The metabolic outcomes of laparoscopic cholecystectomy – a preliminary report of a phase 1 prospective cohort study

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BACKGROUND

Cholecystectomy is one of the most common procedures in the United States, with more than 1.2 million cholecystectomies per year, and 92% of the procedures are performed laparoscopically. In 2011 Amigo et al. reported increased triglyceride levels in mice after cholecystectomy. According to Ruhl et al. (2013), cholecystectomy is associated with an increased risk of non-alcoholic fatty liver disease that is considered a liver manifestation of metabolic syndrome. In 2014, Shen et al. published a retrospective study enrolling 5672 participants that demonstrated an increased risk of metabolic syndrome after cholecystectomy compared with gallstone disease alone.

OBJECTIVE

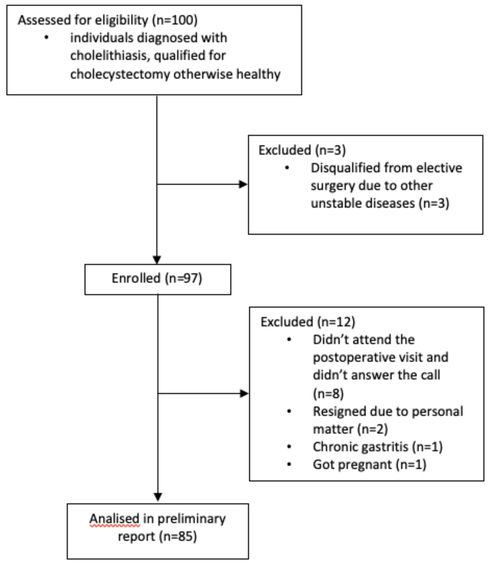
The study aims to assess the risk of metabolic syndrome after laparoscopic cholecystectomy prospectively.

METHODS

This publication is the preliminary report of the ongoing study. The study included all individuals undergoing laparoscopic cholecystectomy due to gallstones. The exclusion criteria covered all previous metabolic disorders like obesity, diabetes, thyroid disease, and influencing drugs. The changes in all metabolic syndrome criteria were evaluated before and three months after the laparoscopic cholecystectomy. The blood evaluation contained serum glucose, total serum cholesterol (TC), low-density (LDL) and high-density lipoprotein cholesterol (HDL), and triglyceride levels (TG). The medical examination evaluated weight, blood pressure, heart rate, and waist circumference.

RESULTS

- All individuals underwent laparoscopic cholecystectomy with no complications.
- There were no statistically significant differences in weight, BMI, blood pressure, heart rate, serum glucose and triglycerides, before and after laparoscopic cholecystectomy.
- There was a remarkable decrease in total cholesterol and low-density cholesterol levels. HDL-cholesterol increased notably).
- The relative risk (RR) of developing mild hypercholesterolemia after cholecystectomy was 0.93 and for severe hypercholesterolemia it was 0.26.
- The relative risk of developing MetS after cholecystectomy was 0.82.



CONCLUSIONS

In contrast to retrospective studies, the prospective evaluation indicated there is no evidence of increased risk of metabolic syndrome after laparoscopic cholecystectomy. However, further investigation regarding the metabolic consequences of this procedure is required.

Demographics and clinical characteristics of the participants in the intervention group

	Before cholecystectomy N=85	3 months after cholecystectomy N=85	p-value
Age, yr	45 (39-58)		
Sex, female/male	60/25		
Height, cm	166 (163-174)		
Weight, kg	73.9 ± 14.5	74.31 ± 14.74	0.334
BMI	25.92 ± 3.69	26.05 ± 3.75	0.273
Systolic blood pressure, mmHg	123 ± 13	123 ± 13	0.885
Diastolic blood pressure, mmHg	80 ± 8	80.0 (75-86)	0.395
HR, per minute	76 ± 9	74 ± 10	0.077
Total cholesterol, mmol/L	5.03 ± 0.86	4.82 ± 0.80	<0.001
Serum glucose, mmol/L	5.50 ± 0.50	5.42 ± 0.47	0.207
HDL, mmol/L	1.5 ± 0.39	1.56 ± 0.41	0.026
LDL, mmol/L	2.93 ± 0.76	2.70 ± 0.68	<0.001
Triglycerides, mmol/L	1.21 (0,94-1,60)	1.14 (0,85-1,55)	0.416

The metabolic syndrome criteria prevalence in participants who underwent laparoscopic cholecystectomy

Metabolic syndrome criteria	Preoperatively (% of participants meeting the MetS criteria)	Postoperatively (% of participants meeting the MetS criteria)	p-value
Total metabolic syndrome prevalence	28 (32.9%)	23 (27.1%)	0.227
Waist circumference ≥ 94 cm in male and 80 cm in female	54 (63.5%)	53 (62.4%)	1.000
Triglycerides ≥150 mg/dL (1,69 mmol/L) or treatment	16 (18.8%)	19 (22.4%)	0.549
high-density lipoprotein (HDL), cholesterol < 40 mg/dL(1,03 mmol/L) in men or < 50 mg/dL (1,29 mmol/L) in women	17 (20.0%)	14 (16.5%)	0.453
Systolic blood pressure ≥ 130 and diastolic blood pressure and ≥ 85 mm/Hg	27 (31.8%)	27 (31.8%)	1.000
Fasting plasma glucose ≥100 mg/dL (5.6 mmol/L) or previously diagnosed type 2 diabetes	40 (47.1%)	32 (37.6%)	0.039