Combined effect of Helicobacter pylori infection and elevated C-reactive protein on 3-month prognosis of ischemic stroke

Tan Xu, Chenhuan Zhang, Aili Wang, Yonghong Zhang
School of Public Health, Medical College of Soochow University, P. R. China

Objective: To investigate the combined effect of Helicobacter pylori (HP) infection and elevated C-reactive protein (CRP) on the prognosis of acute ischemic stroke patients at 3 months. **Methods:** From June 2011 to December 2013, 1110 confirmed cases of ischemic stroke were included from 14 hospitals in China who were followed at prospective cohort study. Serum Helicobacter pylori immunoglobulin G (HP-IgG) and CRP were tested at cases admission. Outcomes were defined as death or cardiovascular events at 3 months after ischemic stroke onset. According to HP-IgG and CRP levels, all patients were divided into four groups: G1 was low-level HP-IgG/ low-level CRP, G2 was low-level HP-IgG/ CRP elevated, G3 was HP-IgG elevated/ low-level CRP and G4 was elevated HP-IgG/ elevated CRP. With G1 as a reference, logistic regression analysis was used to analyze the relationship between HP-IgG elevation with CRP elevation and the poor prognosis of ischemic stroke at 3 months respectively, and the combined effect of elevated HP-IgG with

elevated CRP on poor prognosis of ischemic stroke for 3 months. **Results:** Within 3 months after ischemic stroke onset, a total of 38 (3.42%) patients died and 76 (6.85%) patients died or had cardiovascular events. After multifactorial adjustment, patients with elevated HP-IgG at 3 months had a 3.14-fold (95% CI: 1.30 ~ 7.57) and 2.52-fold (95% CI: 1.45 ~ 4.36) risk on death and death or cardiovascular events compared with patients with low-level HP-IgG. Patients with elevated CRP had a 3.00-fold (95% CI: 1.40 ~ 6.43) and 1.65-fold (95% CI: 0.91 ~ 2.99) risk of death and death or cardiovascular events at 3 months compared with patients with low CRP. With multifactorial adjustment, combined effects of elevated HP-IgG and elevated CRP was found that G4 patients had a 10.00-fold risk (95% CI: 2.85~35.05) of death at 3 months and 4.24-fold (95% CI: 1.83~9.85) risk of death or cardiovascular events compared with G1 patients. **Conclusion:** HP infection and elevated CRP have a combined effect on poor prognosis of stroke.

Table 1. ORs of HP infection and elevated CRP for the prognosis of stroke.

	unadjusted		adjusted	
	OR(95%CI)	P	OR(95%CI)	P
Death				
HP infection ^a	3.91(1.78-8.60)	<0.001	3.14(1.30-7.57)	0.011
CRP elevated	5.10(2.63-9.88)	<0.001	3.00(1.40-6.43)	0.005
Death or vascular events				
HP infection ^a	2.61(1.57-4.35)	<0.001	2.52(1.45-4.36)	0.001
CRP elevated ^b	2.56(1.51-4.33)	<0.001	1.65(0.91-2.99)	0.098

^aThe adjusted factors were age, sex, smoking, drinking, NIHSS score, diastolic pressure, fasting blood sugar, total cholesterol, white blood cell count, history of coronary heart disease, history of diabetes mellitus, history of hypertension and CRP; ^bThe adjustment factors were age, sex, smoking, drinking, NIHSS score, diastolic pressure, fasting blood sugar, total cholesterol, white blood cell count, history of coronary heart disease, history of diabetes mellitus, history of hypertension and HP IgG.

Table 2. Combined effects of HP infection and elevated CRP on the prognosis of stroke.

	unadjusted		adjusted ^a	
	OR(95%CI)	P	OR(95%CI)	P
Death				
G1	1.00		1.00	
G2	5.51(1.35-22.47)	0.017	3.85(0.86-17.18)	0.077
G3	4.26(1.42-12.75)	0.010	3.58(1.14-11.27)	0.029
G4	23.89(7.55-75.52)	<0.001	10.00(2.85-35.05)	<0.001
Death or vascular events				
G1	1.00		1.00	
G2	2.06(0.78-5.43)	0.142	1.67(0.60-4.62)	0.324
G3	2.43(1.34-4.42)	0.004	2.47(1.32-4.64)	0.005
G4	7.52(3.57-15.81)	<0.001	4.24(1.83-9.85)	<0.001

^a The adjusting factors were age, sex, smoking, drinking, NIHSS score, diastolic pressure, fasting blood sugar, total cholesterol, white blood cell count, history of coronary heart disease, diabetes mellitus and hypertension. G1 was low-level HP-IgG/low-level CRP, G2 was low-level HP-IgG/CRP elevated, G3 was HP-IgG elevated/low-level CRP, and G4 was HP-IgG elevated/CRP elevated.