Effects of Rosuvastatin and Gemfibrozil on Small Dense Low-Density Lipoprotein Cholesterol in Chronic Hemodialysis Patients

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BACKGROUNDS

- ***Lipid abnormalities in chronic hemodialysis (CHD) patients***
  - **Hypertriglyceridemia**
  - **Decreased high-density lipoprotein cholesterol (HDL-C)**
  - **Atherogenic change in low-density lipoprotein cholesterol (LDL-C) in the absence of increased level**
- ***Small dense LDL (sd-LDL) cholesterol***
  - **Better penetration into the arterial wall**
  - **Lower binding affinity to the LDL receptor**
  - **Longer plasma half-life**
  - **Weaker resistance to oxidative stress compared to large buoyant LDL-C**

  → **more atherogenic**

  → **emerging cardiovascular risk factor**

PURPOSE

- ***To determine the effects of rosuvastatin and gemfibrozil on lipoprotein profiles, LDL subfraction and LDL particle size in chronicPD patients***

SUBJECTS & METHODS

- ***High triglycerides (TG > 150 mg/dL) patients***

  Control group
  - 27 CHD patients, aged 55.8 ± 8.6 years
  - Male : Female = 11 : 16

  Case group
  - 27 CHD patients, aged 56.3 ± 9.0 years
  - Male : Female = 12 : 15
  - intervention: gemfibrozil 30 mg twice a day for 8 weeks

- ***High LDL cholesterol (LDL-C > 100 mg/dL) patients***

  Control group
  - 29 CHD patients, aged 56.3 ± 9.5 years
  - Male : Female = 12 : 17

  Case group
  - 29 CHD patients, aged 56.7 ± 10.8 years
  - Male : Female = 13 : 16
  - intervention: rosuvastatin 100 mg once daily for 8 weeks

- ***Measurements of lipid profile at the beginning and 8 weeks later***
  - Total cholesterol, HDL-cholesterol, LDL-cholesterol, triglyceride
  - LDL subfraction by electrophoresis using polyacrylamide gel (LipoPrint LDL system, Quantimetrix Co, USA)

- ***1st analysis: the effect of treatment in the case group***
  - Comparison of lipid profiles before and after treatment

- ***2nd analysis: the case group vs. the control group***
  - Comparison of lipid profile of the case group after treatment with that of the control group

RESULTS

Table 1. Baseline characteristics

	High triglycerides		High LDL-Cholesterol	
	Gemfibrozil	Control	Rosuvastatin	Control
Duration of HD (months)	71.8±50.3	68.7±48.8	67.2±46.9	63.2±43.1
Body mass index (kg/m^2)	22.9±3.5	22.5±3.3	21.9±3.4	22.1±3.4
Smoking history	7	5	8	6
Kt/Vurea/Week	1.54	1.53	1.53	1.52
nPCR (g/kg/day)	1.09	1.10	1.11	1.10
Hemoglobin (g/dL)	11.2±1.2	11.5±1.5	11.4±1.3	11.6±1.5
Albumin (g/dL)	3.5±0.3	3.6±0.3	3.6±0.3	3.5±0.4

Table 2. Changes in serum lipid profiles in high triglycerides patients

	Gemfibrozil		Control	
	baseline	Week 8	baseline	Week 8
Total cholesterol (mg/dL)	177.6 ± 30.4	172.4 ± 36.5	180.1 ± 32.6	173.1 ± 34.2
LDL-C (mg/dL)	106.5 ± 24.9	110.3 ± 29.9	109.7 ± 26.1	104.3 ± 25.7
HDL-C (mg/dL)	39.2 ± 8.9	47.2 ± 12.6 *	42.1 ± 10.2	42.7 ± 11.4
TG (mg/dL)	189.9 ± 46.7	104.7 ± 55.8 **	192.2 ± 48.4	191.5 ± 49.8
lb-LDL-C (mg/dL)	44.6 ± 11.9	53.9 ± 15.9 *	45.9 ± 12.2	44.5 ± 12.8
sd-LDL-C (mg/dL)	24.0 ± 8.4	18.0 ± 8.8 *	24.8 ± 7.9	23.2 ± 8.2
LDL size (Å)	263.2 ± 4.7	267.4 ± 4.1 **	262.9 ± 4.5	263.1 ± 3.7

* p < 0.05 ; ** p <0.001

Table 3. Changes in serum lipid profiles in high LDL cholesterol patients

	Rosuvastatin		Control	
	baseline	Week 8	baseline	Week 8
Total cholesterol (mg/dL)	210.5 ± 37.6	145.8 ± 29.4 **	212.1 ± 36.6	201.6 ± 32.8
LDL-C (mg/dL)	127.4 ± 26.0	72.2 ± 22.3 **	128.3 ± 24.7	121.5 ± 20.4
HDL-C (mg/dL)	55.8 ± 12.5	53.6 ± 14.3	54.7 ± 11.1	54.9 ± 12.2
TG (mg/dL)	116.5 ± 42.3	100.5 ± 41.4	120.1 ± 44.5	111.4 ± 45.1
lb-LDL-C (mg/dL)	53.9 ± 14.0	30.3 ± 14.2 **	54.8 ± 13.4	52.4 ± 12.7
sd-LDL-C (mg/dL)	20.4 ± 5.4	10.4 ± 4.7 **	20.1 ± 6.3	18.3 ± 6.1
LDL size (Å)	267.9 ± 2.9	269.3 ± 2.4	267.1 ± 3.2	268.0 ± 2.8

* p < 0.05 ; ** p <0.001

SUMMARY

- ***Lesson of this study***
  - Rosuvastatin; reduce all LDL subfractions, including sd-LDL-C and lb-LDC, by similar amounts
  - Gemfibrozil; selectively decrease sd-LDL-C ; induce a shift from sd-LDL particle to larger, more buoyant LDL particles
- ***Additional prospective studies are needed***
  - to evaluate the impact of these improved lipid profile on morbidity and mortality in CHD patients

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