# Preoperative and postoperative comparison of gallbladder polyps: retrospective analysis of 56 cases

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**Received:** 11 January 2022
**Revised:** 15 January 2022
**Accepted:** 05 February 2022
**Published:** 04 January 2023

**The Egyptian Journal of Surgery** 2023, 41:514–518

**Introduction**
Gallbladder polyps (GBP) are classified as neoplastic and nonneoplastic polyps. Nonneoplastic polyps are cholesterol polyps, hyperplastic polyps, inflammatory polyps, adenomyomas, leiomyomas, fibromas, and lipomas. Neoplastic polyps are adenomas, adenocarcinomas, and squamous-cell carcinomas.
GBP is a rare disease and its indication for operation is still unclear. Cholecystectomy is recommended for polyps of 10 mm or larger and smaller than 10 mm, if symptomatic and with risk factors.
**Results**
The mean age of the patients was 40.58 ± 14.74 (17–87), and 36 of the patients were female and 20 were male. In the preoperative evaluation, the mean polyp size was 6.85 ± 2.97 (3–16). Considering the preoperative diagnoses of the patients, 44 were GBP, nine were cholelithiasis, and three were GBP+cholelithiasis. While 47 patients were diagnosed with preoperative ultrasonography, nine patients were diagnosed with postoperative histopathological examination. Histopathological examination revealed cholesterol polyps in 54 patients and adenomas in two patients. All patients underwent laparoscopic cholecystectomy. No morbidity or mortality was observed.
**Conclusıon**
While the size of GBP larger than 10 mm is widely accepted for surgery, the treatment of polyps smaller than 10 mm is not yet clear. Good identification of risk factors for malignancy and development of imaging methods will reduce unnecessary cholecystectomy as well as contribute to the economy of countries by reducing morbidity and mortality.

**Keywords:**
cholecystectomy, gallbladder polyp, histopathology, ultrasound

Egyptian J Surgery 2023, 41:514–518

1110-1121

## Introduction

A gallbladder polyp (GBP) is an elevation of the gallbladder mucosa that protrudes into the gallbladder lumen. The estimated prevalence of GBP in the global population is about 5%, but only 5% of these are considered true GBP [1].

GBP is usually asymptomatic and is often diagnosed incidentally during radiological examinations performed for other reasons [1,2] or after cholecystectomy [1].

GBP: they are classified as neoplastic and nonneoplastic polyps [2,3]. Nonneoplastic polyps are cholesterol polyps, hyperplastic polyps, inflammatory polyps, adenomyomas, leiomyomas, fibromas, and lipomas. Neoplastic polyps such as adenomas, adenocarcinomas, and squamous-cell carcinomas are found [2].

The presence of GBP causes a clinical problem because surgery is strictly indicated only for neoplastic polyps, including adenomas, due to their malignant potential. Although international guidelines have various recommendations for the general indication for cholecystectomy, American and other western countries advocate cholecystectomy for polyps more than or equal to 1 cm. For polyps less than 1 cm, cholecystectomy is recommended only in patients with additional risk factors for malignancy (e.g. advanced age or primary sclerosing cholangitis) or in patients with biliary symptoms for no other reason [3].

There are limited studies addressing the long-term progression of GBP in unselected populations [4]. A follow-up study of a randomized population sample over a 30-month observation period showed that 81% of polyps did not change in size, 14% increased, and 5% decreased. At follow-up, 23% of patients no longer showed GBP. While 77% of the polyps examined after 84 months were the same size, 8% shrank [4,5].

The accuracy of polyp size as a predictor of malignant potential is limited. It is desirable to identify clinicopathological or clinical features that distinguish GBP on the basis of malignant potential. The distinctive features can improve preoperative work and optimize the indication for cholecystectomy to avoid unnecessary surgery-related morbidity and costs [3]. Risk factors for malignant polyps in previous studies, such as advanced age, polyp size, sessile morphology of GBPs, presence of symptoms, associated stones, presence of diabetes mellitus, and rapid polyp growth, have been reported [6].

GBP is a rare disease and its indication for operation is still unclear. In this study, we aimed to present our cases in which GBP were detected in preoperative ultrasonography (USG) and GBP were detected in the histopathological examination after cholecystectomy and to contribute to the literature.

## Patients and methods

This study includes the retrospective analysis of 56 patients diagnosed with GBP among a total of 2021 patients who underwent cholecystectomy between March 2016 and June 2021 in the General Surgery Clinic of Diyarbakır Gazi Yaşargil Training and Research Hospital. Due to the retrospective design of the study, informed consent was not taken. The ethics committee approval was obtained (approval number: 31.12.2021/952). In this study, the data of 56 patients who were found to have GBP in preoperative USG and who were found to have GBP in histopathological examination after cholecystectomy were analyzed. Demographic characteristics, radiological and pathological characteristics of the patients, and indications for surgery were recorded. In multiple polyps, the largest polyp was evaluated. In patients with polyp detected on USG, polyp size more than or equal to 10 mm, polyp size less than 10 mm, and accompanying risk factors (patient age more than or equal to 50, accompanying gallstones, change in polyp size or shape during follow-up, and being symptomatic) are indications for cholecystectomy. The eyes have it.

The pathology reports of all patients who underwent cholecystectomy (laparoscopic or open) in our clinic on the specified dates were reviewed. All patients with GBP in the pathology report and all patients with GBP in preoperative USG were identified. Cases meeting either of these two conditions were included in the study. Patients whose polyps were not detected in USG and patients whose pathology results were reported other than polyps were excluded from the study.

Statistical Analysis IBM SPSS 20 (Statistics Programramme for Social Scientists) (IBM, Chicago, Illinois; USA) program was used for statistical analysis. Kolmogorov–Smirnov test was used for the data conformity with normal distribution. Continuous data with normal distribution were given as mean±SD, continuous data with non-normal distribution as median and minimum–maximum, and categorical data as percentage (%).

## Results

When the pathology results of a total of 2021 patients who underwent cholecystectomy were examined, 56 patients who were diagnosed with GBP were identified. Our GBP rate was 2.77%.

Thirty (53.6%) of the patients were female and 26 (46.4%) were male. Their mean age was 40.58 ± 14.74 years (Table 1).

Considering the preoperative diagnoses of the patients, 44 were GBP, nine were cholelithiasis, and three were GBP+cholelithiasis. While 47 patients were diagnosed with preoperative USG, nine patients were diagnosed with postoperative histopathological examination. Cholelithiasis was present in 12 of a total of 56 patients.

No polyps were detected in preoperative USG in nine patients. These patients were diagnosed with GBP histopathologically after the operation because of symptomatic cholelithiasis. All of these polyps were cholesterol polyps.

All patients underwent laparoscopic cholecystectomy.

When the pathology results of 47 patients who were found to have polyps on USG were examined, GBP were detected in 37 (78.72%) and no polyps were detected in 10 (22.28%) patients. Our histopathological correlation rate with USG was 78.7%. The number of patients detected by USG in 56 patients with histopathologically determined GBP was 37 (66%). The sensitivity rate in USG was 78.7%, and the specificity rate was 66.0%.

When the pathology results were examined, cholesterol polyp+chronic cholecystitis in 44 (78.6%) patients, chronic cholecystitis in 10 (17.9%) patients, and adenomatous polyp containing low-grade dysplasia in two (3.6%) patients were detected.

**Table 1 Age distribution of the patients**

| | Sex | *n* (%) | Mean±SD |
|---|---|---|---|
| Age | Man | 26 (46.4) | 39.88 ± 12.87 |
| | Woman | 30 (53.6) | 41.20 ± 16.37 |

*P*=0.742.

**Table 2 General information about the patients.**

| | Number of patients (%) |
|---|---|
| Sex | |
| Woman | 30 (53.6) |
| Man | 26 (46.4) |
| Total | 56 (100) |
| Age [mean±SD (minimum–maximum)] | 40.58 ± 14.74 (17–87) |
| Preoperative diagnosis | |
| GBP | 44 (78.6) |
| Cholelithiasis | 9 (16.1) |
| GBP+cholelithiasis | 3 (5.4) |
| Total | 56 (100) |
| Histopathology | |
| Cholesterol polyp+chronic cholecystitis | 44 (78.6) |
| Chronic cholecystitis | 10 (17.9) |
| Adenoma | 2 (3.6) |
| Total | 56 (100) |
| Number of polyps | |
| Multiple | 33 (70.2) |
| Single | 14 (29.8) |
| Total | 47 (100) |
| Polyp size | |
| ≥10 mm | 9 (19.1) |
| <10 mm | 38 (80.9) |
| Total | 47 (100) |
| Polyp size (mm) [mean±SD (minimum–maximum)] | 6.85 ± 2.97 (3–16) |

GBP, gallbladder polyps.

**Table 3 Comorbidities in patients**

| Comorbidities | *n* (%) |
|---|---|
| Asthma | 2 (3.6) |
| Asthma, Cr bronchitis | 1 (1.8) |
| DM, HT, HL, and heart failure | 1 (1.8) |
| Hyperthyroidism | 1 (1.8) |
| HT | 7 (12.5) |
| HT, asthma | 1 (1.8) |
| HT and DM | 2 (3.6) |
| HT, HL, and chronic ischemic heart disease | 1 (1.8) |
| HT, CRF, and kidney transplantation | 1 (1.8) |
| HT and chronic ischemic heart disease | 3 (5.4) |
| Chronic viral hepatitis B | 1 (1.8) |
| Cerebral palsy | 1 (1.8) |
| No | 34 (60.7) |
| Total | 56 (100.0) |

DM, diabetes mellitus; HL, hyperlipidemia; HT, hypertension.

The mean polyp size was 6.85 ± 2.97 mm.

Nine patients had a polyp size of 10 mm or more. Cholesterol polyps were detected in eight patients, and adenomatous polyp with low-grade dysplasia was detected in one patient. Polyp size of 38 patients was 9 mm or less. One of them was adenomatous polyp containing low-grade dysplasia, while 37 were cholesterol polyps.

Polyps were multiple in 33 (70.2%) of 47 patients, while 14 (29.8%) were solitary.

**Table 4 General characteristics of polyps**

| ≥10-mm polyps | Adenomatous polyp [*n* (%)] | Cholesterol polyp [*n* (%)] |
|---|---|---|
| Multiple | 0 | 4 (44.4) |
| Single | 1 (11.1) | 4 (44.4) |
| <10-mm polyps | | |
| Multiple | 0 | 33 (70.2) |
| Single | 1 (2.1) | 13 (27.7) |

The polyps of three patients smaller than 10 mm grew over time, surgery was performed in three patients because they were together with gallstones and six patients were 50 years or older. The remaining 26 patients underwent surgery because they were symptomatic (Table 2).

Additional diseases seen in our patients are shown in Table 3. General characteristics of gallbladder polyps as a result of pathological examination (Table 4).

We had no morbidity or mortality. The mean hospital stay was 1.11 ± 0.41 days.

## Discussion

The widespread and effective use of USG has led to an increase in the diagnosis of GBP. The prevalence of GBP increases with increasing age, male sex, hypertension, diabetes, hepatitis-C infection, impaired fasting glycemia, and obese individuals.

While there are studies reporting that the incidence is equal or close in both sexes [7,8], there are also studies reporting that it is more common in the female sex with a rate of 60.1–72.4% [9–11]. In our study, 30 (53.6%) of the patients were female and 26 (46.4%) were male.

Although polypoid lesions can be seen at any age, they are more common in individuals over the age of 40 [8].

There are studies that reported the mean age as 44.65 [9] and 56.8 years [10]. In our study, the mean age of incidence was found to be 40.58 ± 14.74 years, which is consistent with the literature.

The exact prevalence of GBP is unknown [8]. According to the resected gallbladder pathology reports, the prevalence is between 0.4 and 13.8% [8,9]. Our rate was 2.77%, consistent with the literature.

USG studies in healthy people show a similar prevalence of 0.3–12%.

Sensitivities of USG studies range from 0.45 to 1.00, and specificities range from 0.80 to 0.98. A meta-analysis

showed that 68% of true polyps and 79% of pseudo polyps would be accurately classified by USG [8]. In our study, GBP were detected in 37 (78.72%) of 47 patients who were found to have polyps on USG, and no polyps were detected in 10 (22.28%) patients. Our histopathological correlation rate with USG was 78.7%.

The most common histological types of nonneoplastic polyps are cholesterol polyps (60–90%), followed by adenomyomas (25–40%) and inflammatory polyps (10%) [12]. However, Taskin *et al.* [13] reported fibromyoglandules as the most common (48%) nonneoplastic polyps in their study. In our study, cholesterol polyps were detected in 44 (78.6%) patients and adenomatous polyps in two (3.6%) patients.

The mean polyp size in Kim's study was 9 ± 11 mm. Currently, guidelines recommend laparoscopic cholecystectomy for polyps larger than 1 cm in diameter due to their malignant potential. The treatment algorithm may be affected by the size, shape, and number of polyps, old age (>50 years), presence of primary sclerosing cholangitis, and gallstones [12].

In their study, Park *et al.* [14] reported that the malignancy risk of polyps 10 mm and larger was 24.2 times higher than polyps smaller than 10 mm. On the other hand, they reported that 45.5% of GBP was smaller than 10 mm at the time of diagnosis. In our study, the mean polyp size was 6.85 ± 2.97 mm. The number of polyps 10 mm and above was nine (19.1%). Neoplastic polyps were seen in two of our patients. One of them was smaller than 10 mm and the other was larger than 10 mm. Our neoplastic polyp rate was 3.57%.

Neoplastic lesions tend to be single, and nonneoplastic lesions tend to be multiple [8]. However, the relationship of malignant potential between single and multiple polyps has not yet been established. Few studies did not prove any association between solitary polyp and high risk of malignancy [12]. Meanwhile, Bhatt *et al.* [15] reported that a single polyp increased the probability of malignancy 2.05 times, and the occurrence of solitary polyp in a patient over 50 years of age increased the probability of malignancy by 24.25% [12]. In our study, 33 (70.2) polyps were multiple, while 14 (29.8%) polyps were solitary.Cholecystectomy is the preferred treatment method today, since the presence of polyps larger than 10 mm in diameter is considered to have malignant potential. However, there is still no agreement on the management of GBP less than 10 mm in diameter. However, laparoscopic cholecystectomy is recommended if there is no definite cause of upper-abdominal pain and the patient is suitable for cholecystectomy. Cholecystectomy is also recommended when there are conditions such as old age (>50 years), history of primary sclerosing cholangitis, presence of gallstones, and sessile polyps, which are considered risk factors for malignancy of GBP [3,12]. A 'wait and see' policy and regular follow-up are recommended for those with nonneoplastic and polyploid lesions smaller than 10 mm. Likewise, cholecystectomy is recommended in cases of rapid polyp growth [12]. In our study, the polyps of three patients smaller than 10 mm grew over time, surgery was performed in three patients because they were together with gallstones and six patients were 50 years or older. The remaining 26 patients underwent surgery because they were symptomatic.

## Conclusion

While the size of GBP larger than 10 mm is widely accepted for surgery, the treatment of polyps smaller than 10 mm is not yet clear. Surgery is recommended for patients with risk factors, and close follow-up can be recommended for those without risk factors. Good identification of risk factors for malignancy and development of imaging methods will reduce unnecessary cholecystectomy as well as contribute to the economy of countries by reducing morbidity and mortality.

#### Acknowledgements

The authors thank Gazi Yasargil Teaching and Research Hospital General Surgery Clinic's workers.

#### Financial support and sponsorship

Nil.

#### Conflicts of interest

There are no conflicts of interest.

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