Correlation Between Lacunar Cerebral Infarcts And Serum Uric Acid Levels In Elderly

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BACKGROUND. Growing evidence suggests that uric acid (UA) is a relevant risk factor for arteriolosclerosis and thus it might be associated with cerebral small vessel disease. Although recent studies have demonstrated the positive relation between UA concentrations and severity of leukoaraiosis, the association with lacunar infarcts (LI) has seldom been reported in the literature. The aim of our study was to assess whether serum UA levels may be related to the presence of LI.

METHODS. Consecutive hospital series of patients referring to our Geriatric Department from January 2014 to December 2014 were screened. Two hundred forty-two elderly patients (113 males and 129 females, mean age 82.83±6.49 years) for whom CT scans were available were recruited. Demographic information, medical history, concurrent medications and laboratory data were collected. Patient's CT images were carefully examined to identify presence, size, number and location of LI. LI without corresponding neurological symptoms were considered silent LI.

Table 1. Characteristics of population study

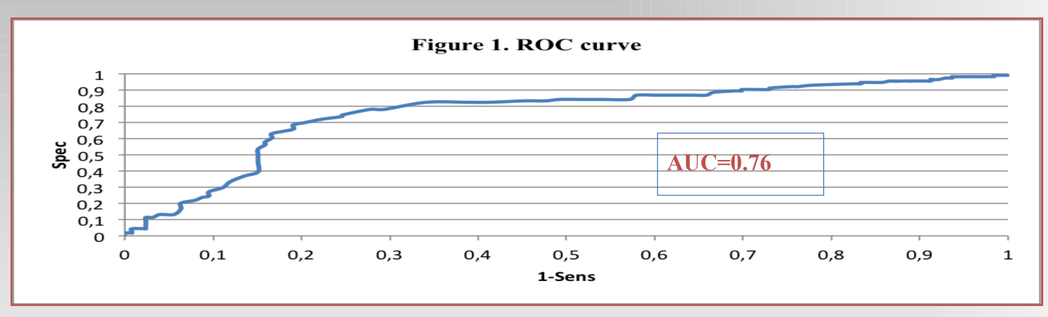
Characteristics	All subjects (n=242)	No LI[a] (n=114)	LI (n=128)	P-value
Continuous Variable (mean±SD)				
Age, year	82.83 ± 6.49	82.57 ± 7.10	83.07 ± 5.92	.56
Sex, males (%)	46.7%	46.5%	46.9%	1.00
Systolic blood pressure, mmHg	131.71 ± 24.04	130.08 ± 22.88	133.16 ± 25.02	.32
Diastolic blood pressure, mmHg	73.07 ± 13.13	71.57 ± 12.55	74.39 ± 13.53	.09
Heart rate, beats per minute	80.10 ± 13.65	78.05 ± 11.10	74.39 ± 13.53	.03
Uric acid, mg/dl	6.36 ± 4.07	5.28 ± 2.36	7.3 ± 4.95	< .001
Creatinine, mg/dl	1.18 ± 0.74	1.05 ± 0.65	1.29 ± 0.79	.008
BUN[b], mg/dl	64.17 ± 45.13	57.39 ± 46.44	70.22 ± 43.19	.03
Fasting glucose, mg/dl	110.09 ± 40.72	107.57 ± 36.22	112.43 ± 44.5	.35
Total cholesterol, mg/dl	154.83 ± 42.86	153.67 ± 40.93	155.98 ± 44.40	.70
Triglycerides, mg/dl	107.96 ± 52.21	99.12 ± 44.25	115.93 ± 57.52	.01
Categorical Variable (%)				
Ischemic Stroke or TIA[c]	26.9	27.2	26.6	1.00
Intracranial Hemorrhage	7.4	9.6	5.5	.32
Previous Ischemic Stroke or TIA	32.2	25.4	38.3	.05
Previous Intracranial Hemorrhage	4.1	1.8	6.3	.15
Atrial Fibrillation	31.8	29.8	33.6	.62
Diabetes Mellitus	29.3	31.6	27.3	.56
Hypertension	74.8	70.2	78.9	.15

RESULTS. The main characteristics of the study population were summarized in **Table 1**.
In the 96.1% of patients LI was silent, in number less than three (67.9%), with a medium size of 6 millimeters and located more frequently in basal ganglia (84.4%). UA was found to be positively associated with the presence (p = 0.0001), number (p = 0.001), size (p = 0.001) and location of LI in basal ganglia (p = 0.0038), deep white matter (DWM) (p < 0.0001) and pons (p = 0.0156). A significant association was also found between UA and silent LI (p = 0.0002).

Table 2. Independent predictors of presence, number, size and location of lacunar infarcts at the stepwise multiregression analysis

Dependent variable	Predictors	P-value
Lacunar infarcts	Diastolic blood pressure	.02
	Previous ischemic stroke	.07
	Previous intracranial haemorrhage	.05
	Uric acid	< .001
	Triglycerides	.06
Number of lacunar infarcts	Diastolic blood pressure	.01
	Previous ischemic stroke	.05
	Uric acid	.006
	Creatinine	.01
Lacunar infarcts in Basal Ganglia	Diastolic blood pressure	.007
	Previous ischemic stroke	.03
	Previous intracranial haemorrhage	.07
	Uric acid	.003
	Triglycerides	.01
Lacunar infarcts in Thalamus	Atrial fibrillation	.06
	Hypertension	.07
	Uric acid	.25
	Total cholesterol	.09
Lacunar infarcts in Deep White Matter	Diastolic blood pressure	.06
	Uric acid	.003
	Creatinine	.003
Lacunar infarcts in Pons	Atrial fibrillation	.08
	Uric acid	< .001
Size of lacunar infarcts	Diastolic blood pressure	.04
	Uric acid	< .001
	Triglycerides	.05
Silent lacunar infarcts	Diastolic blood pressure	.03
	Previous intracranial haemorrhage	.04
	Uric acid	< .001
	Triglycerides	.05
	Creatinine	.07

Stepwise multiple regression analysis confirmed the association of serum UA levels with the presence (p = 0.0001), number (p= 0.0005), size (p = 0.0013) and location of LI in basal ganglia (p = 0.0009), DWM (p < 0.0001) and pons (p = 0.0156), and with silent LI (p = 0.0001) even after adjusting for demographic characteristics, clinical and laboratory data, vascular risk factors and associated treatments **(Table 2)**. The accuracy evaluated by AUC was 76% (**Figure 1)**. According to the literature, we found that the risk of LI increased with UA levels by the value of 5.7 mg/dl.



CONCLUSION. Our study points to a positive association between UA levels and LI which is independent from traditional cardiovascular risk factors. These data suggest that serum UA could play an influential role on the physiopathology of LI and could be a target for preventive the onset of cerebral microinfarcts.