salmon: inj or spray(preferable) specific for vertebrae 200 IU/day;\$750/yr.
- Calcium (Carbonate, citrate,acetate)1000-1500mg/day\$35/yr > GI disturbance - constipation,N/V,etc
- Vit. D (Ca absorption) 600-1200U/d;\$35/yr

IV R & M - Con't

- 5 & 6Therapy Monitor- Prevent adverse effect: Patient counseling
- Physical evaluation >height,wt.,spine,back pain
- >PE of breast (self), mammogram,cervical exam,Pap smear, >Measure BMD
- Lab evaluation: such as CBC,Ca,Po4,Alk phosphatase (bone), thyroid function,ESR, 24-hr.urineCa & creat. 25-Hydroxyvit. D,etc.
- Information to C.F. re:Preventive regimen > Report unusual S/S > Expect compliance of drug tx,exercise,etc

V. Clinical Course

- C.F.'s concern with increased risk of breast Ca with HRT (after 2 months taking)
- Info we could provide:
- HRT if taken correctly & properly supervised does not cause Ca. Incidence of women taking HRT is lower than those who are not
- Two months later: C.F had some vaginal spot. Wants info to prevent OP to her daughter & info prevent more fx to mom
- D/C HRT and change to SERM (C.F.)
- Do OP risk assessment
- Diet & lifestyle Mod.
- Stress Ca and Vit.D

VI. Conclusion

- Word of Wisdom for NP:
- As the world population and its life expectancy increase, the incidence of osteoporosis is also expected to increase sharply over the half century. Although studies are underway for drugs with less
- side effect-Na flouride parathyroid hormone, and non-drug (herbal)
- Prevention is the Key
- Therefore encourage Ca supplementation early in life-Clinic
- Please see enclosures 5,6,7 for OP teaching/ education materials.
- Thank you

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