



Longitudinal Assessment of the Natural rate of Decline in Renal Function with age New Data on an Old Subject

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Introduction

Cross-sectional studies have long suggested that renal function declines with age however there are limited longitudinal studies regarding this issue.

Aim

To assess the natural rate of glomerular filtration rate (GFR) decline with age in healthy subjects and in subjects with co-morbidities.

Methods

- Retrospective database analysis of 23,223 subjects attending a screening center in Israel during the years 2000-2013.
- Estimated glomerular filtration rate (eGFR) assessed consecutively in subjects who had 5 visits or more, at intervals of at least a year.
- eGFR by the Chronic Kidney Disease Epidemiology Collaboration (CKD-EPI) equation.
- Only subjects with age range 20-80 years and baseline line eGFR > 90 mL/min/1.73 m² were included un the study.

Results

- The study sample included 2,693 healthy subjects and 230 subjects with co-morbidities. Characteristics of the study population are presented in Table 1.
- The mean (SD) follow up time was 7.8 years ± 2.2 (range 4-12 years).
- The mean (± standard error) annual rate of decline in eGFR in healthy subjects was of **0.97 ± 0.02** mL/min/year/1.73 m².
- The annual decline in eGFR for different age groups increased significantly from **0.82 ± 0.22** for age group 20-30 years, to **0.84 ± 0.08**, **1.07 ± 0.08** and **1.15 ± 0.12** mL/min/year/1.73 m² in age groups 31-40, 41-50 and 50 years and above respectively (p<0.001). (Figure 1)
- In subjects with either hypertension, diabetes mellitus, impaired fasting glucose or combined co-morbidity the decline in eGFR was **1.12 ± 0.12**, **0.77 ± 0.16**, **0.85 ± 0.17**, **1.18 ± 0.26** mL/min/year/1.73 m² respectively. (Figure 2)

Conclusions

- An annual rate of decline in eGFR of **0.97 ± 0.02** mL/min/year/1.73 m² in healthy subjects is probably the best estimation found in normal subjects.
- Accurate prediction of the natural rate of GFR decline can distinguish between a patient with normally ageing kidneys and one with chronic kidney disease. This can avoid unnecessary diagnostic procedures in the former and indicate the need for treatment in the latter.

Table 1

	Men N= 2224	Women N= 699	P value
Age in years (mean, SD)	42.3 (7.9)	42.8 (8.1)	0.202
Hypertension (%)	4.1	3.1	0.286
Impaired fasting glucose (%)	3.0	1.4	0.032
Diabetes mellitus (%)	2.2	1.3	0.195
Smoker (%)	12.7	12.2	0.767
HDL cholesterol, mg/dl (mean, SD)	45.6 (9.8)	59.0 (13.8)	<0.001
LDL cholesterol, mg/dl (mean, SD)	125.7 (30.0)	120.0 (31.3)	<0.001
Triglycerides mg/dl (mean, SD)	135.8 (86.1)	104.0 (57.3)	<0.001
Creatinine mg/dl (mean, SD)	1.0 (0.1)	0.8 (0.1)	<0.001
eGFR (CKD-EPI) ml/min/1.73 m ² (mean ,SD)	104.6 (8.8)	107.6 (10.0)	<0.001
BMI (mean, SD)	26.7 (4.1)	24.9 (4.6)	<0.001

