

# Routine Histopathologic Examination of Two Common Surgical Specimens—Appendix and Gallbladder: Is It a Waste of Expertise and Hospital Resources?

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**Abstract** This study was undertaken to assess whether a routine histopathologic examination of two common surgical specimens (appendix and gallbladder) is needed and whether routine histopathologic examination has an impact on further management of patients. Histopathology reports of patients who had undergone appendectomy and cholecystectomy, between 2006 and 2010, were analyzed retrospectively in the department of pathology of a tertiary care hospital. The case notes were retrieved in all cases of malignancies. Patients having a clinical diagnosis or suspicion of malignancy were excluded. The incidence and impact of unexpected pathologic diagnosis on postoperative management were noted. The study period included a total of 1,123 and 711 appendectomy and cholecystectomy specimens, respectively. Fifteen (1.336 %) cases of appendectomy specimens revealed incidental unexpected pathological diagnoses, which included tubercular appendicitis ( $n=2$ ), parasite ( $n=8$ ), neuroma ( $n=1$ ), carcinoid ( $n=2$ ), pseudomyxoma ( $n=1$ ), and adenocarcinoma ( $n=1$ ). About 88 % of such unexpected appendiceal findings had an impact on postoperative treatment. Unexpected pathologic gallbladder findings were found in 12 (1.68 %) of 711 cholecystectomy specimens. In 6 (0.84 %) cases, gallbladder cancer (GBC) was detected. Additional further management was required in 50 % of

patients with unexpected gallbladder findings. Twenty of the total 1,834 specimens (1.090 %) had an impact on patient management or outcome and were not suspected on macroscopic examination at the time of surgery. These would have been missed had the specimens not been examined microscopically. The intraoperative diagnosis of the surgeon is therefore sometimes doubtful in detecting abnormalities of the appendix and gallbladder. This study supports the sending of all appendectomy and cholecystectomy specimens for routine histopathological examination. Appendix and gallbladder should undergo routine histopathological examination. This is important in patients with advanced age and gallstones. Also, it is of great value in identifying unsuspected conditions which require further postoperative management. Selectively sending specimens for histopathological examination can result in reduced workload on the histopathology department without compromising patient safety.

**Keywords** Histopathology · Appendectomy · Cholecystectomy · Gallbladder cancer

## Background

Histopathologic examination is an important tool of prognostic and diagnostic value helping in further patient management. It also plays an important role in medicolegal cases.

Surgical specimens harboring malignancies need accurate pathology reports for proper postoperative management [1], thus increasing the time required for reporting. Specimens of appendix and gallbladder are regularly seen in daily routine histopathological work of the pathology department. They not only consume time but also increase the workload

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on pathologists; hence, whether routine histopathologic examination of all surgical specimens is necessary is questionable [2].

The College of American Pathologists and the UK Royal College of Pathologists have recommended that histopathologic examination of surgical specimens should be selective because routine histopathology examination of appendectomy and cholecystectomy specimens puts a huge burden on histopathologists and depletes hospital reserves.

This study was undertaken to assess if a routine histopathologic examination of two common surgical specimens—appendix and gallbladder—is needed. We also studied the incidence of unexpected pathologic diagnoses and their impact on postoperative management.

## Materials and Methods

Histopathology reports of patients on whom appendectomy and cholecystectomy were performed were analyzed retrospectively. The study was done in the department of pathology at a tertiary care hospital. The period of study was from 2006 to 2010. The case notes were retrieved in all cases of malignancies. Patients having a clinical diagnosis or suspicion of malignancy were excluded.

The incidence and impact of unexpected pathologic diagnoses on postoperative management were noted.

## Results

### Appendectomy Specimens

A total of 1,123 appendectomy specimens were examined. Among them, 334 (29.74 %) cases showed pathologic changes consistent with acute inflammation (appendicitis, gangrenous appendicitis, perforating appendicitis, suppurative appendicitis, ulcerative appendicitis, abscess), and 781 (69.54 %) cases showed changes of chronic inflammation (chronic appendicitis, recurrent appendicitis, fibrosing appendicitis, follicular appendicitis). Fifteen (1.336 %) cases revealed incidental unexpected pathological diagnoses (Table 1), which included tubercular appendicitis ( $n=2$ ), parasite ( $n=8$ ), neuroma ( $n=1$ ), carcinoid ( $n=2$ ), pseudomyxoma ( $n=1$ ), and adenocarcinoma ( $n=1$ ). Appendiceal tuberculosis was found in two female patients, 35 years and 18 years old, who had history of pulmonary tuberculosis. None of the patients had concomitant pulmonary tuberculosis; therefore, they received a 6-month regimen of anti-tuberculous drugs. Other 8 patients (0.71 %) had parasites or ova in the lumen of the appendix, and all of them subsequently received antihelminthic drugs.

**Table 1** Unexpected pathological findings in 15 out of 1,123 appendectomy specimens—appendix

Pathological diagnosis	Number of cases (%)
Tuberculous appendicitis	2 (0.178 %)
Neuroma	1 (0.089 %)
Parasitic infection	8 (0.712 %)
<i>E. vermicularis</i>	4 (0.35 %)
<i>E. histolytica</i>	1 (0.089 %)
<i>T. trichuriasis</i>	2 (0.178 %)
Microfilaria	1 (0.089 %)
Well-differentiated adenocarcinoma colon	1 (0.089 %)
Carcinoid tumor	2 (0.178 %)
Pseudomyxoma	1 (0.089 %)
Total	15 (1.336 %)

### Cholecystectomy Specimens

Unexpected pathologic gallbladder findings were found in 12 (1.68 %) (Table 2) of 711 cholecystectomy specimens. In 6 (0.84 %) cases, gallbladder cancer (GBC) was detected. GBC was found in patients with the age range of 40–60 years. All these patients required further management and underwent chemotherapy. Among the remaining 6 cases, the unexpected pathologic gallbladder findings were papillary hyperplasia ( $n=1$ , 0.140 %), pyloric metaplasia ( $n=2$ , 0.281 %), tubular adenoma ( $n=1$ , 0.140 %), gallbladder adenoma ( $n=1$ , 0.140 %), and gallbladder polyp ( $n=1$ , 0.140 %). Cholecystectomy itself with no further intervention was the treatment for these conditions.

Thus, additional further management was required in 50 % of patients having unexpected gallbladder findings.

**Table 2** Unexpected pathological findings in 12 out of 711 cholecystectomy specimens—gallbladder

Pathological diagnosis	Number of cases (%)
Neoplasms	
Gallbladder adenocarcinoma	1 (0.140 %)
Papillary carcinoma gallbladder	1 (0.140 %)
Well-differentiated carcinoma gallbladder	2 (0.281 %)
Well-differentiated adenocarcinoma gallbladder periampullary region	1 (0.140 %)
Transitional cell carcinoma gallbladder	1 (0.140 %)
Papillary hyperplasia	1 (0.140 %)
Pyloric metaplasia	2 (0.281 %)
Tubular adenoma	1 (0.140 %)
Gallbladder adenoma	1 (0.140 %)
Gallbladder polyp	1 (0.140 %)
Total	12 (1.68 %)

## Discussion

In our institution, all surgical specimens are subjected for routine histopathologic evaluation. Appendectomy and cholecystectomy are the most common procedures performed in a general surgical practice.

Importance of routine histopathologic examination of the surgical specimens is now being debated because many incidental findings have little clinical significance [3, 4]. However, sometimes the clinician might miss an occult malignancy even intraoperatively, which could be detected only on microscopy.

A small number of literature data studied the benefits of histopathologic examination of these two common surgical specimens [2–7].

Histology of the appendix shows a varied picture. Only in 0.1–4.2 % of routine histopathologic evaluations does one see abnormal diagnoses other than normal or inflammatory changes. A few of these are clinically significant affecting patient management [2, 3, 7]. Navez and Therasse did a retrospective study on whether patients undergoing laproscopic exploration for clinical diagnosis of appendicitis should have an appendectomy. They concluded that if there is no evidence of another cause to explain the acute right iliac fossa pain, it is sensible to proceed with an appendectomy even if the appendix looks normal, because the rate of re-exploration for recurrent symptoms is considerable, and endoappendicitis defined as inflammation of the appendicular mucosa is seen [8].

In the present study, 15 (1.336 %) cases showed unsuspected appendiceal findings on microscopic examination. All of these findings had an impact on postoperative treatment. One patient underwent right hemicolectomy because of appendiceal adenocarcinoma; antihelminthic drugs and antituberculous treatment were given to 8 and 2 patients respectively. About 0.5–1.5 % of specimens of simple cholecystectomy for presumed benign gallbladder disease showed gallbladder cancer [9].

In this study, unexpected pathologic gallbladder findings were found in 12 (1.68 %) of 711 cholecystectomy specimens. In 6 (0.84 %) cases, gallbladder cancer (GBC) was detected. Additional further management was required in 50 % of patients with unexpected gallbladder findings.

GBC is not a common malignancy in developed countries except Japan. However, it is not unusual to observe it in some parts of India, Chile, Bolivia, and Mexico [10–12], and is the most common biliary cancer worldwide.

The incidence of GBC starts to rise after the age of 50 years [13]. They occur more frequently in the seventh decade of life and are more common in women. Majority of cholecystectomies are done for cholecystitis or cholelithiasis; hence, most gallbladder carcinomas are found incidentally [11, 14–16]. An important risk factor for gallbladder

carcinoma is cholelithiasis, which is present in 95 % of cases. However, gallbladder cancer develops after 20 or more years only in 0.5 % of patients with gallstones [17].

A thickened gallbladder wall has been commonly described in cases of unsuspected GBC [5, 6]. However, a thickened wall is not specific to malignant transformation as it is also seen in an acutely inflamed gallbladder or chronic cholecystitis. Many studies differ on their definition of a thickened wall with 3 mm or even no clearly defined cutoff point [5, 6]. However, in our institution the correlation of thickness of gallbladder wall with gallbladder cancer is not taken into consideration. Kwon and colleagues [18] have investigated the role of intraoperative frozen section examination for any suspicious lesion of the gallbladder, mostly from a polypoid lesion or a thick-walled gallbladder. They reported 90 % sensitivity and 100 % specificity of intraoperative frozen section for detecting GBC. However, such an approach has some limitation because this facility may not be available all the time, and about 10–37 % of GBC patients do not have any gross or suspicious features of malignant transformation [19].

Although the present study included a relatively large number of surgical specimens, limitations inherent to any retrospective study such as reliability of written records or recall of individuals, nonavailability of important data, no accessibility to important information restricted by institutional regulations, and different clinical judgments of surgeons exist.

## Conclusions

The cost of anesthesia, hospital admission, and the patient losing his/her working days—all make surgical procedures expensive and add to the burden on hospital resources. Histopathological processing of specimens also adds to patients and hospital expenses, but appendix and gallbladder should undergo routine histopathological examination.

1. This is important in patients with advanced age and cases of other comorbid conditions such as gallstones. Also, it is of great value in identifying unsuspected conditions which require further postoperative management.
2. Appendectomy specimens from patients with clinically suspected appendicitis show variety in their histological appearances, and routine histological examination can provide clinically significant information in a significant minority of patients.
3. Selectively sending specimens for histopathological examination can result in reduced workload on the histopathology department and its expertise without compromising patient safety.

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