

# Gallbladder Polyps

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## Opinion statement

Most small gallbladder polyps are benign and do not change significantly over time. They are usually incidental findings on ultrasound. Therefore, these polyps should be checked periodically with routine percutaneous ultrasonography. In the asymptomatic patient, gallbladder polyps that are greater than 1 cm in diameter should be treated with cholecystectomy. The size of the polyp and the patient greater than 50 years are important risk factors for malignant potential. Patients who have biliary pain and small gallbladder polyps without gallstones present a difficult management decision for the clinician. If the physician is confident that the polyps are the source of the pain, patients should be referred for cholecystectomy. Endoscopic ultrasound and positron emission tomography may prove to be useful in assessing the malignant potential of large gallbladder polyps. Laparoscopic cholecystectomy is the treatment of choice for most gallbladder polyps. If a malignant polyp is suspected, patients should undergo an open cholecystectomy.

## Introduction

Gallbladder polyp refers to any mucosal projection into the lumen of the gallbladder. These projections may or may not be neoplastic [1]. There is no easy and direct inspection of the gallbladder, and histologic confirmation of gallbladder polyps is usually not possible. Therefore, the clinician must make decisions based on the information obtained from imperfect imaging studies [2].

Most gallbladder polyps are found incidentally at the time of cholecystectomy. The prevalence of gallbladder polyps ranges from 1% to 4% (pathologically or radiologically) [3]. Most gallbladder polyps are not true neoplasias but rather the result of inflammation or lipid deposits [1]. Nonneoplastic lesions of the gallbladder comprise approximately 95% of all gallbladder polyps. Adenomas are account for the majority of the neoplastic polyps (Table 1) [4]. Cholesterol polyp is the most common type of gallbladder polyp. These polyps result from an accumulation of lipid-laded foamy macrophages in the lamina propria and are not true neoplasms. Cholesterol polyps are usually small (< 10 mm) and attached to the mucosa by a thin, fragile stalk [4]. Inflammatory polyps account for approximately 10% of gallbladder polyps. These polyps consist of granulation tissue and fibrous tissue infiltrated by lymphocytes and plasma cells. These polyps are not neoplastic. These polyps range in size from

5 to 10 mm. These polyps are usually incidental findings at the time of cholecystectomy [4].

Adenomyomatosis of the gallbladder resembles a polyp. It is not neoplastic but rather an acquired, hyperplastic lesion of the gallbladder. The epithelium proliferates and then invaginates into the thickened muscularis. These lesions tend to be larger than cholesterol and inflammatory polyps, measuring about 15 mm [4]. Adenomas are the most common neoplastic polyps of the gallbladder. The incidence of adenomas in operative specimens is only 0.15%. These polyps are usually solitary, pedunculated masses ranging from 5 to 20 mm in size. Adenomas are much less common than gallbladder carcinoma, and the frequency of progression from adenoma to adenocarcinoma is unclear. Other rare neoplastic polyps would include fibromas, leiomyoma, lipoma, neurofibromas, carcinoids, and heterotropic gastric glands. These nonadenoma neoplastic polyps represent about 1% of all gallbladder polyps [4].

The size of the gallbladder polyp is an important predictor regarding the natural history. Polyps smaller than 1 cm do not progress to malignancy [5]. Csendes *et al.* [6] evaluated 111 patients with gallbladder polyps less than 1 cm using percutaneous ultrasound; they found 84% were less than 5 mm. Of the 111 patients, 27 patients under-

**Table 1. Polypoid lesions of the gallbladder**

Nonneoplastic	Neoplastic
Cholesterol	Adenoma
Adenomyomatosis	Lipoma
Inflammatory	Leiomyoma
Heterotopia	Granular cell tumor

**Table 2. Risk factors for gallbladder polyp malignancy**

Age > 50
Size > 1 cm
Associated gallstones
Shape (sessile)
Solitary
Isoechogenicity

went cholecystectomy because of patient preference or an increase in polyp size or number of polyps in the follow-up ultrasound; no cancer was found and 70% of the resected polyps were gallbladder polyps. In the group of patients who did not undergo surgery, 50% had no change in polyp size, 26.5% had increased polyp size, and 23.5% had polyps that decreased in size over a mean period of 71 months. The authors concluded that gallbladder polyps less than 1 cm in size did not progress to malignancy or produce symptoms or complications of the biliary system.

Polyps greater than 1 cm are of greater concern, as they may have malignant potential. Yang *et al.* [7] studied 182 patients with gallbladder polyps diagnosed by ultrasound and/or pathology. Of the 182 patients studied, 159 patients had histologic benign lesions and 13 patients had malignant lesions. The authors concluded that lesions greater than 1 cm in size, number of polyps, presence of gallstone, and the age of patient were all correlated with malignant potential. Several independent studies have supported these conclusions (Table 2).

### CLINICAL MANIFESTATIONS

Most gallbladder polyps do not cause symptoms and are usually noted only as an incidental finding at the time of cholecystectomy for symptomatic gallstones. Some polyps are detected through a radiograph in patients complaining

of right upper quadrant pain with no other pathology identified. These clinical symptoms are usually attributed to the gallbladder polyp. If this is the case then the decision must be made on the appropriateness of cholecystectomy. If no other cause for "biliary pain" is found, then cholecystectomy may be warranted.

Most gallbladder polyps are diagnosed by percutaneous ultrasound. On sonography, the gallbladder polyp is fixed, lacks an acoustic shadow, and has an echogenicity similar to that of the gallbladder wall. The sensitivity of percutaneous ultrasound in detecting gallbladder polyps ranges from 36% to 90%. Some report sensitivities as high as 99% in the absence of gallstones, as gallstones may obscure the gallbladder polyps on the sonography. Percutaneous ultrasound is a superior tool compared with oral cholecystography, computed tomography, and endoscopic retrograde cholangiopancreatography. Endoscopic ultrasound (EUS) may be a helpful tool in the management of gallbladder polyps. In a surgical series from Sugiyama *et al.* [8], EUS differentiated polypoid lesions of the gallbladder more precisely than percutaneous ultrasonography (97% vs 76%).

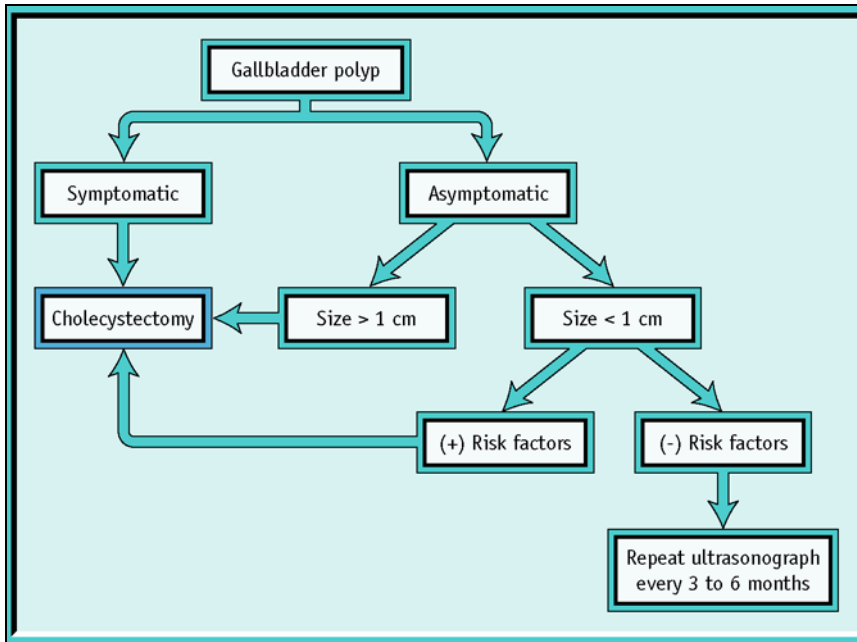
Often, it is not possible for the clinician to distinguish the nonneoplastic from neoplastic gallbladder polyp using routine ultrasonography. Solitary gallbladder polyps that are greater than 1 cm, sessile, and that increase rapidly in size on ultrasound are suggestive of malignancy. A scoring system based on EUS findings of the size, number, shape, echogenicity, and margins of the gallbladder polyp may help assess the malignant potential of gallbladder polyps and aid in appropriate surgical referral [9].

Case studies using F-deoxyglucose positron emission tomography (FDG-PET) scans preoperatively may accurately predict the presence of malignant gallbladder polyps. Koh *et al.* [10] demonstrated increased uptake in a patient with an adenocarcinoma of the gallbladder. No increased uptake was seen in the one patient with a cholesterol polyp and in another patient with adenomyomatosis. The authors suggested that FDG-PET may become an important tool in the accurate preoperative diagnosis of gallbladder carcinoma. The author could not comment on the ability of FDG-PET to differentiate between adenomas and adenocarcinomas of the gallbladder and recommended further study in this area.

## Treatment

### Surgery

- Patients who experience right upper quadrant "biliary pain" and have sonographic evidence of gallbladder polyps with gallstones should be referred for laparoscopic cholecystectomy. Patients who experience "biliary pain" with sonographic evidence of gallbladder polyps without gallstones present a management dilemma. If the clinician is convinced that the symptoms are biliary in origin and severe, then laparoscopic cholecystectomy may be warranted.



**Figure 1.** Treatment algorithm of gallbladder polyps

- In patients who are asymptomatic and have small polyps (< 10 mm), observation with follow-up ultrasound every 3 to 6 months is appropriate with the duration of follow-up unclear. Some suggest that after 2 years the interval between ultrasounds may be lengthened to every 6 to 12 months. Patients who are asymptomatic and have large polyps (> 10 mm) should be referred for laparoscopic cholecystectomy if they are good surgical candidates. If the patient is not a good surgical candidate, follow-up ultrasound should be obtained to assess change in size [11–14]. If EUS or FDG-PET is available, consider one of these modalities for further assessment of malignant potential of gallbladder polyps.
- Patients who have gallbladder polyps larger than 18 mm should be referred for surgery, as these lesions have a significant risk of malignancy. If malignancy is found in the polyp, the surgical approach of choice is conversion to an open procedure for exploration and extended resection [15]. Treatment algorithm can be seen in Figure 1.

#### *Laparoscopic cholecystectomy for symptomatic polyps*

- Standard procedure** Using laparoscopic technology, the gallbladder is removed through a small incision near the navel.
- Contraindications** At times, pregnancy or previous surgery in the upper abdomen (can cause adhesions).
- Complications** Injury to bile ducts, blood vessels, or intestines.
- Special points** 5% to 10% of cases are converted to open abdominal surgeries
- Cost effectiveness** Hospitalization days are reduced compared with open cholecystectomy.

#### *Laparoscopic cholecystectomy for asymptomatic polyp >1 cm*

- Standard procedure** Using laparoscopic technology, the gallbladder is removed through a small incision near the navel.
- Contraindications** At times, pregnancy or previous surgery in the upper abdomen (can cause adhesions).
- Complications** Injury to bile ducts, blood vessels, or intestines.
- Special points** 5% to 10% of cases are converted to open abdominal surgeries.
- Cost effectiveness** Hospitalization days are reduced compared with open cholecystectomy.

*Open cholecystectomy for asymptomatic polyps >1.8 cm*

- Standard procedure** 3 to 7 inch right subcostal incision on the abdominal wall, allowing for direct inspection, palpitation, dissection and removal of the gallbladder, and possible surrounding structures.
- Contraindications** Significant comorbidities.
- Special points** Hospitalization required for 3 to 7 days.
- Cost effectiveness** More expensive compared with laparoscopic procedure.

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