

# A Study on Factors affecting Gallbladder Polyps

Young-Joon Park<sup>1</sup>, Jung-Sik Woo<sup>2</sup>

<sup>1</sup> Dept. of Radio Technology, Cheju Halla University, South Korea, joon740@chu.ac.kr

<sup>2</sup> Dept. of Health Administration, Cheju Halla University, South Korea, joon740@chu.ac.kr

## Article Info

Volume 81

Page Number: 2362 - 2367

Publication Issue:

November-December 2019

## Article History

Article Received: 5 March 2019

Revised: 18 May 2019

Accepted: 24 September 2019

Publication: 12 December 2019

## Abstract

Recently the detection rate of Gallbladder polyps with malignant potential is increasing, owing to the increase of ultrasonic examination. But still the study of the correlation between Metabolic syndrome and gallbladder polyps is insufficient. At the result of analyzing the factors affecting Gallbladder polyps, it was found that the incidence of gallbladder polyps got higher in people with metabolic syndrome. The risk factors affecting gallbladder polyps for the people with metabolic syndrome were higher than for ones without metabolic syndrome, as 1.061 times in body weight, as 1.186 times in BMI, as 1.060 times in the systolic blood pressure, as 1.030 times in diastolic blood pressure, as 1.009 times in the total cholesterol, as 2.736 times in Metabolic syndrome, as 1.011 times in Diabetes and as 1.064 times in Erythrocyte sedimentation rate(ESR).

**Keywords:** Gallbladder Polyp, Metabolic Syndrome, Risk Factors, Biochemical Examination.

## 1. INTRODUCTION

By the data of the National nutrition survey, the prevalence rate of Metabolic syndrome in Korea increased rapidly from 23.6 (0.5)% in 1998 to 28 (0.6)% in 2001 [1]. Gallbladder Polyps are all forms of Masses protruding into the lumen of Gallbladder, and are classified into True polyps and Pseudo polyps. True polyps include Adenoma and Adenocarcinoma, and Pseudo polyps include Cholesterol polyps, Inflammatory polyps and Hyperplastic polyps [2].

The prevalence of gallbladder polyps varies by country. In Japan, the prevalence was 5.3% [3]. In Denmark, it was 4.6% for men and 4.3% for women [4]. In case of Korea, 2.94% and 2.2% were reported each, from single Medical Checkup Centers which are located in Seoul [5] and in Daegu, Gyeongbuk province [6].

The risk factors for gallbladder polyps are known

as High body mass index(BMI), Male, HBsAg positive, Age, Serum cholesterol level and Metabolic syndrome, but these are different by reports so cause controversy. Lifestyle factors affect the diagnosis items for Metabolic syndrome, therefore it is expected that the correction of lifestyle may reduce and prevent the occurrence of Metabolic syndrome. In addition, there are many studies showing that Obesity and IFG(Impaired Fasting Glucose) are associated with gallbladder polyps which are a risk factor for Gallbladder carcinoma. Thus In modern society, the prevalence of gallbladder polyps is also likely to increase.

In modern society, Metabolic syndrome is expected to increase due to aging and westernized eating habits, therefore the need of the clinical research is also growing [7]. Also the increase of the prevalence of Metabolic syndrome leads Cardiovascular complications, mortality and

various cancer patients to increase. But the study of the correlation between Metabolic syndrome and Gallbladder polyps, a risk factor of Gallbladder cancer is still insufficient, thus needs to be continuous.

This study is to analyze the risk factors associated with gallbladder polyps, a risk factor for Gallbladder cancer. It is also to analyze the correlation of the risk factors of gallbladder polyps with Smoking, Drinking and Serum biochemical test, centering on Metabolic syndrome, furthermore to be used as basic health care data for the management of Gallbladder polyps related with Metabolic syndrome.

## 2. STUDY DESIGN AND ANALYTIC METHOD

The objects of this study were 318 Korean adults who visited a secondary hospital in Gyeonggi province from November 2, 2012 to January 31, 2014 and underwent abdominal ultrasonography.

First, during this period, the patients were classified into those with gallbladder polyps and Metabolic syndrome, those with gallbladder polyps without Metabolic syndrome, those with Metabolic syndrome without gallbladder polyps, and those without gallbladder polyps and Metabolic syndrome. After that they were randomly selected.

Second, in order to examine the relevance between gallbladder polyps and Metabolic syndrome, 318 people in total including 151 males and 167 females, aged 20 years or older which are ages being able to be influenced by Metabolic syndrome were analyzed. Among the objects, the people who did not have enough data, or underwent surgery in relation to liver or biliary system in the past were excluded.

The analysis was performed by using the SPSS version 20.0 program. Independent T-test was performed for the mean size difference analysis of variables obtained from biochemical test, by the

existence of gallbladder polyps. The correlation among metabolic syndrome, biochemical test factors and gallbladder polyps was analyzed by Simple correlation analysis. Also factors influencing the difference of the variables related to metabolic syndrome and gallbladder polyps were identified by Binary logistic regression analysis <see Figure 1.>

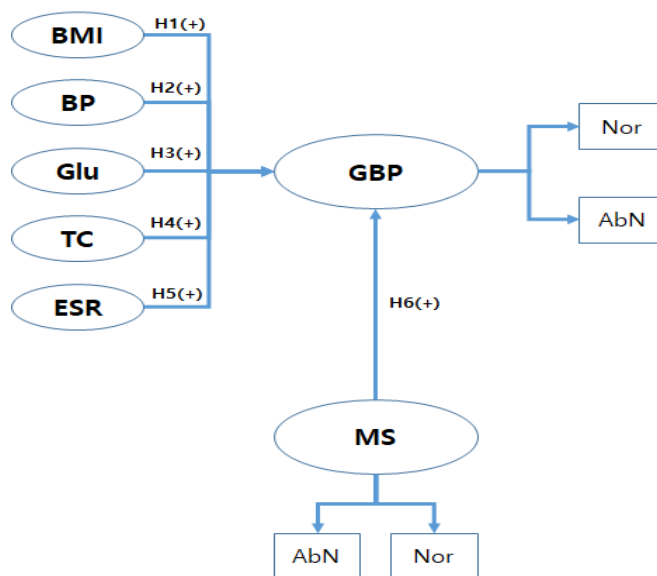


Figure 1: Model of study related to metabolic syndrome and gallbladder polyps

## 3. RESULTS OF STUDY

### 3.1 Characteristics of Metabolic Syndrome

In regard to the mean difference of biochemical test variables by the existence of gallbladder polyps, the patients with polyps were  $54.66 \pm 13.48$  years old, who were older compared to ones with non - polyps ( $p < 0.05$ ). As to weight, the patients with polyps weighed  $72.22 \pm 12.78$ , who weighed more compared to ones with non - polyps. BMI (Total body mass index) was  $28.58 \pm 15.58$  in patients with polyps, which was higher than in those without polyps ( $p < 0.05$ ) <see Table 1>.

**Table 1:** The Significance Analysis between the Variables by Item and Metabolic syndrome

Variable	Existence of Polyp	N	Mean	Std. Deviation	P
Age	Abnormal	154	48.19	14.89	0.000
	Normal	164	54.66	13.48	
Height	Abnormal	154	163.59	8.54	0.000
	Normal	164	141.35	22.67	
Weight	Abnormal	154	63.03	12.08	0.000
	Normal	164	72.22	12.78	
BMI	Abnormal	154	23.52	3.55	0.000
	Normal	164	28.58	15.58	
Systolic BP	Abnormal	154	116.22	18.45	0.000
	Normal	164	131.78	23.44	
Diastolic BP	Abnormal	154	72.32	11.24	0.020
	Normal	164	76.22	13.21	
nicotine	Abnormal	154	1.19	0.39	0.051
	Normal	164	1.24	0.43	
Glucose	Abnormal	154	104.49	28.82	0.004
	Normal	164	116.15	41.47	
WBC	Abnormal	154	4.87	2.06	0.238
	Normal	164	7.15	2.20	
RBC	Abnormal	154	4.58	0.52	0.245
	Normal	164	4.51	0.52	
Hb	Abnormal	154	13.99	1.53	0.684
	Normal	164	13.92	1.79	
Hct	Abnormal	154	40.68	4.04	0.535
	Normal	164	40.39	4.29	
Na	Abnormal	154	141.21	2.11	0.093
	Normal	164	139.73	11.03	
cl	Abnormal	154	105.39	6.29	0.087
	Normal	164	106.34	2.79	
HBs Ag	Abnormal	154	1.08	0.16	0.004
	Normal	164	1.06	0.24	
HLD Cholesterol	Abnormal	154	52.13	16.28	0.797
	Normal	164	51.72	11.91	
Albumin	Abnormal	154	4.08	0.51	0.072
	Normal	164	5.43	9.57	
AST	Abnormal	154	26.78	10.02	0.178
	Normal	164	25.46	7.034	
ALT	Abnormal	154	28.57	17.32	0.069
	Normal	164	26.26	14.82	
ALP	Abnormal	154	177.36	58.64	0.212
	Normal	164	185.73	60.65	
Total bilirubin	Abnormal	154	0.65	0.29	0.053
	Normal	164	0.72	0.32	
Total cholesterol	Abnormal	154	187.44	49.15	0.001
	Normal	164	204.72	39.81	
Triglycerol	Abnormal	154	182.48	97.88	0.424
	Normal	164	171.03	152.74	
BUN	Abnormal	154	13.59	4.23	0.167

	Normal	164	14.32	5.15	
ESR	Abnormal	154	7.05	6.75	0.000
	Normal	164	12.88	13.66	

Nicotine	0.06	ALP	0.07
ESR	0.26***	Total bilirubin	0.12*
		Metabolic Syndrome	0.24***
RBC	-0.07	WBC	0.15
Hb	-0.02		

### 3.2 Biochemical Factors related to Metabolic Syndrome

In the correlation among metabolic syndrome, the biochemical test and gallbladder polyps using simple correlation analysis, the presence of polyp was 0.22 in positive relation with age. It was 0.54 in negative with height, 0.35 in positive with weight, and 0.58 in positive with BMI, and 0.52 in positive with systolic blood pressure. Furthermore, it was 0.43 in positive relation with diastolic blood pressure, 0.19 in positive with total cholesterol, 0.04 in positive with triglycerol, 0.16 in positive with glucose, and 0.24 in positive with metabolic syndrome. <see Table 2>.

**Table 2:** The Correlation among Metabolic Syndrome, Biochemical Test Factors and Gallbladder Polyps

Variables	Existence of Polyp	Variables	Existence of Polyp
Existence of Polyp	1	Total cholesterol	0.19***
Gender	0	Triglycerol	0.04**
Age	0.22***	BUN	0.08
Height	-0.54***	Na	-0.09
Weight	0.35***	cl	0.1
BMI	0.58***	HBsAg	0.09
Systolic BP	0.52***	Hct	-0.03
Diastolic BP	0.43***	Smoking	0.07
Alcohol	-0.05	Albumin	0.1
Glucose	0.16***	AST	-0.08
HDLcholesterol	-0.01	ALT	-0.1

### 3.3 The Logistic Regression for Factors affecting Gallbladder Polyps

In variable difference related to Metabolic syndrome and Gallbladder polyp using Binary Logistic Regression Analysis, the patients with polyps were 0.92 taller in height and 1.06 heavier in weight. BMI was 1.19, Systolic blood pressure was 1.06 and Diastolic blood pressure was 1.03 higher, compared to those without polyps. Also Glucose was 1.011, Total cholesterol was 1.009, ESR was 1.064 and Metabolic syndrome was 2.74 higher(P<0.05) <see Table 3>.

**Table 3:** Binary Logistic Regression Analysis for Factors affecting Gallbladder Polyps

Variables	B	S.E.	P	Exp(B)
Height	-0.083	0.011	0.000	0.92
Weight	0.059	0.01	0.000	1.061
BMI	0.171	0.025	0.000	1.186
Systolic BP	0.058	0.007	0.000	1.06
Diastolic BP	0.036	0.009	0.002	1.03
Glucose	0.11	0.004	0.007	1.011
Total cholesterol	0.009	0.003	0.001	1.009
ESR	0.062	0.015	0.000	1.064
Metabolic Syndrome	1.006	0.234	0.000	2.736

#### 4.DISCUSSIONS AND CONCLUSION

Pathological diagnosis for gallbladder's polypoid lesions is classified into Pseudo polyps such as cholesterol polyp, inflammatory polyp and proliferative polyp, and True polyps such as adenoma and adenocarcinoma [2]. It was reported that among the patients with gallbladder polyps, 45.6% were diagnosed with cholesterol polyps, Pseudo polyp, and 21.1% were diagnosed with adenomas, True polyp [8].

In this study, the risk factors were confirmed to be Age, Weight, BMI, Systolic blood pressure, Diastolic blood pressure, Total cholesterol, Triglycerol, Fasting blood sugar, Metabolic syndrome and ESR. BMI was 23.52 kg/m<sup>2</sup> in case of not accompanying Metabolic syndrome. But it was 28.58 kg/m<sup>2</sup> when accompanying Metabolic syndrome, which was higher than the Korean obesity standard of 25 kg/m<sup>2</sup>. Thus, it can be seen that obesity is associated with metabolic syndrome.

In addition, there was a report of that obesity is associated with gallbladder polyps, and in this study also, it was confirmed that BMI of the patients with polyps was 1.19 higher than that of the patients without polyps. FBS was 116.15mg/dL in patients with Gallbladder polyps, which was higher than in patients without polyps and higher than 100mg/dL, the diagnostic criteria of Metabolic syndrome. It had a significance with gallbladder polyps, and the significance in the patients with polyps was 1.01 higher than in those without polyps.

This study also accorded with the previous researches asserting that hyperglycemia inhibits gallbladder contraction and bile secretion from the liver, and that IFG (Impaired Fasting Glucose) is the risk factor for gallbladder polyposis [9].

Blood pressure was 131.78/76.21 mm/Hg in patients with metabolic syndrome, which was significantly higher than in those without

metabolic syndrome, thus it was confirmed to be a risk factor for Gallbladder polyps. Systolic and diastolic BP were 1.06 and 1.03 higher each, compared to the patients without polyps [10].

Through this study, it was found that BMI, total cholesterol, triglyceride, diabetes mellitus, systolic blood pressure, diastolic blood pressure and etc. Which are metabolic syndrome indicators were risk factors for gallbladder polyps [11].

Metabolic syndrome was independently associated with the comparative risk increase of gallbladder polyps. In particular, for Metabolic syndrome, the possibility of the existence of gallbladder polyps was consistent with those previous reports, but for HBsAg-positive, it came out differently from what was previously known. It could also make sure of that ESR, the indicator of inflammation, was also correlated with gallbladder polyps, in this study. As mentioned above, Gallbladder polyps are a risk factor for Gallbladder cancers, thus patients with metabolic syndrome should try to detect gallbladder polyps early by abdominal ultrasound.

Furthermore, It is recommended that the correlation with ESR which is indicative of inflammation level among variables related to Gallbladder polyps may be used as a subsequent index for gallbladder polyps, and additional studies need to be done by increasing the objects of study in order to verify this study.

#### REFERENCES

1. S. H. Lim, D. H. Kim, M. J. Park, et al. **Is Metabolic Syndrome One of the Risk Factors for Gallbladder Polyps Found by Ultrasonography during Health Screening?**, *Gut Liver*, Vol. 1, No. 2, pp. 138-144, Dec 2007.
2. A. H. Christensen, K. G. Ishak, **Benign tumors and pseudotumors of the gallbladder. Report of 180 cases**, *Arch Pathol*, Vol. 90, pp. 423-432, 1970.



3. K. Segawa, T. Arisawa, Y. Niwa, T. Suzuki, Y. Tsukamoto, H. Goto, et al. **Prevalence of gallbladder polyps among apparently healthy Japanese: ultrasonographic study**, *Am J Gastroenterol*, Vol. 87, Issue. 5, pp. 630-633, May 1992.
4. T. Jorgensen, K. H. Jensen, **Polyyps in the gallbladder. A prevalence study**, *Scand J Gastroenterol*, Vol. 25, Issue. 3, pp. 281-286, 1990.
5. S. G. Shim, K. T. Lee, J. K. Lee, J. H. Park, K. H. Ryu, P. L. Rhee, et al. **Prevalence and risk factors of gallbladder polyyps in health screening subjects**, *Korean J Med*, Vol. 57, No. 6, pp. 1014-1020, Dec 1999.
6. S. Y. Kim, H. S. Lee, Y. S. Lee, K. W. Chung, B. K. Jang, W. J. Chung, et al. **Prevalence and risk factors of gallbladder polyp in adults living in Daegu and Gyeongbuk Provinces**, *Korean J Gastroenterol*, Vol. 48, No. 5, pp. 344-350, Nov 2006.
7. M. J. Seo, J. W. Seong, K. J. Sohn, B. J. Ko, J. H. Han, S. M. Kim, **Prevalence of the metabolic syndrome in Korean Children and Adolescents: Korea National Health and Nutrition Survey 2001**, *Korean J Family Medicine*, Vol. 27, No. 10, pp. 798-806, 2006.
8. M. S. Park, **Clinical characteristics of polypoid lesions of gall bladder**, *Graduate School Kwan Dong University*, Dec 2010.
9. C. Y. Chen, C. L. Lu, F. Y. Chang, S. D. Lee, **Risk factors for gallbladder polyyps in the Chinese population**, *Am J Gastroenterol*, Vol. 92, Issue. 11, pp. 2066-2068, 1997.
10. Voronkova, O., Nikishkin, V., Frolova, I., Matveeva, E., Murzagalina, G., Kalykova, E. 2019. Importance of the process of teaching the basics of social entrepreneurship for the sustainable development of society. *Entrepreneurship and Sustainability Issues*, 7(2), 1048-1058.  
[http://doi.org/10.9770/jesi.2019.7.2\(18\)](http://doi.org/10.9770/jesi.2019.7.2(18))
11. Prodani, R., Bushati, J., Andersons, A. 2019. An assessment of impact of information and communication technology in enterprizes of Korça region. *Insights into Regional Development*, 1(4), 333-342. [https://doi.org/10.9770/ird.2019.1.4\(4\)](https://doi.org/10.9770/ird.2019.1.4(4))