

# Effect of Recombinant Human Erythropoietin on Nitric Oxide, Endothel in - 1 and Angiotension - I in Chronic Hemodialysis Patients

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# Objectives:

To investigate the effect of recombinant Human erythropoietin (rhuEpo) on Nitric Oxide(NO), Endothelin - 1 (ET - 1) and Angiotension - II (Ang II) in chronic hemodialysis patients.

# Methods:

Eighty patients on chronic hemodialysis were enrolled in this randomized, controlled study. Forty - three received rhuEpo (HDepo n=43) and thirty - seven did not (HD n=37). According to the blood pressure, each group was sub - divided into two groups, HDepo with hypertention (HDepo - 1 group n=23), HDepo with normal blood pressure (HDepo - 2 group n=20), HD with hypertention (HD - 1 group n=19), HD with normal blood pressure (HD - 2 group n=18). Twenty uremia patients who did not receive hemodialysis therapy and twenty normal adults were chosen as control group. The NO level was measured by colorimetry. The ET - 1 level and the Ang II level were measured by radioimmunoassay (RIA).

### Using EPO serum NO、ET-1level before and after the change

group	n -	NO ( μmol/L )		ET-1 ( pg/ml )	
group		Before	After	Before	After
HDepo	43	146.63 <u>+</u> 67.20	99.99 <u>+</u> 51.99**	259.78 <u>+</u> 115.4	334.31 <u>+</u> 115.01*
HD	<b>37</b>	135.54 <u>+</u> 60.94	142.28 <u>+</u> 63.17 <sup>Δ</sup>	211.60 <u>+</u> 95.07	246.93 <u>+</u> 112.79 <sup>Δ</sup>
NC	34	74.32 <u>+</u> 17.58		45.12 <u>+</u> 8.74	

<sup>\*</sup>Comparing before and after in using Epo;\*P<0.05;\*\*P<0.001;

### Three months after using Epo serum NO and ET - 1 hypertension

Group	n	NO(µmol/L)	ET-1 ( pg/ml )
Nomal control	34	74.32 <u>+</u> 17.58	45.12 <u>+</u> 8.74
Essential hypertension	20	54.36 <u>+</u> 34.72*	170.87 <u>+</u> 90.86**
HDepo Group	43	99.99 <u>+</u> 51.99	334.31 <u>+</u> 115.01
HDepo-1	23	85.04 <u>+</u> 47.80 <sup>4</sup>	376.58 <u>+</u> 93.43 <sup>4</sup>
HDepo-2	20	117.19 <u>+</u> 52.40°	281.57 <u>+</u> 105.75°
HD Group	<b>37</b>	142.28 <u>+</u> 63.17	246.93 <u>+</u> 112.79
HD-1	19	121.29 <u>+</u> 50.61*	288.92 <u>+</u> 107.03*
HD-2	18	164.45 <u>+</u> 68.75	199.45 <u>+</u> 91.51

<sup>\*</sup>Compared with normal control group with essential hypertension (eh)
\*P<0.05\*\*P<0.001; \*HDepo-1 and HDepo-2 compare \*P<0.05 \*HDepo-1 and
HD-1 compare; \*P<0.05; \*HD-1 and HD-2 compare \*P<0.05; \*HDepo-2 and
HD-2 compare; \*P<0.05

# Results:

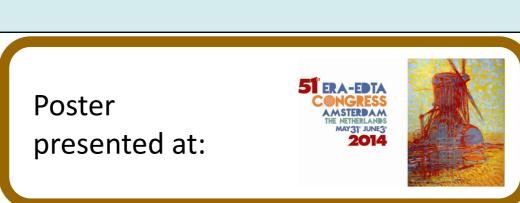
- 1. The NO level, ET 1 level, Ang II level in uremia patients receiving HD therapy were higher than those in normal control group (P < 0.001). The NO level in serum of hemodialysis patients was higher than that in patients did not receive hemodialysis therapy. The ET 1 level and Ang II level were higher than those in patients did not receive hemodialysis therapy (P < 0.05).
- 2. After three months' therapy, the NO consistency in serum in HD group declined after the rHuepo therapy, it was lower than that of normal control group. While the ET 1 consistency and Ang II concentration raised (P < 0.05).
- 3. After the therapy, diastolic pressure, systolic pressure, mean arterial pressure of HDepo group were all higher than those of HD group(P < 0.001). The increase in blood pressure correlated with the decline of the NO concentration as well as increase in ET -1 and Ang II concentration.

# Conclusions:

Erythropoietin can reduce serum NO concentration in chronic hemodialysis patients. It also can raise ET - 1 and Ang II concentration. Hypertention caused by rHuepo was associated with decrease in NO and increase in ET - 1 and Ang II concentration.

## References:

- 1.Bommer J ,Alexiou C ,Muller Buhl U ,et al. RecombinantHuman erythropoietin therapy in haemodialysis patients -dose determination and clinical experience. Nephrol DialTransplant ,1998 ,2 (4) :238 242.
- 2. Zheng Falei, Li Mingxi, Shan Yuanming, et al. Homebred recombinant human erythropoietin injection treatment of renal anemia clinical observation. Chinese practical medical journal, 1998, 18 (12):726 728.
- 3. Matsumoto A, Hirata Y, Kakoki M, et al. Increased excretion of nitric oxide in exhaled air of patients with chronic renal failure. Clin Sci, 1999, 96 (1):67 74.
- 4. Ellen S, Yu bo W, Raul C, et al. Biphasic changes in NitricOxide Generation in Hemodialyzed Patients with End stage Renal Disease Treated with Recombinant Human Erythro-poietin. Am J Med Sci, 2000, 319 (3):149 157.







<sup>&</sup>lt;sup>^</sup>comparison among groups; <sup>^</sup> P<0.05