Clin. Lab. 2023;69:1-3

ORIGINAL ARTICLE

Study on Lipid Metabolism and Related Risk Factors in Endometrial Polyps

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SUMMARY

Background: **The object of the study was to explore the risk factors for endometrial polyps (EP) by analyzing the clinical characteristics and laboratory findings.**
Methods: **From January 2019 to June 2020, clinical data from 183 patients treated with gynecological hysteroscopic surgery were collected. Among them were 118 EP cases which were included into the study group. They were divided into four groups by age: Group 1: < 30 years old (9, 7.6%), Group 2: ≥ 30 < 40 years old (62, 52.5%), Group 3: ≥ 40 < 50 years of age (39, 33.1%), Group 4: ≥ 50 years of age (8, 6.8%). The remaining 65 patients with uterine adhesion were used as controls.**
Results: **Total cholesterol (TC), low-density lipoprotein cholesterol (LDL-C), hemoglobin (HGB), and uterine volume between the two groups were statistically significant. TC, LDL-C, and uterine volume were identified as independent risk factors for EP, with TC being the most significant. In patients < 40 years of age, HGB, LDL-C, and uterine volume were significantly different, with LDL-C and uterine volume acting as independent risk factors and uterine volume being more significant. There were differences in the overall distribution of blood flow signal ratio in the EP age groups. Menarche occurred significantly earlier in Groups 1, 2, and 3 than in groups 4. Uterine volume was significantly smaller in Group 1 than Group 3. LDL-C and uterine volume had better prediction values for EP. When the uterine volume was 61.65 cm^3, the sensitivity was 58.6%, and the specificity was 93.5%.**
Conclusions: **In clinical practice, attention should be paid to the cholesterol metabolism in EP patients.**
(Clin. Lab. 2023;69:xx-xx. DOI: 10.7754/Clin.Lab.2022.220415)

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Manuscript accepted July 25, 2022

Supplementary Data

Table S1. General features of 118 EP patients.

Age				Reason for visiting hospital			Maternity history				
Group 1	Group 2	Group 3	Group 4	Abnormal uterine bleeding	Abnormal physical examination	Presented with dysmenorrhea	0 Pregnancies	1 Pregnancy	2 Pregnancies	≥ 3 Pregnancies times	History of cesarean section
9 (7.6%)	62 (52.5)	39 (33.1)	8 (6.8)	78 (66.1)	39 (33.1)	1 (0.8%)	14 (11.9)	40 (33.9)	39 (33.0)	25 (21.2)	49 (41.5)

Complications and surgical history								BMI				Ultrasound characteristics	
anemia	hypertension	diabetes	hysteromyoma	cervical polyp	adenomyosis	ovarian endometriosis cyst	EP surgical history	low	normal	overweight	obesity	EP blood flow signal	EP multiple occurrences
11 (9.3)	8 (6.8)	2 (1.7)	25 (21.2)	12 (10.2)	8 (6.8)	6 (5.1)	24 (20.3)	5 (4.2)	75 (63.6)	30 (25.4)	8 (6.8)	59 (50)	24 (20.3)

Note: all the above indicators are expressed as number (%).

Table S2. Univariate factor analysis of EP cases.

Correlative factor	Research group (n = 118)	Control group (n = 65)	*t* or *t'* or z	p-value
Age (years)	38 (35,42)	34 (29,38.5)	-4.647	0.000
Menarche age (years)	13 (12, 14)	14 (13,15)	-2.912	0.004
BMI (kg/m^2)	22.65 (20.52, 25.35)	21.96 (19.31, 24.42)	-1.520	0.128
WBC (x 10^9/L)	6.07 (5.08, 7.23)	6.31 (5.37, 7.23)	-0.993	0.321
GR (%)	58.43 ± 8.23	56.86 ± 7.02	1.296	0.197
LY (%)	32.96 ± 7.19	34.6 4± 6.87	-1.534	0.127
NLR	1.74 (1.38, 2.25)	1.61 (1.39, 2.09)	-1.041	0.298
TG (mmol/L)	0.95 (0.69, 1.28)	0.87 (0.59, 1.36)	-0.817	0.414
FBG (mmol/L)	5.06 (4.77, 5.41)	5.06 (4.69, 5.45)	-0.386	0.699
TC (mmol/L)	4.84 ± 0.84	4.53 ± 0.84	2.399	0.017
HDL-C (mmol/L)	1.43 ± 0.29	1.53 ± 0.39	-1.868	0.065
LDL-C (mmol/L)	2.8 9 ± 0.76	2.32 ± 0.70	4.951	0.000
HGB (g/L)	126.50 (116.75, 134)	133 (124.5, 139)	-3.545	0.000
FIB (g/L)	2.64 (2.21, 2.92)	2.56 (2.34, 2.96)	-0.290	0.772
Uterine volume (cm^3)	67.38 (50.45, 83.94)	42.72 (32.56, 55.79)	-6.343	0.000

Note: WBC - white blood cell count, GR - granulocyte group, LY - lymphocyte group, NLR - neutral granulocyte-lymphocyte ratio, TG - triglycerides, FBG - fasting blood glucose, TC - total cholesterol. HDL-C - high-density lipoprotein cholesterol, LDL-C - low-density lipoprotein cholesterol, HGB - hemoglobin, FIB - fibrinogen.
Age, Menarche age, BMI, WBC, NLR, TG, FBG, HGB, FIB, and uterine volume are represented by M (P25, P75), whereas GR, LY, TC, HDL-C, LDL-C are represented by ($\bar{x}$ ± S).

Table S3. Univariate factor analysis in EP patients < 40 years old.

Correlative factor	Research group (n = 54)	Control group (n = 54)	*t* or *t'* or z	p-value
Age (year)	34 (30.75, 37)	31.5 (29, 36)	-1.698	0.090
Menarche age (year)	13 (12, 14)	13 (12.75, 14)	-1.681	0.093
BMI (kg/m^2)	21.16 (19.7, 25.47)	21.77 (19.23, 24.24)	-0.487	0.626
WBC (x 10^9/L)	6.04 (4.8, 7.21)	6.49 (5.25, 7.46)	-1.146	0.252
GR (%)	57.62 ± 7.69	56.73 ± 7.01	0.628	0.531
LY (%)	33.59 ± 6.86	34.68 ± 6.69	-0.834	0.406
NLR	1.69 (1.38, 2.14)	1.61 (1.38, 2.08)	-0.406	0.685
TG (mmol/L)	0.75 (0.65, 1.09)	0.84 (0.61, 1.33)	-0.795	0.427
FBG (mmol/L)	4.98 (4.78, 5.35)	4.99 (4.69, 5.37)	-0.184	0.854
TC (mmol/L)	4.71 ± 0.86	4.62 ± 0.72	0.571	0.569
HDL-C (mmol/L)	1.44 ± 0.30	1.54 ± 0.38	-1.628	0.065
LDL-C (mmol/L)	2.75 ± 0.75	2.38 ± 0.66	2.687	0.008
HGB (g/L)	128 (116, 135)	133 (124.75, 140)	-2.828	0.005
FIB (g/L)	2.59 (2.27, 2.9)	2.56 (2.35, 2.92)	-0.421	0.674
Uterine volume (cm^3)	61.19 (46.38, 76.87)	41.59 (33.27, 52.07)	-5.094	0.000

Note: Age, Menarche age, BMI, WBC, NLR, TG, FBG, HGB, FIB, and uterine volume are represented by M (P25, P75), whereas GR, LY, TC, HDL-C, and LDL-C are represented by ($\bar{x}$ ± S).

Table S4. Logistic regression analysis in EP patients < 40 years old.

Risk factor	OR	B	SE	95% CI		p-value
				lower limit	upper limit	
LDL-C	3.728	1.316	0.469	1.486	9.351	0.005
Uterine volume	1.090	0.086	0.020	1.048	1.134	0.000