Gallbladder Polyps: Benign Bystanders or Malignant Precursors? Defining the Path from Detection to Treatment

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ABSTRACT

Gallbladder polyps (GP) are defined as elevations of gallbladder wall that protrude into the lumen. These elevations are commonly detected incidentally during abdominal ultrasonography and predominantly asymptomatic. Based on malignant potential, gallbladder polyps are broadly classified into neoplastic and non-neoplastic types. Although most cases remain clinically silent, some patients may present with right upper quadrant pain, localized tenderness, and, in certain instances, a palpable mass in the upper abdomen. Abdominal ultrasound (US) remains the primary modality for both diagnosis and surveillance of gallbladder polyps. In general, a polyp size of ≥10 mm serves as a key threshold for considering cholecystectomy. However, additional risk factors such as age >60 years, primary sclerosing cholangitis, Asian ethnicity, and sessile morphology should also be considered in clinical decision-making. Therefore, this review aimed to enhance clinical awareness and inform appropriate management strategies for patients with gallbladder polyps.

Keywords: *Cholecystectomy, Gallbladder, Gallbladder Polyps, Malignancy Risk, Ultrasound (US)*

ABSTRAK

Polip kantung empedu (GP) adalah elevasi dinding kantung empedu yang mengalami protusi ke dalam lumen kantung empedu, sering ditemukan secara tidak sengaja pada saat pemeriksaan ultrasound abdomen, dan kebanyakan bersifat asimtomatik. Polip kantung empedu dibagi menjadi neoplastik dan non-neoplastik berdasarkan kemampuannya untuk menjadi suatu lesi keganasan. Walaupun kebanyakan tidak bergejala, beberapa pasien bisa merasakan nyeri perut kanan atas, nyeri tekan, hingga pada kasus tertentu dapat teraba massa di bagian kanan atas abomen. Pemeriksaan ultrasound (US) abdomen adalah pilihan utama untuk mendiagnosis dan follow-up GP. Secara umum, ukuran polip ≥10 mm merupakan ambang dalam mempertimbangkan tindakan kolesistektomi; namun, faktor risiko tambahan juga harus dipertimbangkan dalam menentukan terapi, seperti usia >60 tahun, primary sclerosing cholangitis (PSC), etnis Asia, dan morfologi sesil. Review ini bertujuan untuk meningkatkan kewaspadaan klinis sekaligus memberikan dasar dalam menentukan strategi penatalaksanaan yang tepat pada pasien dengan GP.

Kata kunci*: Kolesistektomi, Kantung Empedu, Polip Kantung Empedu, Risiko Keganasan, Ultrasonografi (US)*

INTRODUCTION

Gallbladder polyps (GP) are defined as elevations of gallbladder wall that protrude into the lumen. These elevations may present as either sessile or pedunculated forms and are characterized by immobility and absence of acoustic shadowing. The features help distinguish gallbladder polyps from gallstones.[1,2] Gallbladder polyps are frequently detected incidentally during abdominal ultrasonography, with a reported prevalence of approximately 4–7%, and most often asymptomatic.[2]

Based on histopathological characteristics, gallbladder polyps can be classified into neoplastic and non-neoplastic types. Neoplastic polyps include malignant lesions, including adenocarcinomas, as well as premalignant conditions, namely adenomas. In contrast, non-neoplastic polyps comprise entities such as cholesterol polyps, adenomyomatosis, and inflammatory polyps.[3]

Accurate differentiation between benign and premalignant gallbladder polyps is clinically important because management strategies and prognostic implications differ substantially. Although most gallbladder polyps are benign and can be managed conservatively, neoplastic lesions may progress to gallbladder carcinoma when left untreated. Given the poor prognosis of advanced gallbladder carcinoma, early identification of lesions with malignant potential remains a key objective in the evaluation and management of gallbladder polyps.[4,5]

Several risk factors have been associated with gallbladder polyps, including obesity, dyslipidemia, and metabolic syndrome. Male sex, low high-density lipoprotein (HDL) levels, and age ≥60 years are linked to an increased likelihood of polyps measuring greater than 5 mm.[5] Therefore, this review aimed to enhance clinical awareness and inform appropriate management strategies for patients with gallbladder polyps.

PREVALENCE AND RISK FACTOR

Most gallbladder polyps are incidentally detected during abdominal ultrasound (US). In the United States, the reported prevalence ranges from approximately 4% to 5.6%. One study identified 734 cases diagnosed by US among 15,835 cholecystectomy specimens collected between 2007 and 2020.[6] In Qatar, the prevalence was reported at 7.4%, comprising 4.2% solitary and 3.2% multiple polyps, with a comparable distribution between males (7.7%) and females (7%).[7]

A population-based study in Korea reported a prevalence of 6.3% between 2002 and 2012, with a significant increase from 2.9% in 2002 to 8.5% in 2012.[8] A meta-analysis further identified several risk factors associated with gallbladder polyps in East Asian populations, including male sex, high body mass index (≥25 kg/m²), increased waist circumference, higher diastolic blood pressure, elevated low-density lipoprotein (LDL) levels, low HDL levels (<50 mg/dL in women and <40 mg/dL in men), and positive hepatitis B surface antigen (HBsAg) **(Table 1).**[9]

Table 1. Reported Prevalence of Gallbladder Polyps Across Different Geographic Regions

Region/Country	Study period	Study Population	Main Epidemiological Findings
Chile[6]	2007–2020	Retrospective cohort of patients undergoing cholecystectomy for US-diagnosed gallbladder polyps at a single university center in Santiago, Chile	Among 15,835 cholecystectomies, 734 had a preoperative US diagnosis of gallbladder polyps, and 447 patients met the inclusion criteria. Histopathology confirmed gallbladder polyps in 88.4% of included patients.
Western Europe[10]	2010–2018	Multicenter retrospective cohort from four hospitals in Ireland and the United Kingdom evaluating cholecystectomy for US-detected gallbladder polyps	Among 8,341 cholecystectomies, 134 cases were performed for US-identified gallbladder polyps as the primary indication, representing 1.6% of all cholecystectomies.
Qatar[7]	January 1, 2020 – December 31, 2020	Multicenter study of patients undergoing abdominal ultrasonography in Primary Health Care Corporation centers in Qatar	Among 7,156 individuals with gallbladder US, the overall prevalence of gallbladder polyps was 7.4%. Solitary and multiple gallbladder polyps were reported in 4.2% and 3.2% of participants, respectively.
Korea[8]	2002–2012	Health screening population at Keimyung University Dongsan Medical Center, Daegu, Korea	Among 14,250 age- and sex-matched subjects, 765 had gallbladder polyps, with an overall prevalence of approximately 6.3%. The prevalence increased from 2.9% in 2002 to 8.5% in 2012.

Table 2. Classification of Non-Neoplastic Gallbladder Polyps.

Non-neoplastic polyp	Mean size (mm)	Radiologic finding	Pathologic finding	Number (single/ multiple, %)	Frequency (%)
Cholesterol polyp	< 10	US: hyperechoic polyp, typically round shape with "ball on the wall" sign	Grossly, yellow appearance; microscopically, distinctive cauliflower configuration and cholesterol-laden macrophages	Single (36.4) Multiple (63.6)	60-90
Inflammatory polyp	< 10	US: variable echogenicity (iso-, hypo-, or hyper-)	Pseudopapillary fronds with reactive mucosal changes, inflammation, and increased vascularity	Usually multiple	10
Adenomyoma	NA	US: wall thickening with "comet tail"	Trabeculated appearance, cystic dilation of glandular spaces (Rokitansky-Aschoff sinuses) and smooth muscle hypertrophy	Usually single	25-40
Fibromyoglandular polyp	4.3 (2-13)	NA	Broad-based polyps Lobular units of small glands Fibroblastic and muscular stroma	Single (56) Multiple (44)	48
Hamartoma	NA	NA	NA	NA	Very rare

US, ultrasonography; MRI, magnetic resonance imaging; NA, not available.

Adapted from Kim KH. Gallbladder polyps: evolving approach to the diagnosis and management. Yeungnam Univ J Med. 2021;38(1):1–9. Licensed under CC BY-NC 4.0.[4]

Table 3. Classification of Neoplastic Gallbladder Polyps.

Neoplastic polyp	Mean size (mm)	Radiologic finding	Pathologic finding	Number (single/ multiple, %)	Frequency (%)
Benign tumor					
Epithelial tumor					
Adenoma	7 (5-20)	US: isoechoic, sessile or pedunculated	Sessile or pedunculated benign glandular structures	Mainly single	4-8.9
ICPN with low- and high-grade intraepithelial neoplasia	>20	NA	A distinct polypoid mass, intraluminal papillary growth, with low- and high-grade dysplasia	Single (82) Multiple (18)	0.5-0.8
Mesenchymal tumor					
Leiomyoma/lipoma	NA	NA	NA	NA	NA
Malignant tumor					
Epithelial tumor					
Adenocarcinoma	>10	US: a wide polyp base, thickening of wall (>3 mm), a polypoid mass projecting intraluminally	Mainly papillary form, densely cellular papillary fronds protruding into the lumen, with infiltrative growth	Mainly single	0.6-1.7 (80% of gallbladder malignancy)
ICPN with associated invasive carcinoma	>20		Intraluminal growth, mainly papillary growth pattern and stromal invasion	Single (78) Multiple (22)	0.5-0.8
Mesenchymal tumor					
Leiomyosarcoma	NA	NA	NA	NA	<0.1 (1%-2% of gallbladder malignancy)

US, ultrasonography; ICPN, intracholecystic papillary neoplasm; NA, not available.

Adapted from Kim KH. Gallbladder polyps: evolving approach to the diagnosis and management. Yeungnam Univ J Med. 2021;38(1):1–9. Licensed under CC BY-NC 4.0.[4]

PATHOPHYSIOLOGY AND CLASSIFICATION

The term *true neoplastic polyps* refers to lesions with malignant potential, comprising both adenomas and adenocarcinomas. In contrast, the majority of gallbladder polyps are non-neoplastic pseudopolyps, which lack malignant potential and include cholesterol, inflammatory, and hyperplastic polyps, as well as focal adenomyomatosis.[5]

Cholesterol (pseudo) polyps account for approximately 60–90% of cases and presumably arise from the deposition of cholesterol or bile salts within gallbladder wall, often in association with chronic cholecystitis. Inflammatory polyps represent around 5–10% of cases and are linked to inflammation involving gallbladder mucosa and wall. Both cholesterol and inflammatory polyps are typically smaller than 1 cm and frequently multiple. True adenomatous polyps are neoplastic, relatively uncommon, and often associated with gallstones. Adenomyomatosis, although more commonly encountered, is also considered a true lesion with potential premalignant features.[11] Several studies have demonstrated that a polyp size ≥1 cm is associated with an increased risk of adenoma, and this threshold is commonly used as an indication for cholecystectomy.[12]

The majority of gallbladder polyps are non-neoplastic lesions, which generally lack malignant potential and are often identified incidentally. Understanding characteristic features is essential to differentiate from neoplastic polyps and to avoid unnecessary surgical intervention. The main characteristics of non-neoplastic gallbladder polyps are summarized in **Table 2**.[4,5]

Neoplastic gallbladder polyps carry a potential risk of malignancy and require closer evaluation, particularly in the presence of high-risk features. Accurate identification of these lesions is crucial for determining appropriate management strategies, including consideration for cholecystectomy. The key features of neoplastic gallbladder polyps are presented in **Table 3**.[4,5]

In general, non-neoplastic gallbladder polyps are more common, are typically smaller than 10 mm, frequently occur as multiple lesions, and have slight or no malignant potential. Conversely, neoplastic polyps are usually solitary, larger in size, and carry a risk of progression to gallbladder carcinoma. From an imaging perspective, sessile morphology, rapid growth, focal gallbladder wall thickening, and larger lesion size are considered more suspicious for neoplastic disease. Histopathologically, non-neoplastic polyps are predominantly cholesterol polyps and fibromyoglandular polyps, while neoplastic lesions include adenomas and adenocarcinomas. Compared to non-neoplastic polyps, neoplastic lesions carry malignant potential and require closer evaluation as well as management.[4,5]

DIAGNOSIS

Most cases of gallbladder polyps are asymptomatic. However, some patients may present with right upper quadrant abdominal pain, food intolerance, bloating, nausea, a positive Murphy sign, and tenderness on palpation of the right upper abdomen. The intensity of right upper quadrant pain may increase with larger adenomatous lesions, and in certain cases, a palpable mass may be detected.[11]

ULTRASOUND (US)

Abdominal US is the primary modality for both diagnosis and follow-up of gallbladder polyps.[1] The examination is typically performed in the supine position, with or without additional decubitus positioning. Characteristic results include a hyperechoic lesion projecting into gallbladder lumen, without posterior acoustic shadowing, and remaining fixed despite changes in patient position.[4] Differentiating benign from malignant polyps using US alone can be challenging, and lesions are generally detectable when the size exceeds 5 mm.[13] Small gallstones or biliary sludge (<5 mm) may occasionally mimic polyps on imaging.[4]

Diagnostic pitfalls should be considered when interpreting gallbladder polyps on US. Small gallstones and biliary sludge occasionally mimic polypoid lesions, particularly when the size is less than 5 mm. In contrast to true polyps, gallstones are typically associated with posterior acoustic shadowing and may demonstrate mobility with changes in patient position. Adenomyomatosis can also resemble a polypoid lesion, but characteristic imaging features such as comet-tail artifacts and Rokitansky–Aschoff sinuses help establish the diagnosis. Differentiation from gallbladder carcinoma is equally important, because malignant lesions often present as solitary sessile masses larger than 10 mm, with a broad base and associated focal gallbladder wall thickening. Awareness of these potential diagnostic drawbacks may improve diagnostic accuracy and facilitate appropriate clinical management.[4,14]

Contrast-enhanced ultrasound (CEUS) enables real-time assessment of microvascular perfusion and may improve the characterization of gallbladder polyps. Several studies have demonstrated that malignant lesions tend to show rapid arterial enhancement followed by early washout, often accompanied by disruption of gallbladder wall. In a prospective study involving 180 patients with gallbladder polypoid lesions ≥1 cm, CEUS achieved an overall diagnostic accuracy of 92.2% for differentiating benign and malignant lesions. Therefore, CEUS may serve as a useful adjunctive tool in selected patients with indeterminate results on conventional US.[15]

Endoscopic ultrasound (EUS) has a reported sensitivity of 91.7% and specificity of 87.7% for diagnosing carcinoma.[4] Furthermore, contrast-enhanced harmonic EUS (CEH-EUS) can aid in distinguishing adenomas from cholesterol polyps, with a sensitivity of 75% and specificity of 66.6%.[16,17] The presence of an irregular vascular pattern further improves diagnostic performance, increasing sensitivity and specificity to 90.3% and 96.6%, respectively.[17]

OTHER MODALITIES

Other imaging modalities, including computed tomography (CT), fluorine-18 fluorodeoxyglucose (^{18}F-FDG) PET-CT, and magnetic resonance imaging (MRI), are generally used to improve diagnostic accuracy in cases suspected of gallbladder malignancy or for cancer staging. Computed tomography has relatively low sensitivity for detecting small polyps and is more commonly used in the preoperative evaluation of suspected gallbladder cancer.[4] However, it is not reliable for distinguishing between true and pseudopolyps, unsuitable for long-term surveillance, and does not offer superiority over US.[14]

The literature on gallbladder polyp detection using CT or MRI remains limited. Polyps are more possibly identified on non-contrast CT when the size exceeds 15 mm, shows a sessile morphology, and raises suspicion for malignancy. Only about 45% of polyps larger than 5 mm are detected on non-contrast CT. However, detection rates may approach 100% with the use of contrast enhancement.[18]

Artificial Intelligence (AI)-assisted ultrasonographic analysis has recently become a promising adjunctive tool for differentiating neoplastic from non-neoplastic gallbladder polyps. Deep learning and machine learning models have demonstrated encouraging diagnostic performance and may improve diagnostic consistency by reducing interobserver variability. However, current evidence is largely derived from retrospective studies, and prospective multicenter validation is still required before AI can be incorporated into routine clinical practice.[19]

Radiomics has become a promising adjunctive technique for gallbladder polyp assessment by extracting quantitative imaging features beyond visual interpretation. Recent CEUS-based radiomic models have demonstrated encouraging diagnostic performance for differentiating neoplastic from non-neoplastic gallbladder polyps, with AUC values approaching 0.9. However, further prospective multicenter validation is required before routine clinical implementation.[20]

TREATMENT

A systematic review reported that polyps measuring <10 mm may still harbor malignant potential. However, the available data are limited, and a definitive association between small polyp size and malignancy cannot be established. Most malignant cases are observed in polyps >10 mm.[21] An observational study further suggested that a 10 mm threshold alone may not be sufficient as an indication for cholecystectomy, because only approximately 56.4% of the cases were found to be neoplastic.[3]

Although a 10-mm threshold remains the most widely accepted indication for cholecystectomy, its appropriateness remains controversial because many polyps meeting this criterion are ultimately benign, raising concerns regarding overtreatment.[1,18] Aggressive management strategies may expose patients to unnecessary cholecystectomy despite the relatively low incidence of malignancy.[18] Management of 6–9 mm polyps remains challenging because European guidelines recommend cholecystectomy when additional risk factors are present, while Society of Radiologists in Ultrasound (SRU) consensus places greater emphasis on morphologic risk stratification and generally adopts a more conservative surveillance strategy.

These differences underscore persistent uncertainty regarding the optimal balance between early cancer detection and avoidance of unnecessary surgery.[1,18] **Table 4** shows the comparison of the available recommendations, particularly the principal differences among the European Society of Gastrointestinal and Abdominal Radiology (ESGAR), European Association for Endoscopic Surgery and other

Table 4. Comparison of Guideline Recommendations for the Management of Gallbladder Polyps

Guidelines	Cut-off size	Follow-up	Indication for surgery
European joint guideline: ESGAR / EAES / EFISDS / ESGE[1]	• ≥10 mm is the main threshold for cholecystectomy. • Polyps 6–9 mm require risk-factor assessment	• 6–9 mm without risk factors or ≤5 mm with risk factors: Follow-up US at 6 months, 1 year, and 2 years. Discontinued after 2 years in the absence of growth • ≤ 5 mm without risk factors: follow-up not required *Risk Factors: Age > 60 years, History of PSC, Asian ethnicity, Sessile polypoid lesion (including focal gallbladder wall thickening > 4mm)*	Cholecystectomy is recommended for polyps ≥10 mm; polyps 6–9 mm with ≥1 risk factor; symptomatic polyps when no alternative cause is found; or when follow-up shows growth to 10 mm. *Cholecystectomy is recommended, provided the patient is fit and accepts surgery.*
EASL guideline[12]	• ≥10 mm is the main threshold. • Polyps 6–10 mm may warrant surgery when associated with gallstones or growth.	• No detailed surveillance schedule is provided. • Cholecystectomy is not indicated for asymptomatic patients with gallstones and polyps ≤5 mm.	• Polyps ≥10 mm with or without gallstones, regardless of symptoms; • Asymptomatic gallstones with polyps 6–10 mm; • Growing polyps; • PSC with gallbladder polyps irrespective of size
SRU consensus guideline[18]	Surgical consultation is recommended for both extremely low-risk and low-risk polyps measuring ≥15 mm, whereas indeterminate-risk polyps warrant surgical consultation when they measure ≥7 mm. *Extremely low-risk morphology: A pedunculated lesion with a "ball-on-the-wall" appearance or a narrow stalk.* *Low-risk morphology: A pedunculated lesion with a broad or thick stalk, or a sessile lesion.* *Indeterminate-risk morphology: Focal gallbladder wall thickening of ≥4 mm immediately adjacent to the polyp.*	• Extremely low-risk morphology – ≤9 mm require no surveillance. – 10–14 mm, US is recommended at 6, 12, and 24 months. • Low-risk morphology – ≤6 mm require no follow-up. – 7–9 mm should undergo US at 12 months. – 10–14 mm, US is recommended at 6, 12, 24, and 36 months. • Indeterminate-risk morphology – ≤6 mm should be evaluated with US at 6, 12, 24, and 36 months.	• Surgical evaluation is advised for extremely low-risk and low-risk polyps measuring ≥15 mm. Lesions measuring 10–14 mm should also be referred if they enlarge by ≥4 mm within 12 months or reach the size threshold specified for their respective risk category. • Indeterminate-risk polyps measuring ≥7 mm should likewise undergo surgical assessment.

Interventional Techniques (EAES), International Society of Digestive Surgery–European Federation (EFISDS), and European Society of Gastrointestinal Endoscopy (ESGE) guidelines, European Association for the Study of the Liver (EASL) guideline, and SRU consensus. The emphasis is on size thresholds, surveillance strategies, and indications for surgical referral or cholecystectomy.

To better refine malignant risk stratification, these predictors should be interpreted according to the relative clinical contribution rather than as isolated variables. Polyp size remains the most practical and widely adopted predictor, but it should be regarded as a threshold for clinical decision-making rather than a definitive marker of neoplasia. Primary sclerosing cholangitis represents a particularly important patient-related risk modifier because of its association with gallbladder dysplasia and carcinoma, even in small polyps. Sessile morphology and focal gallbladder wall thickening are important lesion-related imaging features that may suggest a higher probability of neoplastic disease. Age >60 years and Asian ethnicity are recognized as important patient-related risk modifiers in current European guidelines. Although these factors increase concern for malignancy, clinical relevance is best interpreted cumulatively with polyp size, sessile morphology, or focal wall thickening, PSC status, and interval growth. Therefore, management decisions should integrate polyp size, morphology, growth pattern, symptoms, patient comorbidities, and cumulative malignancy risk factors.[1,3,12,18]

Several studies proposed higher thresholds (12–15 mm), but these have not demonstrated stronger evidence. Therefore, a 10 mm cut-off remains the standard for considering cholecystectomy.[1] Surgical removal of gallbladder is recommended for individuals who have polyps ≥1 cm, with or without gallstones, provided the patient is fit for surgery and consents to the procedure.[1,12] Cholecystectomy should also be considered in symptomatic patients when no alternative cause for the symptoms is identified, assuming the individual is suitable for surgery.[1]

In patients with primary sclerosing cholangitis (PSC), there is a higher incidence of malignant lesions and intraepithelial neoplasia. Therefore, cholecystectomy is recommended even for polyps <1 cm.[12] Cholecystectomy is also advised for patients with polyps measuring 6–9 mm who possess one or more risk factors for malignancy, including age >60 years, a history of PSC, Asian ethnicity, and sessile morphology (including gallbladder wall thickening >4 mm). For those with polyps measuring 6–9 mm without risk factors, or ≤5 mm with risk factors, follow-up with ultrasonography is recommended at 6 months, 1 year, and 2 years. Surveillance should be discontinued when no growth is observed after 2 years. In cases of polyps ≤5 mm without risk factors, no follow-up is required.[1]

During follow-up, when the polyp increases in size to 10 mm, cholecystectomy is recommended. When growth of ≥2 mm is observed within the 2-year surveillance period, management should be reassessed based on the current size and the patient malignancy risk factors to determine the need for surgery. Meanwhile, when the polyp disappears during follow-up, surveillance can be discontinued.[1] The management pathway for gallbladder polyps is summarized in **Figure 1.**

When cholecystectomy is indicated, laparoscopic cholecystectomy is generally the preferred approach for gallbladder polyps without definite radiologic evidence of invasive malignancy, particularly in patients with larger, solitary, or symptomatic polyps who are fit for surgery. Open cholecystectomy or a planned oncologic surgical approach should be considered when gallbladder cancer is known or strongly suspected, available evidence of gallbladder fossa invasion, dense upper abdominal adhesions, advanced cirrhosis or liver failure, uncorrected coagulopathy, inability to tolerate general anesthesia or pneumoperitoneum, or when safe laparoscopic dissection cannot be achieved. Patients should be informed about the possibility of conversion to open surgery and the need for additional oncologic surgery when carcinoma is identified on histopathology. Intraoperatively, the critical view of safety is important, gallbladder perforation and bile spillage should be avoided, particularly when malignancy is suspected, and the specimen must be safely retrieved and submitted for histopathological examination.[22,23]

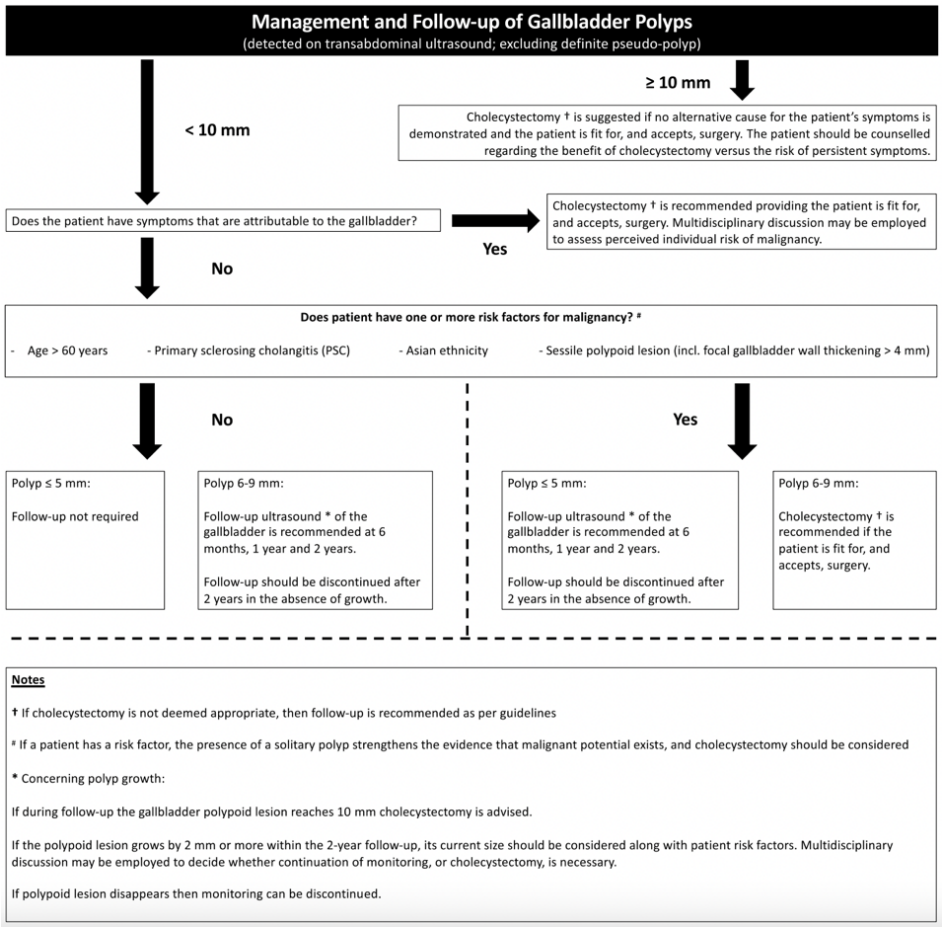

Figure 1. Management Pathway for Gallbladder Polyps[1]

Adapted from Foley et al. (2022). Management and follow-up of gallbladder polyps: updated joint guidelines between ESGAR, EAES, EFISDS and ESGE. European Radiology. Licensed under CC BY 4.0

Although current guidelines provide a practical framework for the management of gallbladder polyps, several recommendations are supported by low- to moderate-quality evidence. Most available studies are retrospective in nature and include relatively few malignant lesions, limiting the strength of the evidence used to guide clinical decision-making.[1] Consequently, important management decisions, including size thresholds for cholecystectomy and surveillance strategies, are often based on limited data rather than robust prospective studies. The variability among contemporary guidelines further indicates the need for large multicenter studies to establish more precise and individualized risk stratification strategies.[1,18]

CONCLUSION

In conclusion, gallbladder polyps are commonly detected incidentally during abdominal US and comprise a heterogeneous group of lesions ranging from benign pseudopolyps to neoplastic lesions with malignant potential. US remains the cornerstone for detection, characterization, and surveillance, while additional imaging modalities may be useful in selected cases with indeterminate results. Appropriate management relies on careful risk stratification based on polyp size, morphology, patient characteristics, and associated risk factors for malignancy. Although cholecystectomy remains the standard treatment for high-risk lesions, most gallbladder polyps are benign and can be managed conservatively with surveillance when appropriate. Therefore, clinical decision-making should aim to balance early detection and prevention of gallbladder carcinoma against the risk of unnecessary surgical intervention.

CONFLICT OF INTEREST

The authors declare no conflicts of interest related to this work.

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AUTHOR CONTRIBUTIONS

DH, BJW, LR, FG, JW, AW contributed to the conception, design, drafting of the manuscript, data acquisition, literature review, and manuscript revision. The authors approved the final version of the manuscript.

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