SEMAPHORIN 3A IS A NEW BIOMARKER OF CHRONIC KIDNEY DISEASE

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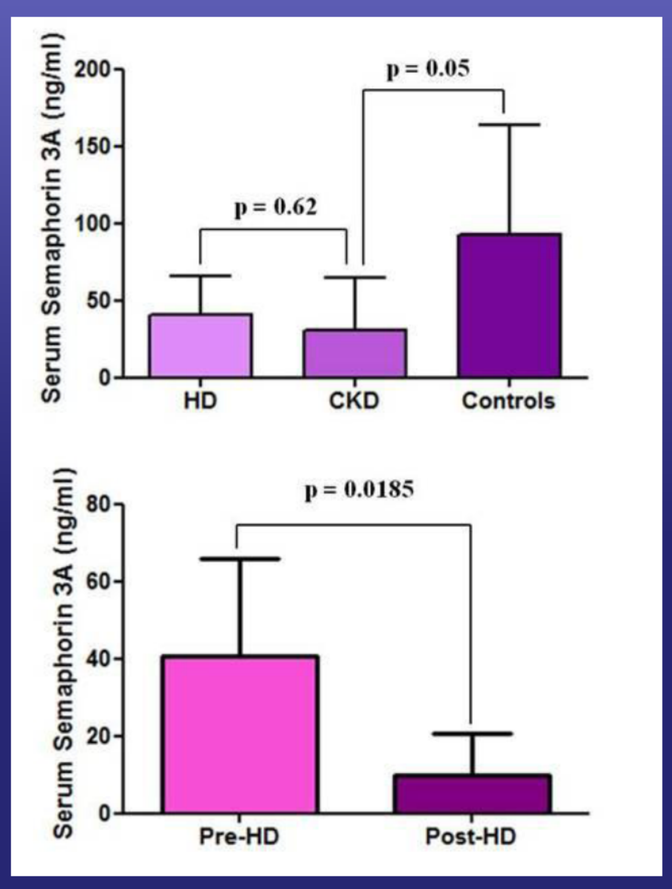
OBJECTIVES

Semaphorin 3A is a secreted protein involved in vascular morphogenesis, axon guidance, immune responses and tumour progression. Its expression has been demonstrated in the developing nephron and mature podocytes and collecting tubules in mice as well as in renal biopsies from lupus glomerulonephritis patients. As recently observed, semaphorin 3A may represent an early, predictive biomarker of acute kidney injury both in paediatric[1] and in adult intensive care patients[2]. The aim of the present study has been to evaluate the serum levels of semaphorin 3A in CKD (chronic kidney disease) and haemodialysis patients and the potential correlation with renal function.

METHODS

We recruited 16 CKD patients not on haemodialysis (5 men, 11 women; mean age 58 ± 15 years) and 18 patients (14 men, 4 women; mean age 63 ± 12 years) receiving haemodialytic treatment three times a week in 4-hour sessions with AFB (Acetate-Free Biofiltration) technique using the Integra® machine (Gambro). Moreover, we enrolled 8 healthy subjects as controls. Peripheral venous blood was taken from haemodialysis patients at different time intervals: start of dialysis, middle and end of dialysis. We also collected samples of dialysate by the monitoring system known as Quantiscan, in order to determine whether Semaphorin 3A was removed during the haemodialysis session. To minimize circadian variation in CKD patients and in the control group, all blood samples were taken at the same time of the day corresponding to pre-dialysis time in haemodialysis patients. Biochemical parameters were measured according to the standard methods of the routine clinical laboratory. Semaphorin 3A was assessed using an enzyme-linked immunosorbent assay kit (Catalogue no. MBS732622; My Biosource®, CA, USA) according to the manufacturer's instructions.



RESULTS

The difference in serum levels of Semaphorin 3A between healthy subjects and CKD patients was statistically significant (92 ng/ml [95% CI: 21-163] versus 30 ng/ml [95% CI: 3-64], p = 0.05) while no significant differences have been observed between CKD and haemodialysis patients (p = 0.62). Semaphorin 3A is removed throughout a haemodialysis session (40 ng/ml [95% CI: 15-65] versus 9 ng/ml [95% CI 0-20], p = 0.0185), especially during the first half of the treatment (P = 0.05). In support of this statement, semaphorin 3A has been also found in the dialysate. In CKD patients, semaphorin 3A serum levels were correlated with creatinine (r = 0.61, p = 0.01), blood urea nitrogen (r = 0.72, p = 0.005) and presence of diabetes mellitus (r = -0.65, p = 0.02).

CONCLUSIONS

Our data suggest that semaphorin 3A is a new biomarker of renal impairment, not only for acute kidney injury but also for CKD. Moreover, it is significantly removed during a haemodialysis session with AFB technique, but whether this may have clinical consequences is still unknown.

REFERENCES:

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H) Clinical Nephrology, CKD. H1) Lab methods, progression & risk factors for CKD 1-5, nutrition in CKD, renal diseases (except GNs and cystic diseases).
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