

Comparison of Ultrasonographic and Pathologic Findings of Gallbladder Polyps

Ahmet Başak¹, Turgut Anuk¹

¹ Department of General Surgery, Erzurum City Hospital, Erzurum, Türkiye

Abstract

Aim: Gallbladder polyps are mucosal projections into the gallbladder lumen, often detected incidentally during ultrasonography or after cholecystectomy. While most are benign, some carry a risk of malignant transformation. This study aimed to evaluate the diagnostic sensitivity of preoperative ultrasonography in detecting gallbladder polyps confirmed by postoperative pathological analysis.

Methods: A retrospective review was conducted on patients who underwent cholecystectomy between October 2021 and March 2024 at Erzurum Regional Training and Research Hospital. Pathology reports were examined to identify gallbladder polyps. Patients with malignancy-related surgeries or missing ultrasonography data were excluded. Polyps were classified by size as small (1–5 mm), medium (6–9 mm), and large (≥ 10 mm). Ultrasonographic findings were compared with pathology results, and data were analyzed using SPSS version 22.

Results: Among 3,230 cholecystectomies, 87 patients had gallbladder polyps, and 70 met the inclusion criteria. The mean age was 47.8 years, and the female-to-male ratio was 1.52. Pathologically, 58 patients had small, 5 had medium, and 7 had large polyps. Preoperative ultrasonography identified polyps in only 25 of 56 patients (sensitivity: 45%). Among patients with polyps ≥ 6 mm ($n=11$), only 5 were identified preoperatively. For polyps ≥ 10 mm ($n=6$), only 2 were correctly detected.

Conclusions: The sensitivity of ultrasonography for detecting gallbladder polyps in this study was lower than reported in the literature. Particularly concerning was the misdiagnosis of polyps ≥ 10 mm, which pose a higher risk for malignancy. These findings emphasize the need for heightened vigilance and systematic evaluation in ultrasonographic assessments, especially in high-risk patients.

Keywords: Gallbladder polyps; ultrasonography; cholecystectomy

1. Introduction

Gallbladder polyps are vegetative lesions that protrude from the mucosa of the gallbladder into the lumen. They are detected in approximately 5% of adult population. Most cases are asymptomatic and are incidentally discovered during ultrasonographic examination. Most cases are asymptomatic and are incidentally discovered during ultrasonographic examination. In symptomatic cases, clinical features may resemble those of gallstones, including right upper quadrant pain radiating to the back, postprandial bloating, and nausea. Although the majority of gallbladder polyps are benign, some may undergo malignant transformation.¹

The non-neoplastic group includes cholesterol polyps, polyps resulting from mucosal injury, fibromyoglandular polyps, and inflammatory fibroid polyps.² In cases of malignant tumors, prognosis and overall survival are poor. Therefore, follow-up and early detection are critical in the management of gallbladder polyps.³

Factors associated with an increased risk of malignancy include advanced age, the presence of gallstones, increased gallbladder wall

thickness, rapid polyp growth, a sessile appearance on ultrasonography, smoking, South Asian ethnicity, the presence of symptomatic polyps, and larger polyp size.⁴ These risk factors play a critical role in determining treatment strategies.

Although ultrasonography (Figure 1) is the most commonly used method for diagnosis, gallbladder polyps can also be detected by magnetic resonance imaging (MRI). Among polyps detected by ultrasonography, the reported malignancy rates are 16% for those larger than 10 mm, 56% for those larger than 15 mm, and 94% for those larger than 20 mm.⁵ In patients with polyps smaller than 1 cm, the malignancy rate is 1.2%, whereas this rate drops to 0% for polyps smaller than 5 mm.⁶

In clinical practice, cholecystectomy is recommended for gallbladder polyps larger than 10 mm or for symptomatic polyps regardless of their size. In polyps measuring between 6–9 mm, the presence of additional risk factors—such as age ≥ 60 years, primary sclerosing cholangitis, Asian ethnicity, and sessile polypoid le-

sions—may support the decision for cholecystectomy.⁷

For polyps measuring 6–9 mm without malignancy risk factors and for those measuring 5 mm or smaller, surveillance is recommended. Follow-up is typically performed at 6 months, 1 year, and 2 years. After the second year, surveillance is discontinued.⁷(Figure 2)

In this study, the ultrasonographic findings of patients who underwent laparoscopic cholecystectomy and were found to have gallbladder polyps in the pathological specimens were retrospectively evaluated.

2. Materials and Methods

The pathology reports of cholecystectomy specimens performed at Erzurum Regional Training and Research Hospital between October 2021 and March 2024 were retrospectively reviewed. Patients diagnosed with gallbladder polyps in the specimen pathology were included in the study. Patients whose ultrasonography results were unavailable, as well as those operated on due to malignancies such as pancreatic or hepatic cancers, were excluded from the study. In the pathology report, polyps were not classified by type.

In this study, patients' age, gender information, and preoperative ultrasonography reports were retrospectively reviewed by a single researcher. Only ultrasonography results from patients registered at the same center and with available imaging were included in the analysis.

Polyps observed in the pathology results were classified according to their sizes as follows:

Small polyps: 1–5 mm

Medium-sized polyps: 6–9 mm

Large polyps: ≥10 mm

Patients' preoperative ultrasonography results were evaluated in terms of the presence of stones, polyps, or both, and these findings were compared with the pathology results.

The obtained data were analyzed using SPSS version 22 software. Descriptive statistics were applied to calculate the mean age, gender distribution, and proportional distributions of ultrasonography and pathology findings.

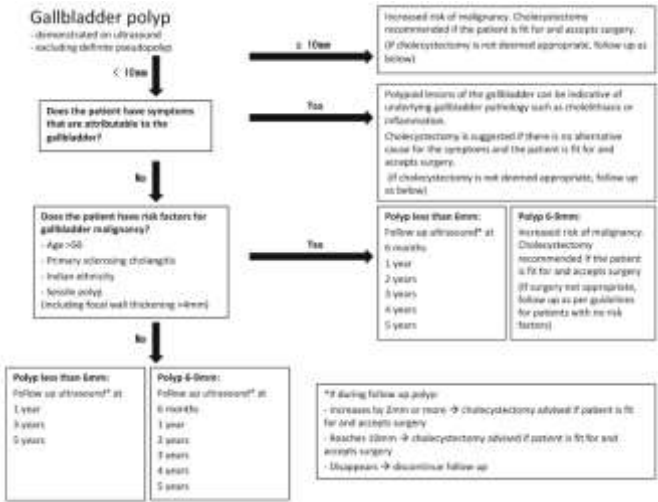
Figure 1

Ultrasonographic image of a gallbladder polyp (indicated by the plus sign).



Figure 2

Management Algorithm⁹



3. Results

Between October 2021 and March 2024, a total of 3,230 cholecystectomies were performed. Upon review of the specimen pathology reports, gallbladder polyps were identified in 87 patients. Twelve patients who underwent surgery due to malignant conditions such as pancreatic cancer and hepatic malignancies were excluded from the study.

Among the 70 patients included in the study, 39 (56%) were female and 31 (44%) were male. The female-to-male ratio was calculated as 1.52. The mean age was found to be 47.78 years. Hypertension was observed in 19, type 2 diabetes in 8, and coronary artery disease in 2 of the patients included in the study.

When classified according to polyp size, 58 patients were categorized into the small polyp group, 5 patients into the medium polyp group, and 7 patients into the large polyp group.(Table 1)

When evaluating the patients' preoperative ultrasonography results, examinations for 14 patients were unavailable. Among the ultrasonography results of 56 patients classified as either stones or polyps, 31 patients were diagnosed with gallstones, while 25 patients were diagnosed with gallbladder polyps. The sensitivity of ultrasonography in detecting polyps was found to be 45%. Among 11 patients with polyps measuring 6 mm or larger, polyp presence was reported in the ultrasonography of 5 patients. In the large polyp group, 2 out of 6 patients were interpreted as having polyps on ultrasonography.(Table 2)

Table 1

Demographic characteristics of patients by group

	Group 1	Group 2	Group 3	Total
Age (mean)	47,91	39,4	52,57	47,78
Gender (n, %)				
Female	35 (%60)	1 (%20)	3 (%43)	39 (%56)
Male	23 (%40)	4 (%80)	4 (%57)	31 (%44)

Table 2

Comparison of pathological and ultrasonographic examination of gallbladder polyps

	Small Polyp Group	Medium-sized Polyp Group	Large Polyp Group	Total
Gallbladder Polyp	25	4	2	31
Gallstones	20	1	4	25
Total	45	5	6	56

4. Discussion

Lesions growing into the lumen of the gallbladder wall are referred to as gallbladder polyps. These lesions are often incidentally detected during abdominal ultrasonography or in pathological examinations following cholecystectomy.⁸ Gallbladder polyps occur approximately 1.3 times more frequently in females than in males, with an average age at diagnosis of 49 years.³ In our study, these ratios were similar, with a female-to-male ratio of 1.52 and a mean age of 47.8 years.

Ultrasonography is the primary imaging modality for the diagnosis of gallbladder polyps. According to the literature, the average size of polyps detected by ultrasonography is reported to be approximately 7 mm. In about 75% of the monitored cases, no significant change in polyp size has been observed.¹⁰ However, many polyps may be confused with pseudopolyps on imaging. Pseudopolyps include cholesterosis, cholesterol polyps, and inflammatory polyps. Histologically, the most common type among benign polyps is adenoma, while adenocarcinoma is the most frequent type among malignant polyps.¹¹

In the literature, the sensitivity and specificity of abdominal ultrasonography for detecting gallbladder polyps have been reported as 84% and 96%, respectively.¹¹ However, in our study, the sensitivity of ultrasonography for polyp detection was found to be 45%. This discrepancy may be explained by the frequent oversight or underreporting of millimetric polyps, which are often considered clinically insignificant.

The treatment approach varies depending on polyp size and the presence of malignancy risk factors in the patient. Prophylactic cholecystectomy is recommended for polyps measuring 10 mm or larger, as well as for polyps between 6–9 mm in patients with additional risk factors such as advanced age, primary sclerosing cholangitis (PSC), or sessile morphology. In cases with polyps measuring 5 mm or smaller, or 6–9 mm without malignancy risk factors, follow-up with ultrasonography is advised.¹² Therefore, the preoperative diagnosis of polyps measuring 6 mm or more is clinically important. In asymptomatic gallbladder disease without additional risk factors, a non-operative follow-up strategy is generally recommended.¹³

In our study, among 11 patients with pathologically confirmed polyps measuring 6 mm or larger, only 5 (45%) were diagnosed with polyps on preoperative ultrasonography. The presence of polyps measuring 10 mm or more is particularly critical due to the potential risk of malignancy; however, among the 6 patients in this group, polyps were detected by preoperative ultrasonography in only 2 cases. In the remaining patients, the diagnosis reported was gallstones. These findings suggest that some high-risk cases may be misdiagnosed or underdiagnosed, potentially leading to delays in surgical decision-making.

5. Conclusion

In our study, the sensitivity of ultrasonography in detecting gallbladder polyps was found to be 45%. This relatively low rate can be attributed to the small size of millimetric polyps, which may lead to them being overlooked or deemed clinically insignificant. However, it is noteworthy that even among polyps larger than 5 mm—which require close follow-up—the detection rate remained low. More importantly, polyps measuring over 10 mm, which carry a high malignant potential, were misdiagnosed in 66% of cases. These findings highlight the possibility that lesions interpreted as gallstones on ultrasonography—particularly those over 10 mm in size—may, in fact, be polyps. Therefore, in high-risk patients, a more meticulous and systematic ultrasonographic evaluation is warranted.

Statement of ethics

This study was approved by the Scientific Research Ethics Committee of Erzurum Faculty of Medicine on February 14, 2024 (Approval No: 34).

genAI

No artificial intelligence-based tools or generative AI technologies were used in this study. The entire content of the manuscript was originally prepared, reviewed, and approved by both authors.

Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Conflict of interest statement

The authors declare that they have no conflict of interest.

Availability of data and materials

This Data and materials are available to the researchers.

Author contributions

AB; Study design, literature review, article writing, TA; Provision of visual data, interpretation of results, data collection All authors read and approved the final manuscript.

References

- Myers RP, Shaffer EA, Beck PL. Gallbladder Polyps: Epidemiology, Natural History and Management. Vol 16.; 2002. [\[Crossref\]](#)
- Taskin OC, Basturk O, Reid MD, et al. Gallbladder polyps: Correlation of size and clinicopathologic characteristics based on updated definitions. *PLoS One* 2020;15(9). [\[Crossref\]](#)
- Babu BI, Dennison AR, Garcea G. Management and diagnosis of gallbladder polyps: a systematic review. *Langenbecks Arch Surg* 2015;400(4):455-462. [\[Crossref\]](#)
- Elmasry M, Lindop D, Dunne DFJ, Malik H, Poston GJ, Fenwick SW. The risk of malignancy in ultrasound detected gallbladder polyps: A systematic review. *International Journal of Surgery* 2016;33:28-35. [\[Crossref\]](#)
- Fujiwara K, Abe A, Masatsugu T, Hirano T, Sada M. Effect of gallbladder polyp size on the prediction and detection of gallbladder cancer. *Surg Endosc* 2021;35(9):5179-5185. [\[Crossref\]](#)
- Kalbi DP, Bapatla A, Chaudhary AJ, Bashar S, Iqbal S. Surveillance of Gallbladder Polyps: A Literature Review. *Cureus* 2021. [\[Crossref\]](#)
- Foley KG, Lahaye MJ, Thoeni RF, et al. Management and follow-up of gallbladder polyps: updated joint guidelines between the ESGAR, EAES, EFISDS and ESGE. *Eur Radiol* 2022;32(5):3358-3368. [\[Crossref\]](#)
- Andrén-Sandberg Å. Diagnosis and management of gallbladder polyps. *N Am J Med Sci* 2012;4(5):203-211. [\[Crossref\]](#)

- 9.Wiles R, Thoeni RF, Barbu ST, et al. Management and follow-up of gallbladder polyps: Joint guidelines between the European Society of Gastrointestinal and Abdominal Radiology (ESGAR), European Association for Endoscopic Surgery and other Interventional Techniques (EAES), International Society of Digestive Surgery – European Federation (EFISDS) and European Society of Gastrointestinal Endoscopy (ESGE). Eur Radiol 2017;27(9):3856-3866. [[Crossref](#)]
- 10.Yoon YB, Park JK, Kim YT, et al. Management Strategies for Gallbladder Polyps: Is It Possible to Predict Malignant Gallbladder Polyps? Vol 2.; 2008. [[Crossref](#)]
- 11.Cocco G, Basilico R, Delli Pizzi A, et al. Gallbladder polyps ultrasound: what the sonographer needs to know. J Ultrasound 2021;24(2):131-142. [[Crossref](#)]
- 12.Valibouze C, El Amrani M, Truant S, et al. The management of gallbladder polyps. J Visc Surg 2020;157(5):410-417. [[Crossref](#)]
- 13.van Dijk AH, de Reuver PR, Besselink MG, et al. Assessment of available evidence in the management of gallbladder and bile duct stones: a systematic review of international guidelines. HPB 2017;19(4):297-309. [[Crossref](#)]