

# DENOSUMAB FOR MALE HEAMODIALYSIS PATIENTS WITH LOW BONE DENSITY (BMD): A CASE CONTROL STUDY.

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## OBJECTIVES

- Low bone mass is a world public health concern that results in increased risk of fractures. Denosumab (Dmab) is a monoclonal antibody against the receptor activator of nuclear factor- $\kappa$ B ligand (RANKL), a cytokine that is essential for the formation, function, and survival of osteoclasts.
- By binding RANKL, Dmab prevents the interaction of RANKL with RANK on osteoclasts and reversibly inhibits osteoclast-mediated bone resorption. Renal function impairment does not significantly affect the pharmacokinetics and pharmacodynamics of Dmab. (JBMR 27 2012 1471-1479)
- We treated male hemodialysis patients with low BMD in our institution with Dmab for 1 year, and evaluated the effects on radius BMD.

## METHODS

- Thirty seven male hemodialysis patients with low BMD (less than 70% of young adult mean (YAM)) in our institution were enrolled. Seventeen patients (mean age 72.8 yo) were treated with Dmab 60 mg every six months, and twenty patients (mean age 71.2 yo) were not treated with Dmab (control group).
- BMD at distal third of radius was measured by X-ray absorptiometry on a DTX-200 densitometer. Dialysates with a calcium content of 2.5 mEq/l were used. A combination of calcium-based phosphate binder, sevelamer, lanthanum carbonate hydrate, calcitriol, alfacalcidol and cinacalcet were titrated according to the serum calcium or phosphate levels.
- No patients were treated by bisphosphonetes or selective estrogen receptor modulators.

## RESULTS

Baseline characteristics of patients

	Dmab	control	P value
N	17	20	
Age(years)	72.8±9.5	71.2±11.0	NS
Duration of HD(years)	7.1±4.9	6.4±5.3	NS
BMD(% of young mean)	56.7±7.2	54.7±11.0	NS

	Baseline (B)	1 week (w)	1 month	B vs w
Corrected Ca mg/dl	9.2±0.5	8.5±1.1	9.2±0.9	P<0.01
P mg/dl	5.0±1.3	4.2±0.9	4.0±1.1	P<0.01
W-PTH pg/dl	149±129	235±119	240±98	P<0.01

	Baseline (% of YAM)	1 year (% of YAM)	% change
Dmab	56.7±7.2	58±7.9	2.6%
Control	54.7±11	52.3±10.1	-4.5%
P value			P<0.001

- At seven days, mean serum albumin-corrected Calcium (Ca (alb)) decreased 9.2 mg to 8.5 mg (P<0.01), mean serum P decreased 5.0 mg/dl to 4.2 mg/dl (P<.01), mean whole-PTH increased 149 pg/ml to 235 pg/ml(P<0.01). At one month, serum albumin-corrected Calcium (Ca (alb)) was 9.2 mg/dl, mean serum P was 4.0 mg/dl and mean whole-PTH was 240 pg/ml.
- At one year, BMD at the distal third of radius increased 2.6 % in donosumab group and decreased 4.5 % in control group (P<0.001).

## CONCLUSIONS

- Although it is a small-sized observational study, in male hemodialysis patients with low bone mass, denosumab Increased bone mineral density.

## REFERENCES:

- Denosumab in postmenopausal women with low bone density. Michieal R. McClung, Micheal Lewwiewcki N Engl J Med 2006; 354(8)821-831.
- Denosumab for prevention of fracture in postmenopausal women with osteoporosis. Steven R. Cummings, Javier San Martin, et al. N Engl J Med 2009; 361:756-765
- A single-dose study of denosumab in patients with various degree of renal impairment. Block GA, Bone HG, Fang L, et al. J bone Mineral Res. 2012;27:1471-1479
- An open label, prospective pilot study of denosumab for severe hyperparathyroidism in patients with low bone mass undergoing dialysis. Chien-Liang Chen, Nai-Ching Chen, et al. J Clin Endocrinol Metab 2014;99:2426-2432
- Denosumab for low bone nass in heamodialysis patients: a noncontrolled trial. Rikako Hiramatsu, Yosifumi Ubara, et al. Am J Kid Dis. 2015;66:175-177
- Severe hypocalcemia following denosumab injection in a heamodialysis patients. Brenden B. McCormick, Janet Davis, Kelvin D. Burns. Am J kidney Dis. 2012;60:626-628
- Trends in hip fracture rate in US heamodialysis patients, 1993-2010. Thomas J. Ameson, Shuling Li. MS, et al. Am J Kidney Dis. 2013;62:747-754

