

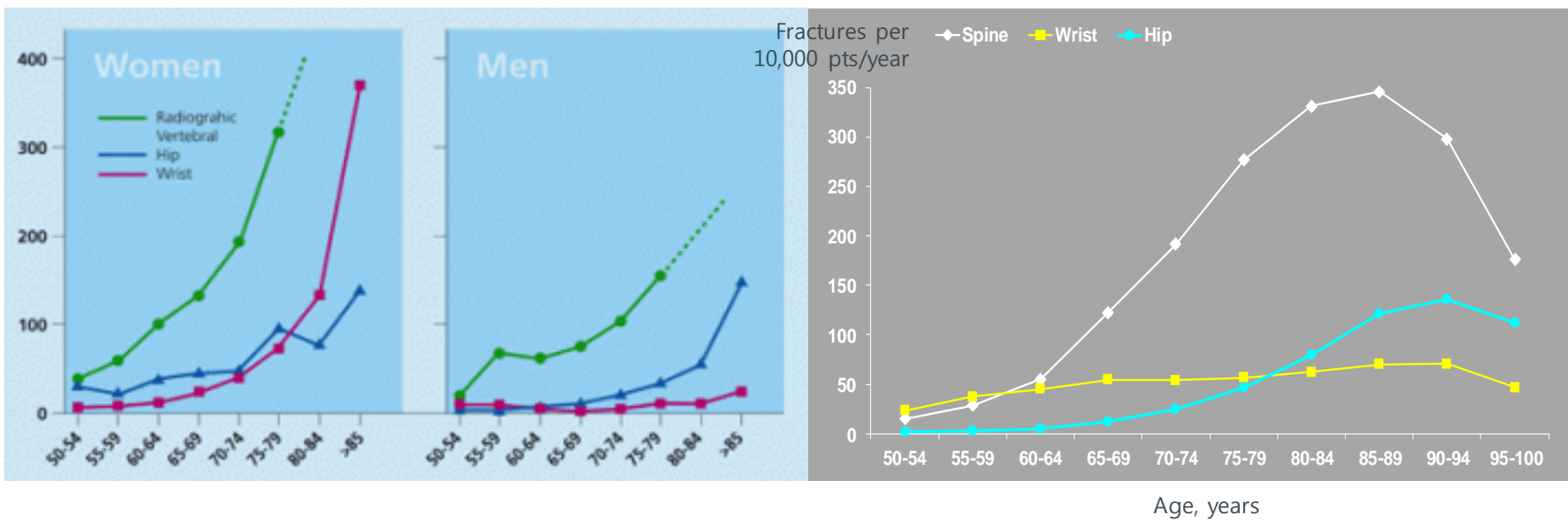


Regression Analysis between Multiple Osteoporotic Spine Fracture and Osteoporotic Fracture Risk Factors

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Introduction



Sambrook et al., Lancet., 2006

Jang et al., HIRA Research report., 2009

Introduction

- Severity of osteoporotic spine fracture ↑ → Subsequent fracture ↑

Delmas et al., Bone., 2003

- All low-trauma osteoporotic fractures were associated with increased mortality risk in the first 5 years.
- Subsequent fracture was associated with x3~4 increased mortality risk for an additional 5 years.

Bliuc et al., JAMA., 2009

*What's the difference between
general osteoporotic spine fracture
and
severe multiple osteoporotic spine fracture?*

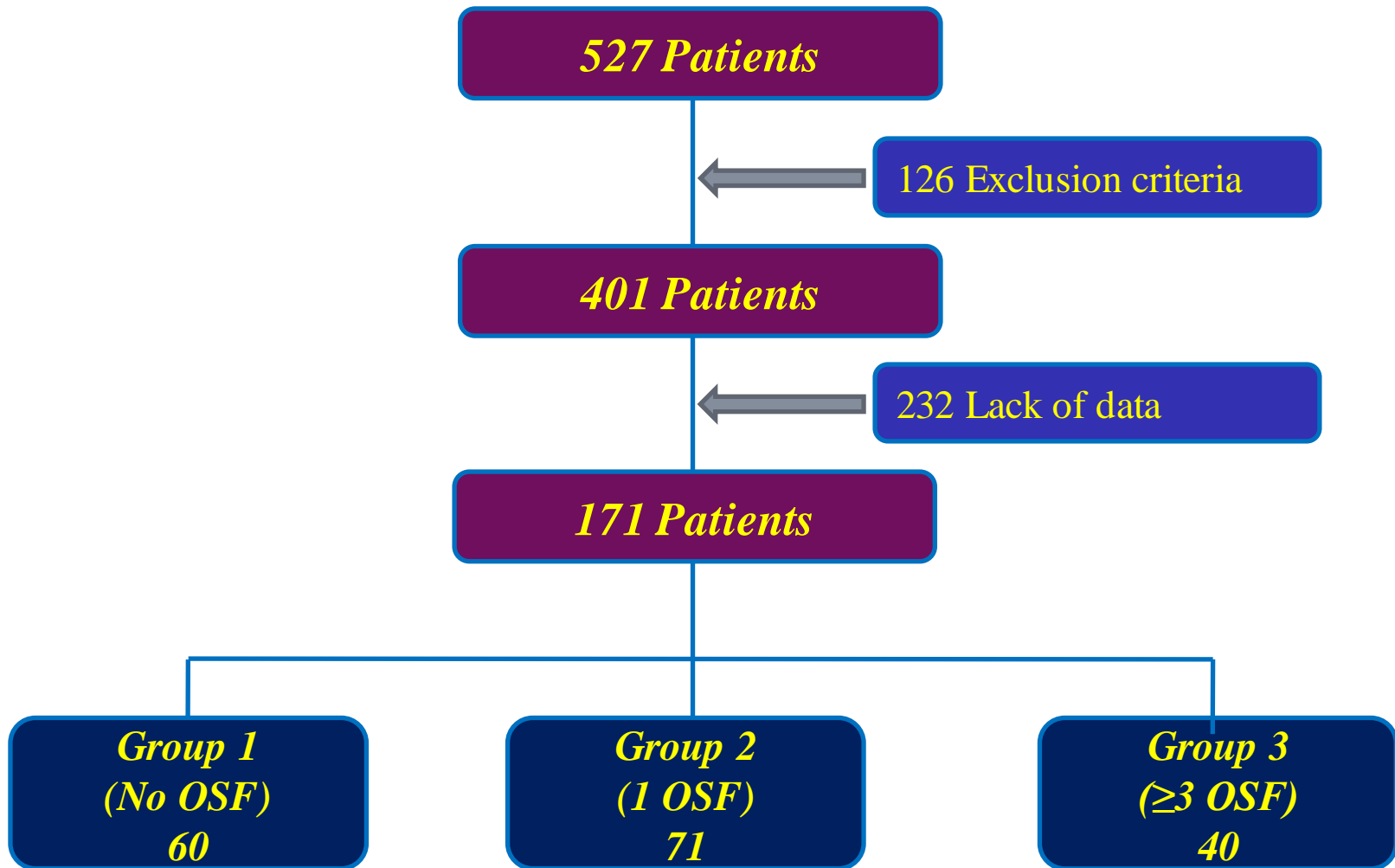
Materials & Methods

- From January 2014 ~ to May 2015

- Inclusion
 - Patients who checked the bone marrow density (BMD) using a dual-energy x-ray absorptiometry(DEXA) (Delphi-W, Hologic, Waltham, MA, USA)
 - Informed consent agreement

- Exclusion
 - Spine fracture due to high-energy trauma that is defined according to the fracture morphology and patient's history.
 - Past history of taking drugs that may affect bone metabolism.
 - Past history of spine surgery.

Materials & Methods



Materials & Methods

- Age
- Body mass index (BMI)
- Bone marrow density (BMD)
- Presence of rheumatoid arthritis (RA)
- Use of steroid (Steroid)
- Osteoporosis treatment (Osteo. Tx.)
- Smoking
- Drinking
- Serum 25(OH) vitamin D₃ (Vit. D₃)
- Past history of osteoporotic fracture (Past Osteo. Fx.)

Results

Mean ± SD	Non-OSF (N=60)	1 OSF (N=71)	>3 OSF (N=40)	Total (N=171)
Age	70.40±5.64	72.61±9.01	70.68±12.92	71.38±9.16
BMI	24.38±3.72	22.04±2.60	20.48±2.34	22.50±3.34
BMD	-2.03±0.97	-2.96±1.12	-3.59±0.82	-2.78±1.17
Vit. D ₃	31.67±18.94	23.70±11.11	15.87±4.64	24.67±14.71
Sex (M : F)	22 : 38 (63.3%)	10 : 61 (85.9%)	3 : 37 (92.5%)	35 : 136 (79.5%)
RA (Non RA : RA)	56 : 4 (6.7%)	60 : 11 (15.5%)	32 : 8 (20.0%)	148 : 23 (13.5%)
Steroid (No history of steroid therapy : history of steroid therapy)	57 : 3 (5.0%)	62 : 9 (12.7%)	34 : 6 (15.0%)	153 : 18 (10.5%)
Osteo. Tx. (No history of osteoporosis treatment : history of osteoporosis treatment)	52 : 8 (13.3%)	55 : 16 (22.5%)	33 : 7 (17.5%)	140 : 31 (18.1%)
Smoking (Non-smoker : Smoker)	58 : 2 (3.3%)	64 : 7 (9.8%)	34 : 6 (15.0%)	156 : 15 (8.8%)
Drinking (No drinker : 3 or more alcoholic beverages a day)	56 : 4 (6.7%)	64 : 7 (9.8%)	35 : 5 (12.5%)	155 : 16 (9.4%)
Past Osteo. Fx. (No previous osteoporotic fracture history : Previous osteoporotic fracture history)	55 : 5 (8.3%)	53 : 18 (25.4%)	25 : 15 (37.5%)	133 : 38 (22.2%)

Results



; Non-OSF vs. 1 OSF // Non-OSF vs. >3 OSF

Non-OSF	Odds ratio	95% CI for OR		p-value	Odds ratio	95% CI for OR		p-value
	1 OSF				3 OSF			
Age	1.028	0.989	1.069	0.166	1.003	0.962	1.046	0.888
BMI	0.770	0.673	0.881	0.000	0.618	0.516	0.740	0.000
BMD	0.421	0.288	0.618	0.000	0.203	0.119	0.348	0.000
Vit. D ₃	0.963	0.937	0.989	0.006	0.861	0.808	0.917	0.000
Sex	3.532	1.509	8.264	0.004	7.140	1.969	25.898	0.003
RA	2.567	0.772	8.529	0.124	3.500	0.977	12.543	0.54
Steroid	2.758	0.711	10.695	0.142	3.353	0.787	14.287	0.102
Osteo. Tx.	1.891	0.746	4.790	0.179	1.379	0.457	4.160	0.569
Smoking	3.172	0.633	15.886	0.160	5.118	0.978	26.790	0.053
Drinking	1.531	0.426	5.506	0.514	2.000	0.503	7.957	0.325
Past osteo. Fx.	3.736	1.294	10.785	0.015	6.600	2.160	20.169	0.001

Results



; Non-OSF vs. 1 OSF vs. >3 OSF (Multivariate)

Non-OVF	Odds ratio	95% CI for OR		p-value	Odds ratio	95% CI for OR		p-value
	1 OVF				3 OVF			
Age	1.031	0.977	1.088	0.260	1.006	0.944	1.073	0.846
BMI	0.847	0.722	0.994	0.042	0.641	0.493	0.832	0.001
BMD	0.524	0.311	0.883	0.015	0.174	0.074	0.408	0.000
Vit. D ₃	0.953	0.921	0.987	0.007	0.779	0.705	0.859	0.000
Sex	1.615	0.539	4.836	0.392	2.122	0.335	13.462	0.425
RA	1.806	0.418	7.808	0.428	2.148	0.339	13.630	0.417
Steroid	2.994	0.500	17.951	0.230	8.583	0.871	84.618	0.066
Osteo. Tx.	1.472	0.470	4.614	0.507	1.174	0.257	5.361	0.836
Smoking	0.722	0.112	4.640	0.731	0.317	0.036	2.813	0.303
Drinking	1.281	0.283	5.803	0.748	2.011	0.285	14.163	0.483
Past Osteo. Fx.	1.197	0.328	4.364	0.785	0.810	0.156	4.206	0.802

Conclusions

- **Risk factors** of multiple osteoporotic spine fracture has **no difference** between osteoporotic spine fracture happened 1 level.
- But, multiple osteoporotic spine fracture has **lower BMI, BMD, Vit. D3** than osteoporotic spine fracture happened 1 level.
- **Females**, and having more **past history of osteoporotic fracture** might have more chance to get the multiple osteoporotic spine fracture.