

Stroll saves lives and delay renal replacement therapy in chronic kidney disease patients

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Abstract

Increasing physical activity improves clinical outcomes in chronic kidney disease (CKD) patients. The type of exercise associated with beneficial effect in CKD patients is not clear. We investigated the effect of types, duration and frequency of exercise on the risk of overall mortality and renal replacement therapy (RRT) in CKD 3-5 patients.

Methods

All CKD 3-5 patients in the CKD program of China Medical University Hospital from 2003 to 2012 were enrolled and all patients were prospectively followed to Dec 2012. The risk of overall mortality was analyzed using Cox proportional hazard regression and the risk of RRT was analyzed using competing-risks analysis.

Results

Six thousand three hundred and sixty-three CKD patients aged 70 ± 14 years old were followed for 3 ± 10.8 years. The overall mortality was 2.5 per 100 patients/year for CKD 3, 6.8 for CKD 4 and 5.4 for CKD 5 patients. The incidence of RRT was 24.4 per 100 patients/year for CKD 3, 20.3 for CKD 4 and 40.8 for CKD 5 patients. An increase of frequency and duration of exercise decreased overall mortality and risk for RRT. Stroll, independent of the frequency and duration of exercise, decreased overall mortality ($p = 0.04$) and risk for RRT ($p = 0.005$) with adjustments for patient's age, stage of CKD and primary kidney disease.

Results

Clinical characteristics of chronic kidney disease stage 3 to 5 patients			
	CKD 3 n=2292	CKD 4 n=1287	CKD 5 n=2783
Age (year)	$71 \pm 13^{b,c}$	$73 \pm 13^{a,c}$	$68 \pm 14^{a,b}$
Male gender n(%)	1585(69) ^{b,c}	712(55) ^{a,c}	1362(49) ^{a,b}
Mortality (per 100 pts/year)	2.5	6.8	5.4
RRT (per 100 pts/year)	24.4	20.3	40.8
Follow-up (year)	1.9 ± 1.5^b	2.0 ± 1.8^a	$1.6 \pm 1.7^{a,b}$
Types of exercise			
Stroll	576(25.1)^{b,c}	267(20.8)^{a,c}	498(17.9)^{a,b}
Hike	147(6.4)	72(5.6)	94(3.4)
Trot	20(0.9)	8(0.6)	9(0.3)
Dance	24(1.1)	4(0.3)	15(0.5)
Cycling	42(1.8)	15(1.2)	29(1.0)

RRT: renal replacement therapy including hemodialysis, peritoneal dialysis and kidney transplantation, DM: diabetes mellitus as primary kidney disease, CGN: chronic glomerulonephritis, HTN: hypertension, EPO: erythropoietin, eGFR: estimated glomerular filtration rate using MDRD formula, $p < 0.05$ in ^aCKD 5 v.s. CKD 4, ^bCKD5 v.s. CKD 3, ^cCKD 4 v.s. CKD 3

Results

Substantial hazard ratio (SHR) of factors associated with the risk of renal replacement therapy (RRT)

	SHR	95 % CI	p	
Age	0.983	0.981	0.986	<0.001
Male gender	0.970	0.908	1.04	0.369
DM	1.19	1.11	1.27	<0.001
HTN	0.979	0.895	1.07	0.647
CGN	0.903	0.842	0.969	0.004
Stage of CKD	1.21	1.16	1.26	<0.001
Frequency of exercise	0.931	0.910	0.952	<0.001
Duration of exercise	0.914	0.887	0.942	<0.001
Stroll	0.785	0.729	0.845	<0.001
Smoke	1.09	0.977	1.22	0.121
Alcohol	0.997	0.844	1.18	0.972
Hemoglobin	1.03	1.02	1.05	<0.001
EPO	0.949	0.885	1.02	0.138

Conclusions

Stroll is the most common physical activity in chronic kidney disease patients. Stroll, independent of its frequency and duration, decreases overall mortality and risk of renal replacement therapy in chronic kidney disease patients.