

[illegible]

10 D 가 1 α -

D 가가

25(OH)D가 20 ng/ml 50 가

pg/ml 가 20- 50% 가 가

25(OH)D 가 12- 15 ng/ml

D

D 가 (calcitriol) 58%

D

Bischoff

D 86%

가 25% , 1,25- (OH)2D

가

(Antiresorptive agent)

50%

(calcitonin),

(ipriflavone)

. 765

D 가

25%

D 가

가

D 가

가

D (Myopathy)

1.

D , 60 2 1947 Albright가

D

400- 800IU (10- 20 μ g)

1,25- (OH)2D 0.25- 0.5 μ g 가 Consensus Development Conference(1987, 1990, 1993)

, 800- 1000mg 가

1,25- (OH)2D

5 50%, 50% 90% 1/3 8 가 . 가 가 , Interleukin-6 , 가 1,25(OH)₂D 가 . 65 D 50-70pg/ml , conjugated estrogen 0.625mg 가 Micronized Estradiol 0.5-1mg, Piperazine Estrogen Sulfate D 1.25mg, Estradiol Valerate 1-2mg, Transdermal Estrogen 50 µg, Ethinyl Estradiol 5 µg , Estradiol Implant 50mg 가 가 가 25 가 . 40% 20% 2가 가 가 가 가 20 % 300 가 - 1 17 2.3 70 17 1.8 가 . T - score 가 2 가 가 . HERS (1380 , (LDL- cholesterol) 1380 4) 5% HDL- cholesterol 가 , 5 (fibrinogen) , , LDL , 60 kg , 71 20 가 (280) . HERS 4

- 858 -

가

가

가

가

가

(etidronate)

가

BMU

가

1

(clodronate),

(tiludronate)

2 3

400mg 3 2

Ibandronate, Zoledronate, YM- 529

(mineralization)

. Watts 400

2

10 mg P/kg/day

(rickets)

3.5%

가

1- 2%

가가 7

가

(ectopic calcifi-

cation)

가

Chesnut

가

188

10mg

8.56%, 6.47%,

2.84% 가 가

가

50% 가

가 가

가

1/1,000

가

1969

가 (10mg/Kg)

가

가

(alendronate)

가

가

, 60 kg

가 (trabecular bone) .
 1 가
 4% 가
 2% 가 10
 가 ,
 25% ,
 가
 , (nausea),
 (dyspepsia), (vomiting), ,
 . amino
 (erosive gastritis) ,
 FDA
 Procter and Gamble risedronate 5
 mg 10 mg 30 - 1
 , risedronate FDA
 (pamidronate)
 P-C-P bond 가
 , (blood
 cell count)
 (bioavailability)
 1-10% .
 0.7% , 0.3%
 3-7% 가
 (passive diffusion)
 (paracellular absorption). 2-3
 , (uveitis), (scleritis),
 (conjunctivitis)
 3.
 90% 가 60-70% 가
 pH가 가 C 32
 20-80%
 active process ,
 20% ,
 50% , 50% ,
 (clearance)
 1-2
 (soft tissue)
 40%

. , , , .
 , 20- 40 , 1- 2 가
 (brush border) 가
 , , 가
 , , 가
 , 가
 가 , 가
 가 가 , 가 .
 4. SERM (selective estrogen receptor modulator)
 , 50- 100 IU 가
 1- 2
 가 , 가
 가 가
 200IU 가 .
 , 50, 가 .
 100, 200IU 1- 2 200IU
 가 가 200IU (agonist) 가
 200 IU (tamoxifen),
 가 (raloxifen)(LY 139481 HCL), droloxifen (3- hydroxy-
 tamoxifen, DRO) , toremifene, ICI 164384
 , 2 2 4- hydroxytamoxifen
 , MEDOS
 25%가 SERM(selective estrogen receptor modulator)
 , 가
 가 , SERM
 50- 70%

fibrinogen LP(a) PAI- 1
가 . 가

가 .

STAR(study of Tamoxifen and Raloxifen) trial
가 가 22,000
40
76%

(bone ER(+)) 90%

remodeling) .
(thromboembolism) 가 .

benzodiazepene .

가

가 가

(sodium fluoride),
(parathyroid hormone), (growth hormone),
(growth factor) .

가 IL- 6 TGF- (

1. (fluoride)

가

3 MORE(Multiple
Outcomes with Raloxifen Evaluation) trial 가 ,
3% 2% 가 가
40- 50 % . Lau
가 acid phosphatase
tyrosine phosphorylated protein
가 TGF
(mitogenic effect) 가 .

(1/4) 2%
6.4%, 10-5M (osteoprogenitor)
LDL- cholesterol 10.1% , HDL- cholesterol 180% 가 , 가
가 HDL2- cholesterol 가 , PICP 가
T G 가 , 50% 가

fluoroapatite (osteoid) 가 IL-6 (humoral factor) 95 195 ng / ml IL-6가 10 μ M (NaF) mono- (plain fluorophosphate(MFP)가 NaF) IGF-I , 10 μ M TGF β 가 PTPP 가 (osteomalacia) D 가 (400I.U.) (lower-extremity pain syndrome), enteric coated form, intestinal-release form 2-8 가 (25 mg/dl) 18 가 가 FDA 가 (desensiti- zation) (down regulation) , 2 가 2.

가 IGF-I Ab

8-10% 가

IGF-I, II TGF- β

, Lindsay

9

IGF-I, II TGF- β

1

.

가

1981 Hesp

(1-34)

3

, (total hip)

(total body)

13%, 2.6% 7.8 %

가

가 1 alpha hydroxylase

가

1,25(OH) $2D$

가가

가

가

가

가

가?

3.

-1 (IGF-I)

Slovik

1,2

5(OH) $2D$

가

1

98% 가

, (radial bone)

가

IGF-I, IGF-II (insulin growth factor I ,II), TGF- β 1, TGF- β 2 platelet-derived growth factor, basic and acidic fibroblast growth factor, bone morphogenic protein

, 1993 Neer 15

32% 가

6%

(osteoblast)가

, Reeve 1991

autocrine paracrine

nandrolone (anabolic steroid)

systemic

50%

가

hormone

ADFR

(acti-

가

vation cycle)

, Hesch

rhIGF-I

25%

가

IGF-I

가 가

MGH

Finkelstein

40

IGF-I

(Endometriosis)

GnRH agonist

1)

, 2)

. (, carpal tunnel syndrome), 3)

6

가 . IGF-I

2.8%

가

가

1

가 5%,

가 5%

rhIGF-I rhIGFBP-3

가

. IGFBP-3 IGF-I

3% 가

IGF-I

가

. 1997 Hodsman

, rhIGF-I

가 , IGF-I 가 , 가 , 가 , IGFBP-3 가 .

4. (GH) , SERM(selective receptor estrogen modulator) FDA

가 3 가

IGF , 1990 가 가 , IGF-1 가 , 1.6 % 가 IGF-1 가 , 가 , IGF-1 가 가 가 가 (carpal tunnel syndrome,)

Table 1. Therapy update 1999

Estrogen	Vitamin D
Calcitonin	Fluoride
SERMs	Anabolic steroid
Bisphosphonate	PTH

REFERENCES

- 1) Russel RGG, Rogers MJ. *Bisphosphonates: from the laboratory to the clinic and back again. Bone* 25: 97-106, 1999
- 2) Balena R, Kleerekoper M, Foldes JA, shih M-S, Rao SD, Schober HC, Parfitt AM. *Effects of different*

- regimens of sodium fluoride treatment for osteoporosis on the structure, remodeling and mineralization of bone. Osteoporosis Int 8:428-435, 1998*
- 3) Spencer CP, Morris EP, Rymer JM. *Selective estrogen receptor modulators: women's panacea for the next millennium? Am J Obst Gynecol 180:763-770, 1999*
 - 4) Gwusens P, Vanhoof J, Declerck K, Bruckers L, Molenbergs G, Raus J. *Effect of vitamin D supplements on bone density and muscle strength in elderly women. A double blind, placebo controlled study. Calcif Tissue Int 64:S44, 1999*
 - 5) Zofkova I, Kanceva RL. *New drugs with positive effects on bones. Casopis Lekaru Ceskych 136(15): 459-63, 1997*
 - 6) Cosman F, Lindsay R. *Is parathyroid hormone a therapeutic option for osteoporosis? A review of the clinical evidence. Calcified Tissue International 62(6):475-80, 1998*
 - 7) Greenspan SL, Holland S, Maitland-RL, Poku M, Freeman A, Yuan W, Kher U, Gertz B. *Alendronate stimulation of nocturnal parathyroid hormone secretion: a mechanism to explain the continued improvement in bone mineral density accompanying alendronate therapy. Proceedings of the Association of American Physicians 108(3):230-8, 1996*
 - 8) Olesen C, Steffensen FH, Sorensen HT, Nielsen GL, Olsen J, Bergman U. *Low use of long-term hormone replacement therapy in Denmark. Br J Clin Pharmacol 47:323-328, 1999*
 - 9) Hulley S, Grady D, Bush T, Furber C, Herrington D, Riggs B, Vittinghoff E. *Randomized trial of estrogen plus progestin for secondary prevention of coronary heart disease in postmenopausal women. 280:605-613, 1998*
 - 10) Delmas PD, Emsrud KE, Harris S, Pols HAP, Recker R, Reginster JY, Adachi JR, Eastell R, Gennari C, Bjarnason N, Mitlak BH, Knickerbocker RK, Black DM, Genant HK. *Raloxifen therapy for 3 years reduces the risk of incident vertebral fractures in postmenopausal women. Calcif Tissue Int 64:S43, 1999*