Gallbladder polyps

AUTHORS: Wisam F Zakko, MD, Salam F Zakko, MD, FACP, AGAF
SECTION EDITOR: Sanjiv Chopra, MD, MACP
DEPUTY EDITOR: Shilpa Grover, MD, MPH, AGAF

All topics are updated as new evidence becomes available and our peer review process is complete.

Literature review current through: **Sep 2023.**
This topic last updated: **Feb 21, 2023.**

INTRODUCTION

Gallbladder polyps are outgrowths of the gallbladder mucosal wall. They are usually found incidentally on ultrasonography or after cholecystectomy but can occasionally lead to symptoms similar to those caused by gallbladder stones. The majority of these lesions are not neoplastic but are hyperplastic or represent lipid deposits (cholesterolosis). With the widespread use of ultrasonography, polypoid lesions of the gallbladder are increasingly detected. However, imaging is insufficient to exclude the possibility of gallbladder carcinoma or premalignant adenomas. This topic will review the clinical significance and differential diagnosis of gallbladder polyps, and will provide a practical approach to their management. Gallbladder cancer is discussed in detail elsewhere. (See "Gallbladder cancer: Epidemiology, risk factors, clinical features, and diagnosis".)

EPIDEMIOLOGY AND CLASSIFICATION

Gallbladder polyps have been observed in 1.5 to 4.5 percent of gallbladders assessed by ultrasonography and up to 13.8 percent of resected gallbladders [1-3]. Gallbladder polyps have only rarely been described in children, in whom they occur either as a primary disorder or in association with other conditions, including metachromatic leukodystrophy, Peutz-Jeghers syndrome, or pancreatobiliary malunion [4]. Polypoid gallbladder lesions can be categorized as benign or malignant (table 1) [5-7]. Benign lesions have been further subdivided into neoplastic or non-neoplastic.

Benign polyps

Non-neoplastic — The most common benign non-neoplastic lesions (pseudotumors) are cholesterol polyps, followed by adenomyomas, and inflammatory polyps [1,5].

Cholesterol polyps and cholesterosis — Cholesterolosis is a benign condition characterized by the accumulation of lipids in the mucosa of the gallbladder wall [8]. It is either diffuse or polypoid type. The term cholesterolosis refers to the diffuse type, which is usually diagnosed incidentally during cholecystectomy; it is not typically diagnosed by ultrasound and not included in the differential diagnosis of gallbladder polyps. Cholesterol polyps is the polypoid form of cholesterolosis, which is the most common gallbladder polyp, typically diagnosed incidentally on ultrasonography. Although usually asymptomatic, in some patients, it can lead to symptoms and complications similar to those caused by gallstones.

- **Epidemiology** — Cholesterolosis is common; its prevalence in surgical studies varies from 9 to 26 percent [8]. A large autopsy series of 1300 cases found the prevalence to be 12 percent [9] and in 20.2 percent of a total of 2290 cholecystectomy patients who had polyps diagnosed on ultrasound [10]. Cholesterolosis in association with gallstones is by far the most common pathologic finding in the gallbladder [3]. The prevalence of cholesterolosis appears to be comparable between men and women [9].

- **Pathogenesis** — Cholesterolosis results from abnormal deposits of triglycerides, cholesterol precursors, and cholesterol esters into the gallbladder mucosa. The lipid accumulation creates yellow deposits that are generally visible to the naked eye. The appearance of the yellow deposits on a background of hyperemic mucosa led to the description of this finding as a "strawberry gallbladder" (picture 1).

  The main microscopic feature is the presence of fat laden macrophages within elongated villi. Most of the lipid in the cytoplasm of the macrophages is in the form of liquid crystals, which are birefringent under polarized light microscopy, giving the macrophages a characteristic foamy appearance (picture 2).

  The hyperplastic villus is filled and distended with these cells, creating the small yellow nodules under the epithelium. In about two-thirds of cases, these nodules are less than 1 mm in diameter, which gives the mucosa the coarse and granular appearance that is characteristic of the diffuse or planar type of cholesterolosis. The nodules in the remaining one-third of cases are larger and polypoid in appearance (polypoid form) [9].

  In the polypoid form, the deposits give rise to solitary or multiple cholesterol polyps that are attached to the underlying mucosa with a fragile epithelial pedicle, the core of which is

composed of lipid-filled macrophages. These polyps can break off, leading to complications similar to those caused by small gallstones including biliary pain, pancreatitis, and obstructive jaundice.

Inflammatory polyps — Inflammatory polyps are the least common of the non-neoplastic polyps. They appear as either sessile or pedunculated on an ultrasonographic examination and are composed of granulation and fibrous tissue with plasma cells and lymphocytes. Polyps are usually 5 to 10 mm in diameter, although inflammatory polyps larger than 1 cm have been described [11].

Adenomyomatosis — Adenomyomatosis is an abnormality of the gallbladder characterized by overgrowth of the mucosa, thickening of the muscle wall, and intramural diverticula. The prevalence of adenomyomatosis of the gallbladder is low but appears to have a higher prevalence in women than in men. In one report, for example, only 103 cases of adenomyomatosis were found in over 10,000 cholecystectomies (1 percent) [12] and in 61 patients (2.7 percent) of a total of 2290 cholecystectomy patients who had polyps diagnosed on ultrasound [10].

The abnormality can be diffuse, segmental (annular), or localized to the fundus of the gallbladder.

- Diffuse adenomyomatosis causes thickening and irregularity of the mucosal surface and the muscle coat, leading to cystic-like structures in the gallbladder wall or polypoid projections from the mucosa of the gallbladder. In the early phases, the intramural extension of the epithelium creates tubules and crypts in the lamina propria that accumulate mucous. Fluid-filled mucosal pockets eventually herniate into the wall of the gallbladder and through the muscularis propria, forming cystic structures that are visible on gross inspection as pools of bile in the gallbladder wall (Rokitansky-Aschoff sinuses). The point of herniation may appear sealed due to hypertrophy of the muscularis.

- In the segmental type, a circumferential ring divides the gallbladder into separate interconnected compartments.

- In the localized type, the cystic structure forms a nodule, usually in the fundus, that projects into the lumen, giving the appearance of a polyp on ultrasonography [13-16]. The muscle layer in the involved area is usually thickened to three to five times its usual thickness [14,15].

Neoplastic polyps

Adenomas — Adenomatous polyps of the gallbladder are the most common benign neoplastic lesions of the gallbladder [17]. Although the true incidence is unknown, in most series it is less than 0.5 percent. Adenomas of the gallbladder are benign epithelial tumors composed of cells resembling biliary tract epithelium. These lesions are classified into papillary and non-papillary types on histology [5]. A classification similar to that of intestinal polyps has been proposed, in which the adenomas are divided into tubular, papillary, and mixed [18].

The risk of cancer increases with polyp size, with adenomatous polyps ≥10 mm having a 37 to 55 percent risk of malignancy [10,19,20]. (See "Gallbladder cancer: Epidemiology, risk factors, clinical features, and diagnosis", section on 'Histology and molecular pathogenesis'.)

Other — Other benign neoplasms of the gallbladder, such as fibromas, lipomas, and leiomyomas, are rare. The natural history of these polyps is not well defined, but is probably similar to their counterparts in other regions of the gastrointestinal tract.

Malignant polyps — Most malignant gallbladder polyps are adenocarcinomas. Gallbladder adenocarcinomas are much more common than gallbladder adenomas, in contrast with the colon where adenomas are much more common than adenocarcinomas. Squamous cell carcinomas, mucinous cystadenomas, and adenoacanthomas of the gallbladder are rare.

CLINICAL FEATURES

Asymptomatic — Polyps of the gallbladder are typically incidental findings detected during radiologic imaging of the abdomen. (See "Gallbladder cancer: Epidemiology, risk factors, clinical features, and diagnosis".)

Abdominal pain — Gallbladder polyps can be associated with episodic right upper quadrant pain. Proposed mechanisms of pain include prolapse of the polyp into Hartmann's pouch, which, if it occurs during gallbladder ejection, can lead to biliary-type pain that subsides upon spontaneous reduction [21]. Another possible mechanism is that a detached portion of a polyp lying free in the gallbladder lumen can obstruct the cystic duct in much the same way a gallstone would, leading to biliary colic or cholecystitis [22]. In rare cases, the detached portion can also obstruct the common bile duct, leading to obstructive jaundice [23] and pancreatitis [24].

Cholesterolosis and adenomyomatosis have also been associated with chronic dyspeptic abdominal pain due to poor gallbladder emptying and compartmentalization [25,26]. However, given the variable success of surgery, it is unclear if these lesions are truly responsible for chronic dyspepsia.

Cancer risk — Most gallbladder polyps are benign, and most benign polyps, with the exception of adenomas, have no malignant potential. The overall risk of gallbladder cancer in patients with gallbladder polyps appears to be low. In a cohort study of 35,856 adults with gallbladder polyps on ultrasonography, 19 (0.053 percent) were diagnosed with gallbladder cancer, similar to those without polyps (316 of 586,357 [0.054 percent]) [27]. In addition, growth of gallbladder polyps was frequently noted on ultrasound, occurring in polyps <6 mm and sized 6 to <10 mm at rates of 66 and 53 percent, respectively. Despite this, gallbladder cancer rarely occurred in those with gallbladder polyps, with an overall rate of 11.3 per 100,000 person-years, but the risk varied based on polyp size, with a risk of 128.2 per 100,000 person-years for polyps larger than 10 mm and 1.3 per 100,000 person-years for polyps smaller than 6 mm.

Established risk factors

- **Large polyps (≥1 cm)** – The incidence of gallbladder cancer ranges from 43 to 77 percent in polyps larger than 1 cm [28] and 100 percent in polyps larger than 2 cm [29]. In a retrospective analysis using a nationwide network and registry of histopathology in the Netherlands, a total of 2085 out of 220,612 cholecystectomies contained a polyp (0.9 percent). Of these polyps, 56 percent were neoplastic (40 percent adenomas, 60 percent malignant). Neoplastic polyps differed from non-neoplastic polyps in size (18.1 mm versus 7.5 mm) [30]. At a threshold of ≥1 cm, the sensitivity and specificity for neoplastic polyps was 68 and 70 percent, respectively.

- **Primary sclerosing cholangitis (PSC)** – Gallbladder mass lesions/polyps exhibit a high rate of malignancy in patients with PSC. In a study of 102 patients with PSC undergoing cholecystectomy, 14 percent had mass lesions, and 57 percent of these were adenocarcinomas [31].

- **Sessile polyp (including focal gallbladder wall thickening >4 mm)** – In a systematic review of 21 studies, sessile morphology in a gallbladder polyp is an independent risk factor for malignancy and was associated with a sevenfold increase in risk for gallbladder cancer [32].

- **Indian ethnicity** – In a retrospective study that included 2359 patients in the United Kingdom, the prevalence of malignancy in those with gallbladder polyps was significantly higher among patients with an Indian ethnic background as compared with patients who did not identify as having an Indian ethnic background (5.5 versus 0.08 percent) [33]. Indian ethnicity was an independent risk factor for gallbladder cancer.

- **Age >60** – The age threshold associated with increased risk of malignant gallbladder polyps has varied between studies [34,35]. In a large systematic review, which included 12

studies and 5482 gallbladder polyps, age >60 years was associated with an increased risk for malignancy and is used in guidelines for risk stratification and guiding management [35,36].

Conditions with unclear risk

- **Concomitant gallstones** — There is conflicting evidence that the presence of concomitant gallstones is a risk factor for gallbladder cancer; if present, the associated risk is small [1,30,33,37,38]. It is also proposed that the presence of gallstones may prevent adequate evaluation of the polyp [39].

- **Adenomyomatosis** — There is no conclusive evidence that the presence of adenomyomatosis increases the risk of gallbladder cancer. If the risk is increased, the magnitude of the increased risk appears to be small (probably not more than twice the risk) [40-43].

  However, the presence of adenomyomatosis is associated with more advanced gallbladder cancer, possibly because its presence prevents early diagnosis of cancer on imaging studies. One series suggested that gallbladder cancer in patients with adenomyomatosis may be associated with more advanced cancer; in a series of 97 patients with gallbladder cancer, 25 percent were positive for adenomyomatosis, and in these patients there was an increased risk for a more advanced T stage, lymph node, and distant metastasis. The authors suggested that the presence of adenomyomatosis may prevent early detection of gallbladder cancer [44].

DIFFERENTIAL DIAGNOSIS

The differential diagnosis of gallbladder polyps are other causes of right upper quadrant pain including gallstones, acute cholecystitis, choledocholithiasis, and acute cholangitis. Choledocholithiasis can typically be differentiated from these other entities based on the patient's history, laboratory tests, and abdominal imaging. Gallbladder polyps can be differentiated from gallstones on abdominal ultrasound because they are fixed and, unlike gallstones, do not move when the patient is rolled from one side to another and do not cast a shadow (image 1).

Adenomyomatosis at the fundus of the gallbladder can produce a focal mucosal thickening of the gallbladder wall and projection that can give the appearance of a polyp on ultrasonography (image 2) [45].

DIAGNOSIS

Gallbladder polyps are usually discovered incidentally on imaging with transabdominal ultrasonography. None of the available imaging modalities can unequivocally distinguish benign from malignant polyps. This can only be achieved by histologic examination of the gallbladder after cholecystectomy.

Transabdominal ultrasound — Polyps are identified on transabdominal ultrasonography as single or multiple echogenic foci. In a meta-analysis of six studies that included 16,260 individuals, the sensitivity and specificity of transabdominal ultrasound for the detection of gallbladder polyps was 84 and 96 percent, respectively [46].

However, transabdominal ultrasound, similar to other imaging modalities, has low sensitivity in differentiating between dysplastic polyps/carcinoma and adenomas/non-neoplastic polyps. In a meta-analysis of four studies that included 1009 participants, the sensitivity for dysplastic polyps/carcinoma was 79 percent (95% CI 62 to 90 percent) and the summary specificity was 89 percent (95% CI 68 to 97 percent). The following characteristics of gallbladder polyps have been noted on ultrasound [47]:

- Cholesterol polyps are usually multiple, homogeneous, and pedunculated polypoid lesions that are more echogenic than the liver parenchyma (image 3). They may or may not contain hyperechoic spots and have a mulberry-like surface. Cholesterol polyps are usually smaller than 1 cm. In contrast to cholesterol polyps, diffuse cholesterolosis has no specific ultrasonographic finding. As a result, the diagnosis is usually made during surgery.

- Adenomas are homogeneous, are isoechoic with the liver parenchyma, have a smooth surface, and usually do not have a pedicle (image 4). Sessile polyp morphology and focal thickness of the gallbladder wall of more than 4 mm are risk factors for malignancy [32]. (See 'Cancer risk' above.)

- Adenocarcinomas are homogeneous or heterogeneous polypoid structures that are usually isoechoic with the liver parenchyma and exhibit a mulberry-like surface [47].

- Adenomyomatosis can also cause a diffuse thickening with round anechoic foci that represent the intramural diverticula. When located in the fundus, adenomyomatosis can produce a mucosal projection that can give the appearance of a polyp on ultrasonography (image 2).

Limited data suggest that contrast-enhanced ultrasound may facilitate the detection of gallbladder polyps by helping to distinguish them from mural folds, gallbladder contents, or sludge, and also to detect invasion into the liver and metastasis. Most of the studies, however, are small single-center studies. In a metanalysis of 868 patients in 10 studies, the sensitivity and specificity of contrast-enhanced ultrasound in detecting gallbladder adenomas were 85 and 87 percent, respectively. Contrast-enhanced ultrasound is not widely available and large, prospective multicenter studies are needed to assess its clinical utility [48-50]. Color Doppler appears to have higher sensitivity than conventional abdominal ultrasound in diagnosing gallbladder lesions, but cannot reliably differentiate between benign and malignant lesions due to an overlap in flow velocities, particularly with early T1 lesions [51-57]. (See "Gallbladder cancer: Epidemiology, risk factors, clinical features, and diagnosis".)

Limited role for additional imaging

- **Endoscopic ultrasound** — Endoscopic ultrasound (EUS) may be of utility in selected patients with a suspected malignant polyp who are unable or unwilling to undergo surgery. However, EUS cannot be routinely recommended in the evaluation of gallbladder polyps. Even though EUS has the advantage of imaging the gallbladder through the gastric wall, without deleterious attenuation by subcutaneous fat or interference from intestinal gas, the accuracy of EUS in differentiating neoplastic from non-neoplastic gallbladder polyps is limited [58,59]. In a meta-analysis of four studies that included 1009 participants, the sensitivity for dysplastic polyps/carcinoma was 79 percent (95% CI 62 to 90 percent) and the summary specificity was 89 percent (95% CI 68 to 97 percent) [46]. Contrast-enhanced harmonic EUS may have a modestly higher accuracy as compared with conventional EUS in differentiating between adenomatous and cholesterol polyps, but further studies are needed [60,61].

- **Computed tomography** — Abdominal computed tomography (CT) can stage gallbladder cancer by revealing liver invasion or metastasis in patients with large polyps or abnormal thickening of the gallbladder wall that is suspicious of malignancy. Otherwise, CT has low sensitivity for detecting small polyps and cholesterol polyps and is not routinely used [62,63]. Multidetector CT scan also appears to be inferior to high-resolution ultrasound and EUS in detecting malignant polyps [64]. A prospective study of 144 patients with > 1 cm sized polypoid gallbladder lesion (115 benign gallbladder polypoid lesions and 29 gallbladder cancers) evaluated diagnostic accuracy of CT with EUS and high-resolution abdominal ultrasound [64]. Diagnostic sensitivities for malignancy for high-resolution US, EUS, and CT were 90, 86, and 72 percent, respectively. However, CT biliary cystography may have higher sensitivity. In a study of 32 patients with gallbladder polyps, sensitivity

for gallbladder polyps with conventional ultrasound, CT cystoscopy, and CT with oral contrast were 94, 97, and 79 percent, respectively [65].

MANAGEMENT

Symptomatic patients — Cholecystectomy is the treatment of choice for patients who have biliary colic or complications (eg, pancreatitis). Cholesterol polyps have a fragile pedicle that can break off, leading to complications similar to those caused by small gallstones. It is also possible that small gallbladder polyps themselves are not the cause of symptoms, but they may be indicative of underlying inflammation or stone disease that may not have been detected on ultrasound. An appreciable proportion of such patients (>90 percent) will improve after cholecystectomy (algorithm 1) [23,25,26,66,67].

Patients with non-specific dyspeptic symptoms without biliary colic should be managed conservatively (unless other indications for polyp removal are present) since the pathogenesis of these symptoms is unclear and cholecystectomy may not relieve the symptoms. Such patients should be treated symptomatically, as are other patients with functional dyspepsia [26]. (See "Approach to the adult with dyspepsia".)

Asymptomatic patients with risk factors for gallbladder cancer — Optimal follow-up of patients who do not undergo cholecystectomy is unclear since there have been few studies and no controlled trials comparing cholecystectomy to observation (algorithm 1) [68].

Large polyps

- **Polyps >20 mm** — As gallbladder polyps >20 mm are usually malignant, an extended cholecystectomy with lymph node dissection and partial hepatic resection in the gallbladder bed is indicated [47]. Patients should undergo preoperative staging with a computed tomographic scan or endoscopic ultrasound. (See 'Limited role for additional imaging' above and "Gallbladder cancer: Epidemiology, risk factors, clinical features, and diagnosis".)

- **Polyps 10 to 20 mm** — Polyps 10 to 20 mm in diameter should be regarded as possibly malignant. Cancer of this size is usually at an early stage and laparoscopic cholecystectomy with full thickness dissection (removal of the entire connective tissue layers of the gallbladder bed to expose the liver surface) is recommended [47,67]. (See 'Cancer risk' above.)

Primary sclerosing cholangitis — For patients with primary sclerosing cholangitis (PSC) with cirrhosis, cholecystectomy is indicated for gallbladder polyps that are >8 mm. In patients who are unable or unwilling to undergo surgery and for patients with a gallbladder polyp ≤8 mm, we continue surveillance with an ultrasound evaluation every three to six months. In the absence of concurrent cirrhosis, we suggest cholecystectomy regardless of gallbladder polyp size. (See "Primary sclerosing cholangitis in adults: Management", section on 'Cancer screening'.)

However, guidelines differ in their recommendations for management of gallbladder polyps in patients with PSC [69,70]. The European Association for the Study of the Liver and American Association for the Study of Liver Diseases guidelines recommend cholecystectomy regardless of gallbladder polyp size [71,72]. The American College of Gastroenterology clinical guidelines suggest cholecystectomy for patients with gallbladder polyps greater than 8 mm, or based on the size and growth of the polyp [73-75]. The American Gastroenterological Association suggests that the decision to perform a cholecystectomy in PSC patients with a gallbladder polyp should be based on the size and growth of the polyp, as well as the clinical status of the patient, with the knowledge of the increased risk of gallbladder cancer in polyps greater than 8 mm [70]. These recommendations are based on the observation that cholecystectomy in patients with PSC and cirrhosis is associated with high morbidity and, while there are reports of gallbladder cancer in PSC with polyps of 6 mm in size, the majority of gallbladder cancers are in polyps greater than 8 mm [76].

Other risk factors for cancer — In patients with other risk factors for gallbladder cancer, age >60 years, Indian ethnicity, and sessile polyps with focal thickness of the gallbladder wall >4 mm, management is based on polyp size. (See 'Established risk factors' above.)

- For polyps 6 to 9 mm, we suggest cholecystectomy. For patients who are unable or unwilling to undergo cholecystectomy, we perform surveillance ultrasounds at six months and then, if stable in size, annually.

- For polyps ≤5 mm, we perform a surveillance ultrasound at six months and then, if stable in size, annually [77].

Asymptomatic patients without risk factors for gallbladder cancer — In asymptomatic patients without risk factors for gallbladder cancer, surveillance recommendations vary by polyp size (algorithm 1).

Polyps 6 to 9 mm — We suggest that asymptomatic patients with a gallbladder polyp 6 to 9 mm undergo an ultrasound every six months for a year and, if stable in size, then annually. The most reassuring finding is the stability of a polyp on repeated follow-up examinations, though there is no consensus regarding the frequency of follow-up ultrasounds. Our recommendations

are largely consistent with the European Society of Gastrointestinal Endoscopy and the updated joint European guidelines [36,77]. The American Society for Gastrointestinal Endoscopy suggests that patients undergo annual ultrasounds every 12 months [67]. The need for follow-up was demonstrated in a study of 1027 patients with gallbladder polyps who were followed for more than one year [38]. An increase in polyp size was noted in 36 patients (3.5 percent), of which nine (0.8 percent) were neoplastic (defined as either malignant or premalignant). Of those nine polyps, six were less than 10 mm in size prior to the start of follow-up. However, data are conflicting and other prospective studies have demonstrated that growth is part of the natural history of gallbladder polyps and despite this the risk of gallbladder cancer remains low [27]. (See 'Cancer risk' above.)

Polyps ≤5 mm — Polyps ≤5 mm are usually benign and most frequently represent cholesterol polyps. The updated joint European guidelines do not recommend follow up of polyps less than 5 mm without risk factors for malignancy [36]. However, there are multiple studies that showed neoplastic polyps that are smaller than 6 mm and reports of such polyps that evolved into malignancy over time [27,32,35,69]. Given these concerns, we perform repeat ultrasounds at least once in 12 months. Medical management aimed at increasing the solubility of cholesterol in bile by administering ursodeoxycholic acid is without benefit in patients with cholesterolosis [78].

Adenomyomatosis — Patients with typical features of adenomyomatosis on ultrasound do not require surveillance or cholecystectomy. (See 'Adenomyomatosis' above.)

Important considerations in patients undergoing surveillance

Increase in polyp size — An increase in size of >2 mm on imaging is likely to represent a clinically relevant increase in size and should prompt referral to a surgeon for cholecystectomy (algorithm 1).

Duration of surveillance — The duration of surveillance in patients with gallbladder cancer is unclear. The updated joint European guidelines recommend to discontinue surveillance in two years [36]. We continue to recommend surveillance for five years in patients with gallbladder polyps and discontinue surveillance if polyps remain stable in size [79]. However, in patients with risk factors for gallbladder cancer, we continue surveillance for gallbladder cancer with transabdominal ultrasounds indefinitely.

If during follow-up gallbladder polyp disappears, follow-up surveillance can be discontinued.

SOCIETY GUIDELINE LINKS

Links to society and government-sponsored guidelines from selected countries and regions around the world are provided separately. (See "Society guideline links: Cholecystitis and other gallbladder disorders".)

SUMMARY AND RECOMMENDATIONS

- **Epidemiology and classification of polypoid gallbladder lesions** – Polypoid lesions in the gallbladder can be categorized as benign or malignant (table 1). Benign lesions are further subdivided into neoplastic (adenomas, leiomyomas, lipomas) or non-neoplastic (cholesterol polyps, inflammatory polyps).

  The majority of gallbladder polyps are not neoplastic but are hyperplastic or represent lipid deposits. The most common benign non-neoplastic gallbladder polyps are cholesterol polyps, followed by adenomyomas, and inflammatory polyps. Adenomatous polyps of the gallbladder are the most common benign neoplastic lesions of the gallbladder. Most malignant gallbladder polyps are adenocarcinomas. (See 'Epidemiology and classification' above.)

- **Clinical presentation** – Gallbladder polyps are usually found incidentally on ultrasonography or after cholecystectomy but can occasionally lead to symptoms similar to those caused by gallbladder stones. Gallbladder polyps can be associated with episodic right upper quadrant pain. (See 'Clinical features' above.)

- **Cancer risk** – Most gallbladder polyps are benign, and most benign polyps, with the exception of adenomas, have no malignant potential. The overall risk of gallbladder cancer in patients with gallbladder polyps is low (11.3 per 100,000 person-years). Risk factors for gallbladder cancer include age >60 years, sessile polyps, size >1 cm, presence of primary sclerosing cholangitis, and Indian ethnicity. It is unclear if presence of adenomyomatosis increases the risk of gallbladder cancer. If the risk is increased, the magnitude of the increased risk appears to be small. (See 'Cancer risk' above and 'Established risk factors' above.)

- **Diagnosis** – The primary diagnostic modality for gallbladder polyps should be with transabdominal ultrasound. However, none of the available imaging modalities can unequivocally distinguish benign from malignant polyps. This can only be achieved by histologic examination of the gallbladder after cholecystectomy. (See 'Diagnosis' above.)

- **Management**

- **Symptomatic patients** – Cholecystectomy is the treatment of choice for patients who have biliary colic or complications (eg, pancreatitis). (See 'Symptomatic patients' above.)

- **Asymptomatic patients** – In asymptomatic patients, the decision to undergo cholecystectomy rather than surveillance imaging with transabdominal ultrasound is based on the presence of risk factors for gallbladder cancer and the size of the polyp. Indications for cholecystectomy include polypoid lesions of the gallbladder measuring 10 mm or more; polyps 6 to 9 mm and additional risk factors for gallbladder cancer (age >60, Indian ethnicity, or sessile polyp including focal wall thickness >4 mm); and an increase in polyp size >2 mm in patients undergoing surveillance. (See 'Management' above.)

- **Patients with primary sclerosing cholangitis** – For patients with primary sclerosing cholangitis, the decision to undergo cholecystectomy is based on the presence of cirrhosis and polyp size. (See 'Primary sclerosing cholangitis' above.)

REFERENCES

1. Yang HL, Sun YG, Wang Z. Polypoid lesions of the gallbladder: diagnosis and indications for surgery. Br J Surg 1992; 79:227.
2. Heyder N, Günter E, Giedl J, et al. [Polypoid lesions of the gallbladder]. Dtsch Med Wochenschr 1990; 115:243.
3. Jørgensen T, Jensen KH. Polyps in the gallbladder. A prevalence study. Scand J Gastroenterol 1990; 25:281.
4. Stringer MD, Ceylan H, Ward K, Wyatt JI. Gallbladder polyps in children--classification and management. J Pediatr Surg 2003; 38:1680.
5. Christensen AH, Ishak KG. Benign tumors and pseudotumors of the gallbladder. Report of 180 cases. Arch Pathol 1970; 90:423.
6. Weedon D. Benign mucosal polyps. In: Pathology of the gallbladder, Mason, New York 198 4. p.195.
7. Laitio M. Histogenesis of epithelial neoplasms of human gallbladder II. Classification of carcinoma on the basis of morphological features. Pathol Res Pract 1983; 178:57.
8. SALMENKIVI K. CHOLESTEROSIS OF THE GALL-BLADDER. A CLINICAL STUDY BASED ON 269 CHOLECYSTECTOMIES. Acta Chir Scand Suppl 1964; 105:SUPPL 324:1.

9. FELDMAN M, FELDMAN M Jr. Cholesterosis of the gallbladder; an autopsy study of 165 cases. Gastroenterology 1954; 27:641.
10. Li Y, Tejirian T, Collins JC. Gallbladder Polyps: Real or Imagined? Am Surg 2018; 84:1670.
11. Maeyama R, Yamaguchi K, Noshiro H, et al. A large inflammatory polyp of the gallbladder masquerading as gallbladder carcinoma. J Gastroenterol 1998; 33:770.
12. Shepard VD, Walters W, Dockerty MB. Benign neoplasms of the gallbladder. Arch Surg 1942; 45:1.
13. Jutras JA, Levesque HP. Adenomyoma and adenomyomatosis of the gallbladder, radiologic and pathologic correlations. Rad Clin N Amer 1966; 4:483.
14. BEAN BC, BERENS DL, CULVER GJ. The relationship of stenosis to Rokitansky Aschoff sinuses of the gallbladder. Am J Roentgenol Radium Ther Nucl Med 1957; 77:47.
15. Maccarty WC. IV. The Pathology of the Gall-bladder and some Associated Lesions: A Study of Specimens from 365 Cholecystectomies. Ann Surg 1910; 51:651.
16. King ES, McCallum P. Cholecystitis glandularis Proliferans. Br J Surg 1931; 19:310.
17. Aldridge MC, Bismuth H. Gallbladder cancer: the polyp-cancer sequence. Br J Surg 1990; 77:363.
18. Albores-Saaverdra J, Henson DE. Tumors of the gallbladder and the extrahepatic bile duct, 1 7-25. US Armed Forces Institute of Pathology, Washington, DC 1989.
19. Kozuka S, Tsubone N, Yasui A, Hachisuka K. Relation of adenoma to carcinoma in the gallbladder. Cancer 1982; 50:2226.
20. Farinon AM, Pacella A, Cetta F, Sianesi M. "Adenomatous polyps of the gallbladder" adenomas of the gallbladder. HPB Surg 1991; 3:251.
21. McGregor JC, Cordiner JW. Papilloma of the gallbladder. Br J Surg 1974; 61:356.
22. KANE CF, BROWN CH, HOERR SO. Papilloma of the gallbladder; report of eight cases. Am J Surg 1952; 83:161.
23. Takii Y, Shirai Y, Kanehara H, Hatakeyama K. Obstructive jaundice caused by a cholesterol polyp of the gallbladder: report of a case. Surg Today 1994; 24:1104.
24. Parrilla Paricio P, García Olmo D, Pellicer Franco E, et al. Gallbladder cholesterolosis: an aetiological factor in acute pancreatitis of uncertain origin. Br J Surg 1990; 77:735.
25. MITTY WF Jr, ROUSSELOT LM. Cholesterosis of the gall bladder. Gastroenterology 1957; 32:910.
26. Kmiot WA, Perry EP, Donovan IA, et al. Cholesterolosis in patients with chronic acalculous biliary pain. Br J Surg 1994; 81:112.

27. Szpakowski JL, Tucker LY. Outcomes of Gallbladder Polyps and Their Association With Gallbladder Cancer in a 20-Year Cohort. JAMA Netw Open 2020; 3:e205143.
28. Koga A, Watanabe K, Fukuyama T, et al. Diagnosis and operative indications for polypoid lesions of the gallbladder. Arch Surg 1988; 123:26.
29. Ishikawa O, Ohhigashi H, Imaoka S, et al. The difference in malignancy between pedunculated and sessile polypoid lesions of the gallbladder. Am J Gastroenterol 1989; 84:1386.
30. Wennmacker SZ, van Dijk AH, Raessens JHJ, et al. Polyp size of 1 cm is insufficient to discriminate neoplastic and non-neoplastic gallbladder polyps. Surg Endosc 2019; 33:1564.
31. Buckles DC, Lindor KD, Larusso NF, et al. In primary sclerosing cholangitis, gallbladder polyps are frequently malignant. Am J Gastroenterol 2002; 97:1138.
32. Bhatt NR, Gillis A, Smoothey CO, et al. Evidence based management of polyps of the gall bladder: A systematic review of the risk factors of malignancy. Surgeon 2016; 14:278.
33. Aldouri AQ, Malik HZ, Waytt J, et al. The risk of gallbladder cancer from polyps in a large multiethnic series. Eur J Surg Oncol 2009; 35:48.
34. Sarkut P, Kilicturgay S, Ozer A, et al. Gallbladder polyps: factors affecting surgical decision. World J Gastroenterol 2013; 19:4526.
35. Elmasry M, Lindop D, Dunne DF, et al. The risk of malignancy in ultrasound detected gallbladder polyps: A systematic review. Int J Surg 2016; 33 Pt A:28.
36. 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; 32:3358.
37. Terzi C, Sökmen S, Seçkin S, et al. Polypoid lesions of the gallbladder: report of 100 cases with special reference to operative indications. Surgery 2000; 127:622.
38. Park JY, Hong SP, Kim YJ, et al. Long-term follow up of gallbladder polyps. J Gastroenterol Hepatol 2009; 24:219.
39. Andrén-Sandberg A. Diagnosis and management of gallbladder polyps. N Am J Med Sci 2012; 4:203.
40. Ootani T, Shirai Y, Tsukada K, Muto T. Relationship between gallbladder carcinoma and the segmental type of adenomyomatosis of the gallbladder. Cancer 1992; 69:2647.
41. Nabatame N, Shirai Y, Nishimura A, et al. High risk of gallbladder carcinoma in elderly patients with segmental adenomyomatosis of the gallbladder. J Exp Clin Cancer Res 2004; 23:593.

42. Kim JH, Jeong IH, Han JH, et al. Clinical/pathological analysis of gallbladder adenomyomatosis; type and pathogenesis. Hepatogastroenterology 2010; 57:420.
43. Kasahara Y, Sonobe N, Tomiyoshi H, et al. Adenomyomatosis of the gallbladder: a clinical survey of 30 surgically treated patients. Nihon Geka Hokan 1992; 61:190.
44. Kai K, Ide T, Masuda M, et al. Clinicopathologic features of advanced gallbladder cancer associated with adenomyomatosis. Virchows Arch 2011; 459:573.
45. Berk RN, van der Vegt JH, Lichtenstein JE. The hyperplastic cholecystoses: cholesterolosis and adenomyomatosis. Radiology 1983; 146:593.
46. Wennmacker SZ, Lamberts MP, Di Martino M, et al. Transabdominal ultrasound and endoscopic ultrasound for diagnosis of gallbladder polyps. Cochrane Database Syst Rev 2018; 8:CD012233.
47. Kubota K, Bandai Y, Noie T, et al. How should polypoid lesions of the gallbladder be treated in the era of laparoscopic cholecystectomy? Surgery 1995; 117:481.
48. Meacock LM, Sellars ME, Sidhu PS. Evaluation of gallbladder and biliary duct disease using microbubble contrast-enhanced ultrasound. Br J Radiol 2010; 83:615.
49. Tsuji S, Sofuni A, Moriyasu F, et al. Contrast-enhanced ultrasonography in the diagnosis of gallbladder disease. Hepatogastroenterology 2012; 59:336.
50. Behzadmehr R, Salarzaei M. Is contrast enhanced ultrasonography an accurate way to diagnose gallbladder adenoma? A systematic review and meta-analysis. J Med Imaging Radiat Sci 2021; 52:127.
51. Li D, Dong BW, Wu YL, Yan K. Image-directed and color Doppler studies of gallbladder tumors. J Clin Ultrasound 1994; 22:551.
52. Hirooka Y, Naitoh Y, Goto H, et al. Differential diagnosis of gall-bladder masses using colour Doppler ultrasonography. J Gastroenterol Hepatol 1996; 11:840.
53. Li D. [Color Doppler flow imaging in gallbladder tumors]. Zhonghua Yi Xue Za Zhi 1992; 72:394.
54. Pradhan S, Shukla VK, Agrawal S, et al. Sonographic and colour doppler morphology in carcinoma gallbladder. Indian J Cancer 2002; 39:143.
55. Sato M, Ishida H, Konno K, et al. Localized gallbladder carcinoma: sonographic findings. Abdom Imaging 2001; 26:619.
56. Komatsuda T, Ishida H, Konno K, et al. Gallbladder carcinoma: color Doppler sonography. Abdom Imaging 2000; 25:194.
57. Hayakawa S, Goto H, Hirooka Y, et al. Colour Doppler-guided spectral analysis of gall-

bladder wall flow. J Gastroenterol Hepatol 1998; 13:181.

58. Sugiyama M, Xie XY, Atomi Y, Saito M. Differential diagnosis of small polypoid lesions of the gallbladder: the value of endoscopic ultrasonography. Ann Surg 1999; 229:498.
59. Sugiyama M, Atomi Y, Yamato T. Endoscopic ultrasonography for differential diagnosis of polypoid gall bladder lesions: analysis in surgical and follow up series. Gut 2000; 46:250.
60. Park CH, Chung MJ, Oh TG, et al. Differential diagnosis between gallbladder adenomas and cholesterol polyps on contrast-enhanced harmonic endoscopic ultrasonography. Surg Endosc 2013; 27:1414.
61. Choi JH, Seo DW, Choi JH, et al. Utility of contrast-enhanced harmonic EUS in the diagnosis of malignant gallbladder polyps (with videos). Gastrointest Endosc 2013; 78:484.
62. Furukawa H, Takayasu K, Mukai K, et al. CT evaluation of small polypoid lesions of the gallbladder. Hepatogastroenterology 1995; 42:800.
63. Choi JH, Yun JW, Kim YS, et al. Pre-operative predictive factors for gallbladder cholesterol polyps using conventional diagnostic imaging. World J Gastroenterol 2008; 14:6831.
64. Jang JY, Kim SW, Lee SE, et al. Differential diagnostic and staging accuracies of high resolution ultrasonography, endoscopic ultrasonography, and multidetector computed tomography for gallbladder polypoid lesions and gallbladder cancer. Ann Surg 2009; 250:943.
65. Lou MW, Hu WD, Fan Y, et al. CT biliary cystoscopy of gallbladder polyps. World J Gastroenterol 2004; 10:1204.
66. Jones-Monahan KS, Gruenberg JC, Finger JE, Tong GK. Isolated small gallbladder polyps: an indication for cholecystectomy in symptomatic patients. Am Surg 2000; 66:716.
67. American Society for Gastrointestinal Endoscopy (ASGE) Standards of Practice Committee, Anderson MA, Appalaneni V, et al. The role of endoscopy in the evaluation and treatment of patients with biliary neoplasia. Gastrointest Endosc 2013; 77:167.
68. Gurusamy KS, Abu-Amara M, Farouk M, Davidson BR. Cholecystectomy for gallbladder polyp. Cochrane Database Syst Rev 2009; :CD007052.
69. Lu D, Radin R, Yung E, Tchelepi H. Malignant transformation of a 5-mm gallbladder polyp over 2 years: a case report and review of current literature. Ultrasound Q 2015; 31:66.
70. Bowlus CL, Lim JK, Lindor KD. AGA Clinical Practice Update on Surveillance for Hepatobiliary Cancers in Patients With Primary Sclerosing Cholangitis: Expert Review. Clin Gastroenterol Hepatol 2019; 17:2416.
71. Chapman R, Fevery J, Kalloo A, et al. Diagnosis and management of primary sclerosing cholangitis. Hepatology 2010; 51:660.

72. European Association for the Study of the Liver. EASL Clinical Practice Guidelines: management of cholestatic liver diseases. J Hepatol 2009; 51:237.
73. Eaton JE, Thackeray EW, Lindor KD. Likelihood of malignancy in gallbladder polyps and outcomes following cholecystectomy in primary sclerosing cholangitis. Am J Gastroenterol 2012; 107:431.
74. Razumilava N, Gores GJ, Lindor KD. Cancer surveillance in patients with primary sclerosing cholangitis. Hepatology 2011; 54:1842.
75. Lindor KD, Kowdley KV, Harrison ME, American College of Gastroenterology. ACG Clinical Guideline: Primary Sclerosing Cholangitis. Am J Gastroenterol 2015; 110:646.
76. Schramm C, Lohse AW. Gallbladder polyps in primary sclerosing cholangitis: indication for early intervention. Hepatology 2012; 56:396; author reply 396.
77. 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; 27:3856.
78. Yamamoto T. [A study of cholesterol gallstone formation in cases of cholesterolosis of the gallbladder (author's transl)]. Nihon Shokakibyo Gakkai Zasshi 1979; 76:91.
79. Wiles R, Varadpande M, Muly S, Webb J. Growth rate and malignant potential of small gallbladder polyps--systematic review of evidence. Surgeon 2014; 12:221.

Topic 646 Version 25.0

GRAPHICS

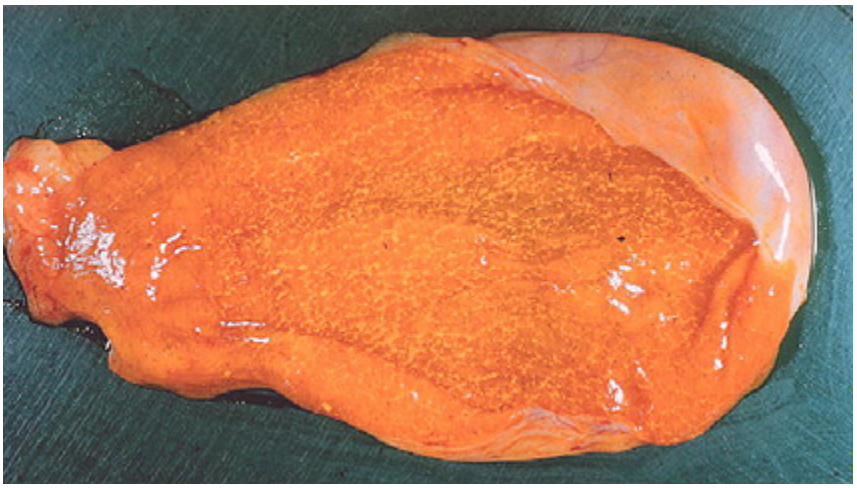
Relative frequency of the different pathologic types of gallbladder polyps

Type	Frequency
Benign polyps	
Cholesterol polyps	60%
Adenomyomas	25%
Inflammatory polyps	10%
Adenomas	4%
Miscellaneous:	1%
Leiomyomas	
Fibromas	
Lipomas, etc	
Malignant polyps	
Adenocarcinoma	80%
Miscellaneous:	20%
Mucinous cystadenomas	
Squamous cell carcinoma	
Adenoacanthomas	

Data from: Weedon, D. Benign mucosal polyps. In pathology of the gallbladder, Mason, New York 1984. p.195. and Laitio, M, Pathol Res Pract 1983; 178:57.

Graphic 56347 Version 2.0

Gallbladder cholesterolosis (strawberry gallbladder)

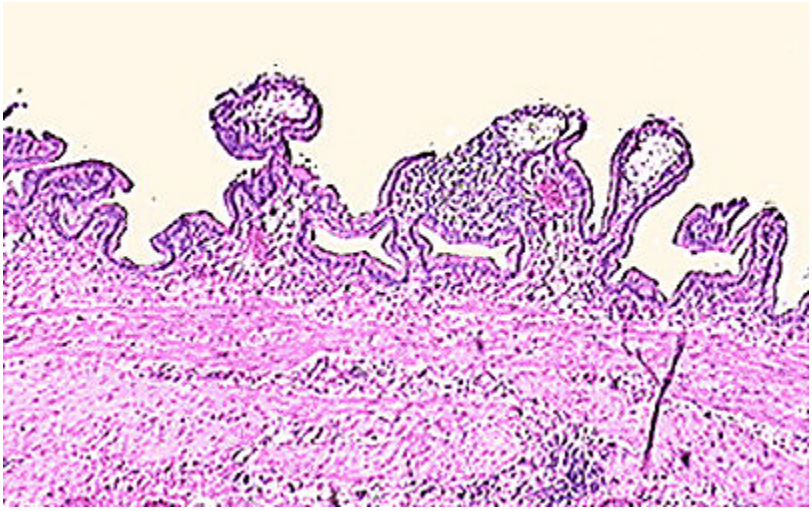


Surgical specimen from a patient with gallbladder cholesterolosis. The lipid accumulation on a background of hyperemic mucosa gives it the appearance of a strawberry.

Courtesy of Salam F Zakko, MD, FACP.

Graphic 54904 Version 2.0

Gallbladder cholesterolosis

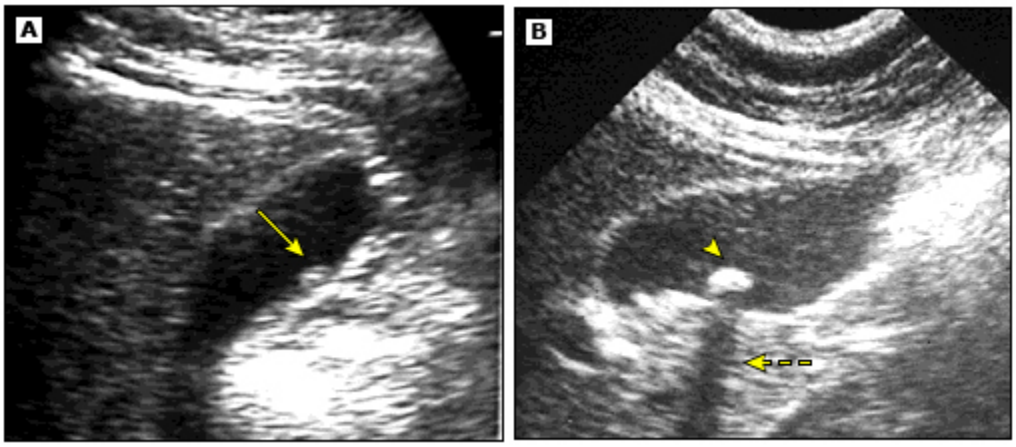


Microscopic appearance of the gallbladder wall from a specimen demonstrating cholesterolosis. The villi are elongated and contain lipid-laden macrophages.

Courtesy of Salam F Zakko, MD, FACP.

Graphic 60481 Version 2.0

Gallbladder polyp versus gallstone on ultrasound

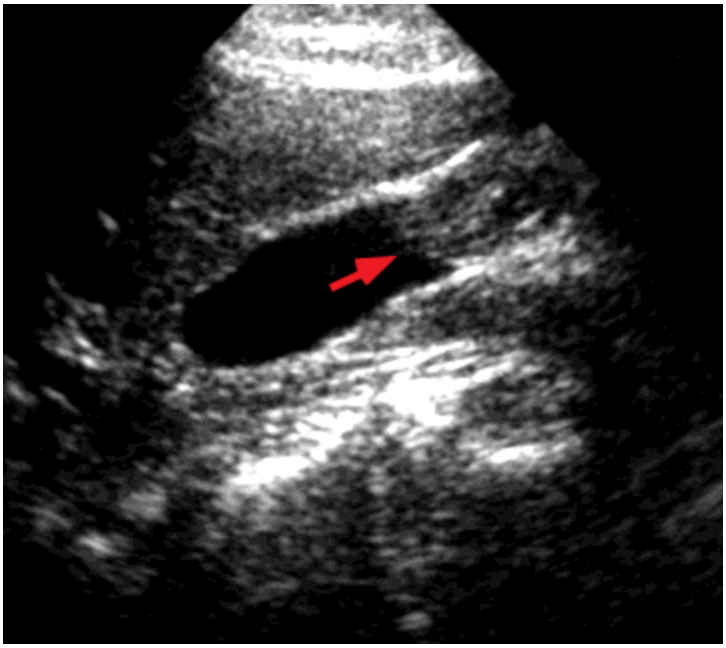


Ultrasound images of a gallbladder adenomatous polyp (arrow) compared with a gallstone (arrowhead). Note the shadow cast by the stone (dashed arrow) compared with the absence of a shadow behind the polyp.

Courtesy of Salam F Zakko, MD, FACP.

Graphic 70175 Version 4.0

Gallbladder adenomyomatosis

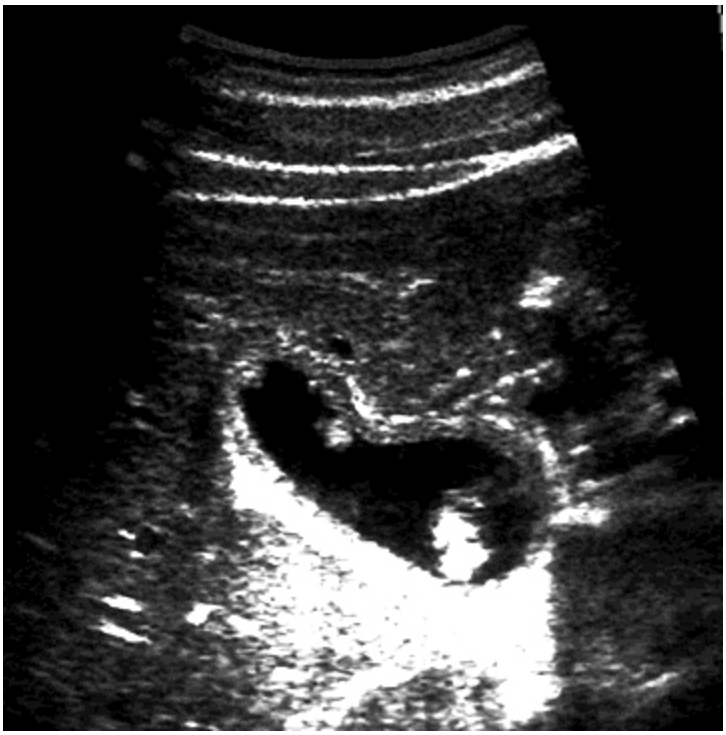


Ultrasound image of localized adenomyomatosis in the gallbladder fundus (arrow) producing a polypoid appearance.

Courtesy of Salam F Zakko, MD, FACP.

Graphic 80707 Version 2.0

Cholesterolosis and multiple cholesterol gallbladder polyps

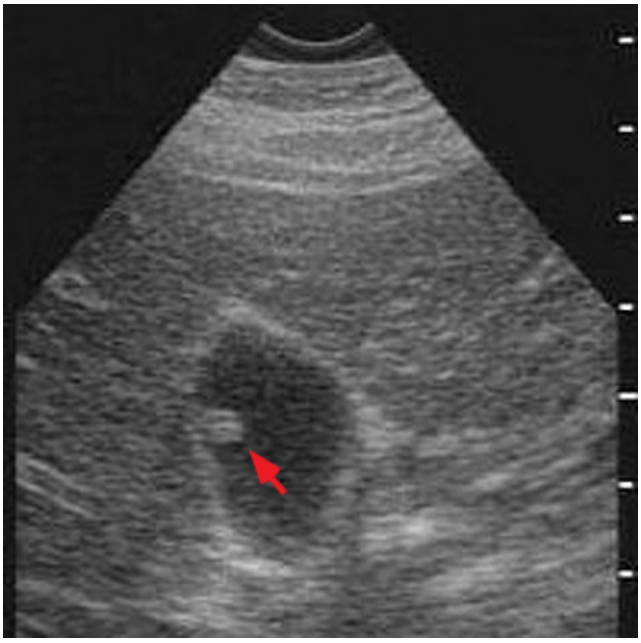


Ultrasound imaging demonstrating cholesterol polyps and thickening of the gallbladder wall. Note that the polyps appear much denser than the surrounding liver tissue.

Courtesy of Salam F Zakko, MD, FACP.

Graphic 73242 Version 2.0

Gallbladder adenomatous polyp

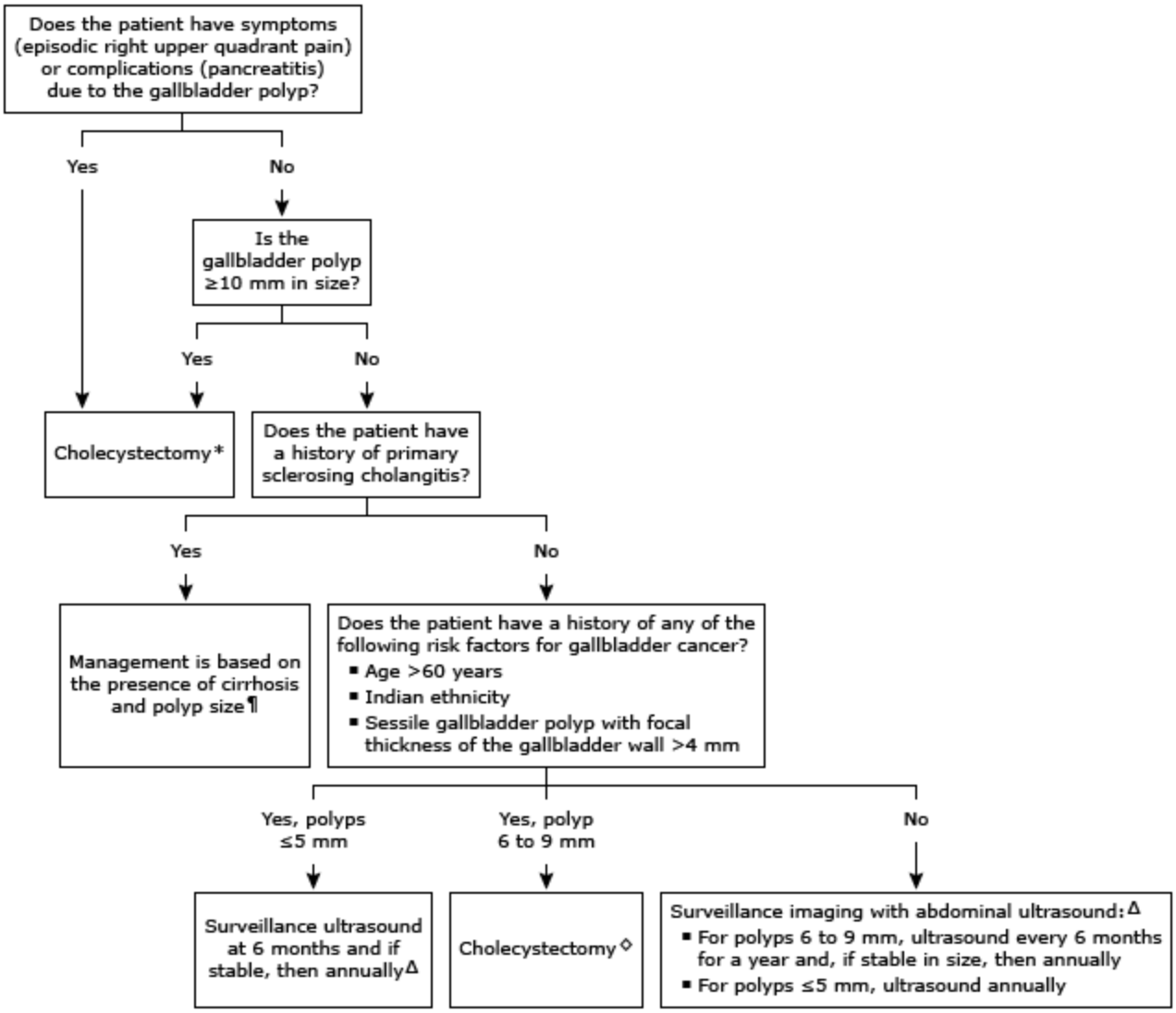


Gallbladder ultrasonography showing an adenomatous polyp. Note its homogeneous appearance and density that is similar to the surrounding liver tissue.

Courtesy of Salam F Zakko, MD, FACP.

Graphic 71629 Version 2.0

Suggested approach to the management of gallbladder polyps in adults



* Gallbladder polyps ≥10 mm have an increased risk of malignancy. For polyps ≥10 to 20 mm, laparoscopic cholecystectomy with full thickness dissection is indicated. For polyps >20 mm, an extended cholecystectomy with lymph node dissection and partial hepatic resection in the gallbladder bed is indicated.

¶ For example, cholecystectomy is indicated in patients with primary sclerosing cholangitis with gallbladder polyps >8 mm. Refer to UpToDate text for additional information related to the approach to gallbladder polyps in patients with primary sclerosing cholangitis.

Δ An increase in size of >2 mm on imaging is likely to represent a clinically relevant increase in size and should prompt referral to a surgeon for cholecystectomy.

◇ In patients who are unable or unwilling to undergo cholecystectomy, we perform a surveillance ultrasound at 6 months and then annually if stable in size.

Graphic 129109 Version 2.0

Contributor Disclosures

Wisam F Zakko, MD No relevant financial relationship(s) with ineligible companies to disclose. **Salam F Zakko, MD, FACP, AGAF** No relevant financial relationship(s) with ineligible companies to disclose. **Sanjiv Chopra, MD, MACP** No relevant financial relationship(s) with ineligible companies to disclose. **Shilpa Grover, MD, MPH, AGAF** No relevant financial relationship(s) with ineligible companies to disclose.

Contributor disclosures are reviewed for conflicts of interest by the editorial group. When found, these are addressed by vetting through a multi-level review process, and through requirements for references to be provided to support the content. Appropriately referenced content is required of all authors and must conform to UpToDate standards of evidence.

Conflict of interest policy

→