

Cholecystectomy increases the risk of chronic kidney disease in the Korean population

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Background/Aims: Cholecystectomy is a worldwide surgery to treat gallbladder disease. However, there is some evidence that cholecystectomy may cause metabolic syndrome. Chronic kidney disease (CKD) also can be associated with metabolic syndrome. Therefore, we decided to investigate the association between CKD and cholecystectomy.

Methods: Participants aged 20 years and older with cholecystectomy from 2010 to 2014 (n = 116,748) and age- and sex-matched control subjects without cholecystectomy (n = 116,748) using the National Health Insurance Service database. Cox proportional hazards analyses were performed to evaluate the association between cases and incident CKD and hazard ratios and 95% confidence intervals were calculated.

Results: A total of 233,496 patients were included. The mean age was 54.69 ± 12.71 years, and 52.61% were male. During the follow-up period, there were 6,450 patients (5.52%) newly diagnosed with CKD in the study population. The risk of CKD in the cholecystectomy group was approximately 21% higher than that in the control group (adjusted odds ratio, 1.21; 95% confidence interval, 1.17-1.26). Cholecystectomy was an independent risk factor of incident CKD after adjusting for potential confounding factors. In the subgroup analyses, there is no significant difference in the risk of CKD between the cholecystectomy group and the other.

Conclusions: In this large, population-based study, cholecystectomy was associated with an increased risk of developing CKD independent of other confounding factors. Therefore, careful monitoring and long-term follow-up are required to evaluate CKD risk after cholecystectomy.

Table 1. Baseline characteristics of participants

	Cholecystectomy (n=116,748)	Non-cholecystectomy (n=116,748)	P-value
Age (years)	54.69 ± 12.71	54.69 ± 12.71	1.000
Sex, male (%)	61,426 (52.61%)	61,426 (52.61%)	1.000
Body mass index (kg/m ²)	24.61 ± 3.31	23.86 ± 3.12	<0.001
Waist circumference (cm)	83.09 ± 9.07	80.99 ± 8.9	<0.001
GFR (ml/min/1.73m ²)	89.82 ± 25.19	90 ± 24.09	0.070
Fasting blood glucose (mg/dL)	101.24 ± 25.55	99.25 ± 23.49	<0.001
Total cholesterol (mg/dL)	195.05 ± 37.73	196.41 ± 36.87	<0.001
Triglyceride (mg/dL)	115.61 (115.25 - 115.96)	111.92 (111.57 - 112.28)	<.0001
HDL-C (mg/dL)	53.00 ± 17.95	55.05 ± 17.64	<0.001
LDL-C (mg/dL)	115.75 ± 35.74	115.66 ± 35.16	0.556
Systolic blood pressure	123.69 ± 14.82	123.42 ± 15.09	<0.001
Diastolic blood pressure	76.76 ± 9.86	76.55 ± 9.95	<0.001
Comorbidities (%)			
Hypertension	43,631 (37.37%)	39,022 (33.42%)	<0.001
Dyslipidemia	29,700 (25.44%)	27,058 (23.18%)	<0.001
Diabetes mellitus	17,152 (14.69%)	13,011 (11.14%)	<0.001
Smoking status			<0.001
Non-smoker	71,492 (61.24%)	72,736 (62.3%)	
Ex-smoker	20,740 (17.76%)	19,775 (16.94%)	
Current	24,516 (21%)	24,237 (20.76%)	
Alcohol			<0.001
None	69,511 (59.54%)	65,826 (56.38%)	
Mild	39,382 (33.73%)	42,709 (36.58%)	
Heavy	7,855 (6.73%)	8,213 (7.03%)	
Regular exercise	22,713 (19.45%)	23,651 (20.26%)	<0.001
Low income (<25%)	21,567 (18.47%)	22,808 (19.54%)	<0.001

Data are expressed as the mean ± SD, or median (interquartile range)

GFR, glomerular flow rate; HDL-C, high density lipoprotein cholesterol; LDL-C, low density lipoprotein cholesterol;

Table 2. Risk of CKD according to the cholecystectomy status

Cholecystectomy status	Incident CKD	Odds ratio (95% confidence intervals)	
		Model 1	Model 2
Non-Cholecystectomy	5068 (4.34)	1 (reference)	1 (reference)
Cholecystectomy	6450 (5.52)	1.30 (1.25-1.36)	1.21 (1.17-1.26)

Model 1: age, sex (Crude model)

Model 2: age, sex, low income, smoking status, alcohol intake, regular exercise, DM, hypertension, dyslipidemia, waist circumferences, BMI