

# Plasma interleukin-6 levels are higher and vary more in hemodialysis than in peritoneal dialysis patients

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## Conclusions

Plasma interleukin 6 (IL-6) levels are higher in hemodialysis (HD) than in peritoneal dialysis (PD) patients. The variation of IL-6 is also higher in HD than in PD patients. Additional factors associated with IL-6 variation are age, male sex, high comorbidity and wasting.

## Introduction

Inflammation and its association to cardiovascular disease in dialysis patients is a well-known but poorly understood problem. IL-6 has been more strongly related to outcome than CRP in dialysis patients but little is known about its variation.

## Aims

- 1) To study IL-6 variation in HD and PD patients
- 2) To study which factors trigger inflammation variability

## Methods

**Study design:** observational, longitudinal cohort study  
**Participants:** 228 prevalent HD patients and 80 PD patients from the Stockholm area followed for 3 months.  
**Variables:** Blood samples for IL-6 taken monthly, in total 4 times, in HD patients before dialysis sessions. Weekly questionnaires on clinical symptoms. Nutritional status based on subjective global assessment (SGA, includes history of weight loss, loss of appetite, incidence of vomiting, muscle atrophy, loss of subcutaneous fat and edema). Comorbidity based on Davie's score (malignancy, ischemic heart disease, congestive heart failure, peripheral/cerebral vascular disease, diabetes mellitus, systemic inflammatory disorder and other significant disease).  
**Statistics:** Mixed model with fixed and random effects to estimate factors affecting variation of IL-6 over time. Intraclass correlation (ICC) to account for proportion of variation explained by changes between patients.

## Results

### 1) Inflammation is higher in HD than PD patients

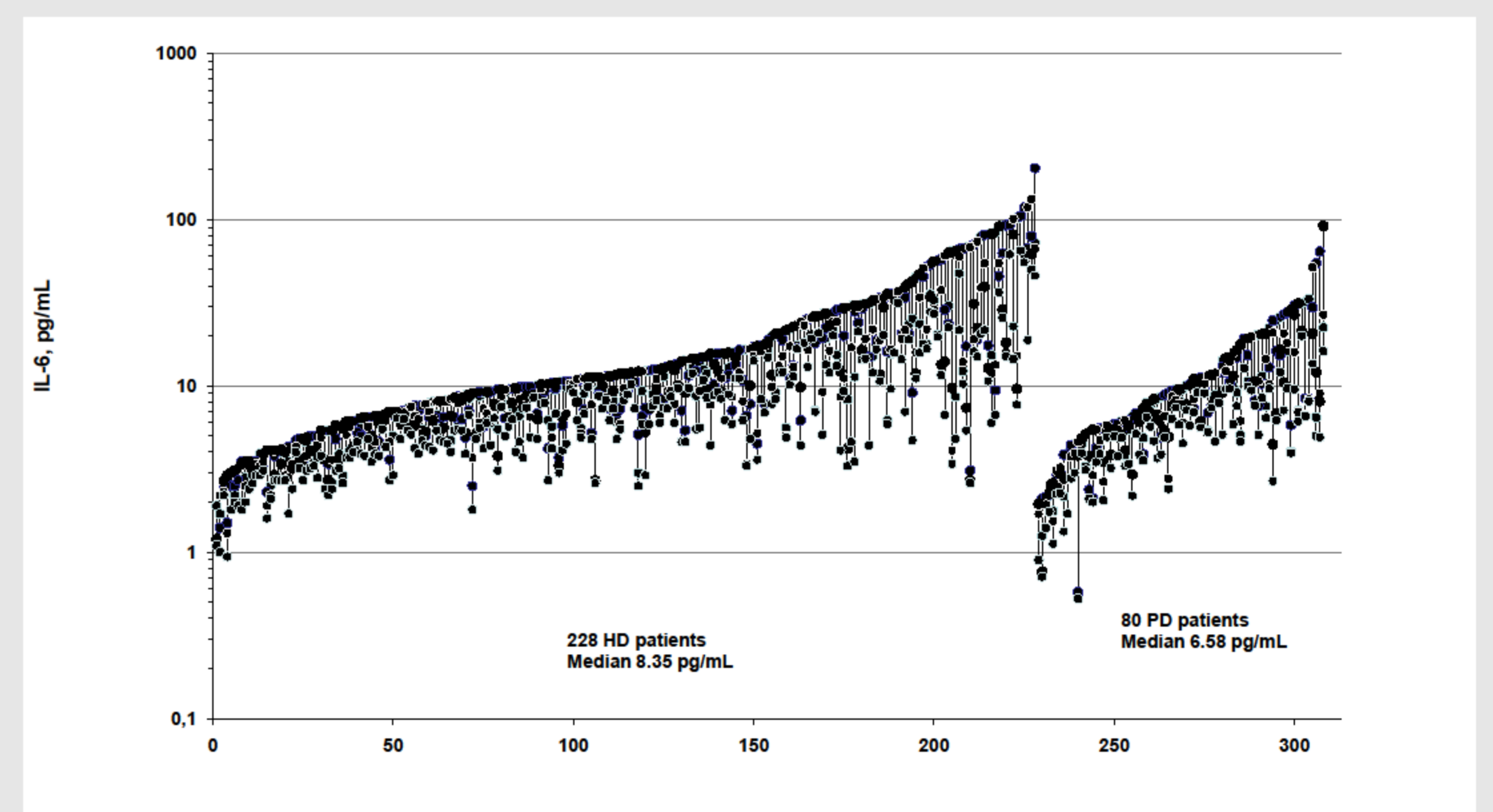
Table 1. Clinical characteristics and biomarkers at baseline in 2 dialysis cohorts

	HD patients (n=228)	PD patients (n=80)	p-value
Age, years	66 (51-74)	65 (56-77)	0.54
Sex, men %	56	68	0.09
Vintage, months	29 (14-57)	11 (6-29)	<0.001
Smoker no/yes, %	80/20	80/20	1.0
BMI median, kg/m <sup>2</sup>	24 (21-27)	25 (23-28)	0.02
PEW (SGA>1), %	48	40	0.23
Comorbidity, low/medium/high, %	19/57/24	26/58/16	0.08
Diabetes mellitus, %	26	24	0.71
Peripheral/cerebral vascular disease, %	31	28	0.52
Ischemic heart disease, %	30	31	0.99
Left ventricular dysfunction, %	21	16	0.27
Albumin, g/l	35 (32-38)	32 (28-35)	<0.001
NT-proBNP, pg/ml	9,051 (2,811-26,489)	3,080 (1,188-8,845)	<0.001
hs-CRP, mg/l	6.7 (2.5-21)	4.6 (1.5-10.6)	0.01
IL-6, pg/ml	8.70 (5.40-15.48)	6.57 (3.95-9.60)	0.002

Note: Data expressed as median values (IQR) or %  
 Abbreviations: BMI, body mass index; PEW, protein energy wasting; SGA, subjective global assessment

### 2) IL-6 varies greatly within patient

Figure 1. IL-6 variation - range shown for each patient



### 3) IL-6 variation is explained by wasting, dialysis modality, comorbidity, age, sex, and clinical symptoms

Table 2. Factors affecting IL-6 variability in dialysis patients

	Estimate	SE	95% CI	p-value
Age <45 vs 45-65/>65 y	4.34/4.07	1.83/1.82	0.76-7.92/0.50-7.64	0.02/0.03
Sex; women vs men	3.84	1.11	1.67-6.02	0.001
Comorbidity; low vs medium/high risk	2.12/6.46	1.43/1.76	-0.69-4.93/3.0-9.9	0.14/<0.001
SGA >1; wasting	5.01	1.07	2.92-7.1	<0.001
Dialysis modality; HD vs PD	-4.52	1.70	-7.85- -1.20	0.008
Dialysis vintage; <24 vs ≥24 months	-0.63	1.19	-2.95-1.70	0.6
Fever >38° C	6.93	2.11	2.79-11.06	0.001
Cold	4.42	1.14	2.19-6.65	<0.001
Vomiting	1.99	1.24	-0.43-4.42	0.11
Antibiotic use	3.56	1.15	1.31-5.80	0.002



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