

Research Article

Development of Cancer in Gall Bladder Polyps Detected on Ultrasound in a High Risk Population

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Abstract

Objectives: Current literature regarding the assessment of changes in gall bladder polyps is minimal in Pakistan, which is known to have one of the highest risk of developing gall bladder carcinoma. The aim of this study is to determine the occurrence of cancer in incidentally detected Gall Bladder (GB) polyps identified by sonography and to propose surveillance guidelines in high risk population for gall bladder cancer.

Methods: Radiological data of all “gall bladder polyps” detected on ultrasounds done between January 2001 and February 2015 was taken at a tertiary care institution and it was evaluated to see changes in the size of GB polyps. Pathologic and clinical follow-up was reviewed from the medical record files.

Results: GB polyps from 155 patients (Age range, 18–92 years) were included. US follow-up was performed with minimum follow-up duration of 2 years. The polyps ranged in size from 2-19 mm (mean size, 4 mm). Polyp size remained unchanged in 65 (42 %) polyps, decreased in 25 (16 %), increased in 12 (7 %) and resolved in 53 (34%). None of the polyps ranging in size from 1-6 mm turned out to be neoplastic. One polyp of 7 mm showed increase in size and progressed to carcinoma.

Conclusion: The risk of malignancy of gall bladder resulting from incidentally detected polyps is very low. Hence, gall bladder polyps measuring upto 6 mm require no additional follow-up. Follow up may be indicated for polyps that are greater than or equal to 7 mm in size.

Keywords: Gall bladder cancer, gall bladder polyps, ultrasonography

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Incidental detection of Gallbladder (GB) polyps on ultrasound is approximately 4%-7%.^[1] Pakistan falls in the region with the highest incidence of Gall bladder carcinoma.^[2] As the use and dependence of imaging increases, the frequency of these incidental occurrences and their management remains a clinical dilemma. Majority of these lesions are non neoplastic and represent cholesterol or inflammatory polyps. Also, some of these lesions turn out to be gall stones after cholecystectomy. However, rarely these lesions may prove to be neoplastic and this increases the physicians' concern regarding their transformation to an adenocarcinoma. The chance of malignancy is greater in polyps of size 10 mm or more.^[3] Other causes of concern include

single polyps, sessile polyps and polyps showing adjacent wall thickening or infiltration and with advancing patient age.^[4-6] Of these, size greater or equal to 10 mm is the most important predictor of malignancy.^[5-7] However, majority of the polyps detected incidentally are less than 10 mm in diameter. In addition, other features of these polyps such as adjacent wall thickening or sessile morphology are difficult to characterize accurately due to their small size.

Management of gall bladder polyps according to the current guidelines recommend cholecystectomy for polyps that are greater or equal to 10 mm and for patients having a polyp of 6-9 mm with risk factors for gallbladder malignancy. If the patient has no risk factors for gallbladder malignancy and

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a polyp of 6-9 mm or gallbladder polyp ≤ 5 mm, follow-up ultrasonography (US) of the gallbladder is recommended.^[8]

Current literature regarding the assessment of changes in incidentally detected gall bladder polyps is minimal in our region, which is known to have one of the highest risk of developing gall bladder carcinoma. In our study we determined the course of sonographically detected incidental polyps in gall bladder and on the basis of their size, suggested appropriate management guidelines for these lesions in high risk population.

Methods

This retrospective study was conducted after approval from the institutional review board. Requirement of informed consent was waived. Patients having gall bladder polyps were identified by using our departmental reporting search engine with the key word "Gall bladder polyp" for all ultrasounds of the abdomen performed from January 2001 to February 2015.

Only patients who had follow-up imaging available within the local PACS archive were included. Patients without an US follow-up of at least two years, clinical follow-up of at least 5 years, or a pathology report were excluded from the study.

A list of 1226 patients was generated by the local Radiology Report Search Engine. Then, 155 patients following the inclusion criteria were shortlisted and their ultrasound reports and images were reviewed. The images were reviewed on Picture Archiving and Communication System (Rogan Delft). The number of polyps, their size, and any additional pathologies were documented. Polyps were characterized based on their appearances on ultrasound. They were labeled as immobile, non-shadowing, hyperechoic to bile, and attached to the GB wall. When more than one polyp was identified, the diameter of the largest was recorded (Fig. 1).

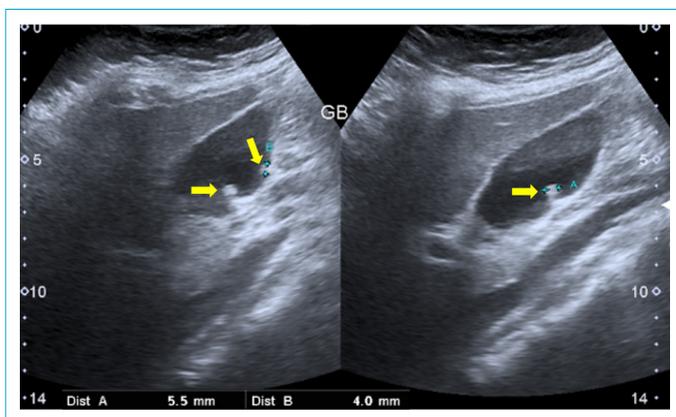


Figure 1. Grey scale ultrasound image showing echogenic foci without posterior acoustic along the wall of gall bladder representing polyps. (yellow arrows).

Subsequently, the reports and images of all follow-up ultrasound examinations in patients with gall bladder polyps were reviewed. Measurements obtained by the performing radiologist during the study were taken into consideration. Those polyps were subsequently characterized based on change in size using the maximum dimension. They were classified as having increased in size, remained the same, decreased or resolved on follow-up. If this was not mentioned in the reports, the measurements were performed on a picture archiving and communication system. Change in size of 2 mm or greater was considered relevant.

In patients with multiple polyps (Fig. 1), the largest one was formally assessed, however any change in the gross appearance of the smaller polyps was also noted. Pathology reports were assessed if the patient underwent cholecystectomy. If the ultrasound or pathological follow-up was not available, then the patients' follow-up was done clinically, by searching the medical records to look for any evidence of gall bladder related pathology.

The ultrasound examinations were performed by experienced radiologists by using 3.5-MHz transducers (Nemio and Xario by Toshiba Medical Systems Ltd). All patients included in the study were scanned in the supine position and left lateral decubitus positions with at least 6 hours fasting. Majority of the scans were performed for evaluation of abdominal pain and chronic liver disease assessment and not for suspected pathologies of the gall bladder. Statistical analysis was performed using Statistical Package for the Social Sciences (SPSS) version 21.

Results

A total of 1226 patients were shortlisted for the reporting engine and one hundred and fifty five (mean age, 52.6 years; range, 18-92 years) patients with GB polyps fulfilling the inclusion criteria were included. This included 72 men (46%) and 83 women (54%). Change in size greater or equal to 2 mm was considered relevant. Polyp size was stable in 65 (42%) polyps, decreased in 25 (16%), increased in 12 (7%), and resolved in 53 (34%). Mean polyp size was 4.0 mm (range, 2-19 mm). Of the sample size, one of the patients showing an increase in the polyp size revealed a gall bladder mass on further MRI investigation. Subsequent histopathology confirmed the diagnosis. This was the solitary case of malignant transformation out of the total of 155 patients. No neoplastic polyp was found in the 1-6 mm range, one neoplastic polyp was seen in those 7 mm or larger (Tables 1, 2).

Table 1. Study group dynamics

Variables	n (%)
Mean age	52.6 years
Total no. of cases	150
Males/Females	72 (46)/83 (54)
Study period	15 years (Jan 2001-Feb 2015)
Mean follow up duration	2 years

Table 2. Fate of polyp on follow-up Ultrasound

Polyp size	n (%)
Increased	12 (7)
Decreased	25 (16)
Stable	65 (42)
Resolved	53 (34)

Discussion

There is fair incidence of detecting polyps on ultrasound, with detection rates ranging from 4%-7% of patients undergoing ultrasound.^[1] According to recent guidelines and current practice, after the identification of the polyps on ultrasound, the patients either undergo routine follow ups for size assessment of the polyps, or when the sizes greater than 10 mm undergo cholecystectomy.^[8] This management of gall bladder polyps is influenced currently by the concern of presence or development of gall bladder carcinoma. Gall bladder cancer has a poor prognosis, with a 10% 5 year survival, and so, special emphasis is laid on the management of GB cancer.

It is because of this strategy that results in a great number of possibly unnecessary follow up ultrasound examinations. Most of the literature, however, has been unable to show the evolution of gall bladder polyps to cancer, especially those less than 10 mm in size. In our study we have attempted to determine the natural course of incidentally discovered GB polyps in a high risk population and based on their size, suggest possible management strategies.

Our results show that it is extremely less likely to have a gall bladder malignancy resulting from incidentally detected polyps. We had one patient who subsequently was recorded to have developed gall bladder carcinoma, however the causal relationship cannot be established. But considering the extremely low incidence, subjecting all patients with polyps to follow up examinations is questionable. Besides, the chance of a neoplastic polyp is less likely and is also greatly related to the size of the polyp. A single adenoma was seen in the polyps ranging in size from 7-9 mm and none of the polyps ranging in size from 1-6 mm were found to be neoplastic.

Literature review has revealed many previous studies such as one by Csendes et al.^[7] who worked on a population of 111, and found a single adenoma and no malignant transformation in 27 polyps proven on histopathology that were less than 10 mm in size and also no cases of neoplasia in a total of 98 detected polyps. Another relevant study by Ito et al.^[9] had a follow-up period of 71 month via ultrasound and clinical assessment. Cholecystectomy gross specimen were examined in 80 patients with known gall bladder polyps and subsequently no neoplastic changes were seen in 44 such lesions less than 6 mm in diameter.

In our study we also found that the occurrence of a polyp-like lesion (focal polyps and cholesterosis) on gross histopathology, was seen in only 13 of cholecystectomy specimens. Mainprize et al who studied specimens of gall bladder post-cholecystectomy determined that preoperative diagnosis of polyps on US was confirmed in only 32% (11 of 34) at histopathology.^[10] Therefore, it is very likely that most of these lesions were gall stones.

Review of literature also reveals that some of the polypoid lesions seen on ultrasound but not histopathological exam may be due to cholesterol polyps that may have sloughed off or due to adherent sludge.^[5,7] We support this hypothesis in our study as 50% (78 of 155) polyps seen on US resolved or decreased in size. Hence, most of the lesions simulating polyps on US are either small stones or cholesterol polyps, and not neoplastic. Also considering the rather frequent occurrence of gall bladder polyps and the relatively rare incidence of GB carcinoma, there is evidence to suggest that small lesions of the gall bladder do not require follow-up.

It is worth mentioning here that some authors such as Lee et al. recommend that all polyps smaller than 10 mm should be followed-up once in three months.^[5] However, we think further delineation of follow-up criteria based on the size of polyp is important as, in our study, we did not find polyps smaller than 6 mm to be neoplastic and only one polyp increased slightly in size. Hence, we think follow-up is not required in polyps measuring 6 mm or less in size as the risk of neoplastic transformation is very low. Application of this strategy would mean that majority of the incidentally detected polyps in our study don't need a follow-up as 83% (129 of 155) of the polyps fell into the aforementioned size range. The potential benefits of this strategy would be reducing expenses by eliminating unnecessary follow up studies which is of significant importance in our country with poor socioeconomic factors.

We did find a 7 mm adenocarcinoma, falling in the 7-9 mm range. Study by Park et al followed 1558 patients with gall bladder polyps.^[11] Fifteen out 33 neoplastic polyps were less than 10 mm in size. However important consideration

when interpreting these investigators' results is that the exact sizes of polyps were not mentioned.

Kozuka et al.^[12] found 7 adenomas undergoing malignant transformation and fifteen carcinomas with adenomatous residue. The adenomas with malignant change in that study, however, were all greater than 12 mm in diameter.

Due to the relatively smaller number of polyps 10 mm or larger in size in our study (13 of 155), we cannot very clearly conclude about these polyps. However, literature supports the need for further follow-up for polyps of this size. The option of close follow-up is better than automatic cholecystectomy, for lesions of this size, keeping in view the low rate of malignancy that we see in our study, especially if we don't see evidence of other malignant features on imaging. However, evidence based studies are needed further to reach a conclusion.

Being retrospective was one of the limitations to our study. In addition, for most studies, the examinations were reviewed by looking at their reports, subsequently proceeding to images and clinical follow-up in a smaller proportion of patients. Secondly, the US follow-up for most of the patients was for evaluating chronic liver disease and abdominal pain, rather than specifically for GB polyps and so the polyps did not receive the special attention at the time of US. Hence, a polyp not visualized on ultrasound could either not be present or could have been missed by the observer on the scan.

Conclusion

In conclusion, our study of 155 patients showed that one patient had a gall bladder malignancy. Thus showing that the risk of malignancy of the gall bladder carcinoma resulting from sonographically detected incidental polyps is very low. The solitary case of neoplastic transformation was seen in the polyp measuring 7 mm on initial imaging. No neoplastic changes were seen in polyps less than 7 mm in size. Majority of the polyps seen on US were not neoplastic. Most represented cholesterol polyps adherent to the wall or gall stones. Hence for management proposed, we have evidence to support that GB polyps that are incidentally detected on ultrasound measuring 6 mm or less, may require no additional follow-up. Follow up may be indicated for polyps that are greater than or equal to 7 mm in size.

Disclosures

Disclaimer: Part of this study was presented as poster in Radiological Society of North America (RSNA).

Ethics Committee Approval: The study was approved by the

Aga Khan University Hospital 1852-RAD-ERC-11.

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References

1. Corwin MT, Siewert B, Sheiman RG, Kane RA. Incidentally detected gallbladder polyps: is follow-up necessary?--Long-term clinical and US analysis of 346 patients. *Radiology* 2011;258:277–82. [\[CrossRef\]](#)
2. Randi G, Franceschi S, La Vecchia C. Gallbladder cancer worldwide: geographical distribution and risk factors. *Int J Cancer* 2006;118:1591–602. [\[CrossRef\]](#)
3. 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. [\[CrossRef\]](#)
4. Terzi C, Sökmen S, Seçkin S, Albayrak L, Uğurlu M. Polypoid lesions of the gallbladder: report of 100 cases with special reference to operative indications. *Surgery* 2000;127:622–7.
5. Lee KF, Wong J, Li JC, Lai PB. Polypoid lesions of the gallbladder. *Am J Surg* 2004;188:186–90. [\[CrossRef\]](#)
6. Yang HL, Sun YG, Wang Z. Polypoid lesions of the gallbladder: diagnosis and indications for surgery. *Br J Surg* 1992;79:227–9.
7. Csendes A, Burgos AM, Csendes P, Smok G, Rojas J. Late follow-up of polypoid lesions of the gallbladder smaller than 10 mm. *Ann Surg* 2001;234:657–60. [\[CrossRef\]](#)
8. Wiles R, Thoeni RF, Barbu ST, Vashist YK, Rafaelsen SR, Dewhurst C, 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;27:3856–66. [\[CrossRef\]](#)
9. Ito H, Hann LE, D'Angelica M, Allen P, Fong Y, Dematteo RP, et al. Polypoid lesions of the gallbladder: diagnosis and follow-up. *J Am Coll Surg* 2009;208:570–5. [\[CrossRef\]](#)
10. Mainprize KS, Gould SW, Gilbert JM. Surgical management of polypoid lesions of the gallbladder. *Br J Surg* 2000;87:414–7.
11. Park JY, Hong SP, Kim YJ, Kim HJ, Kim HM, Cho JH, et al. Long-term follow up of gallbladder polyps. *J Gastroenterol Hepatol* 2009;24:219–22. [\[CrossRef\]](#)
12. Kozuka S, Tsubone N, Yasui A, Hachisuka K. Relation of adenoma to carcinoma in the gallbladder. *Cancer* 1982;50:2226–34.