



**ORIGINAL RESEARCH PAPER**

**Radiology**

**INCIDENCE AND SPECTRUM OF GALL BLADDER PATHOLOGIES ON CROSS SECTIONAL IMAGING**

**KEY WORDS:** Gall bladder tuberculosis , acute and chronic cholecystitis, adenocarcinoma of gall bladder, biliary ascariasis

<b>Dr. Sidharth Mohindru</b>	3rd year Resident radiology Dy Patil University School Of Medicine, Navi Mumbai
<b>Dr. Shyam Sobti*</b>	Dy Patil University School Of Medicine, Navi Mumbai *Corresponding Author
<b>Dr. Madan Manmohan</b>	Dy Patil University School Of Medicine, Navi Mumbai
<b>Dr. Thahir V U</b>	Dy Patil University School Of Medicine, Navi Mumbai
<b>Dr. Ankur Pramanick</b>	Dy Patil University School Of Medicine, Navi Mumbai

**ABSTRACT** Imaging often plays an important role in the evaluation of patients with suspected gallbladder disease. In this paper, we provide a comprehensive review of the cross-sectional imaging features of numerous gallbladder inflammatory, infective and malignant conditions. Our study included 100 cases of different GB pathologies which were evaluated by USG, CT scan and MRCP studies and suspected cases of the neoplastic lesions of the gall bladder were correlated with the histopathological diagnosis. Our inference from the study was that the incidence of inflammatory condition was most prevalent among all the gall bladder pathologies which accounted for almost 90 % of all the pathologies followed by the malignant conditions with incidence of around 7-8 %. The least prevalent were infective conditions which was possibly due to the inhibitory function of bile.

**INTRODUCTION**

- Gallbladder diseases are a common cause of upper abdominal pain.
- Although many of these conditions may cause significant morbidity and mortality if left untreated, the prognosis is generally excellent with prompt diagnosis and management.
- Imaging often plays an important role in the evaluation of patients with suspected gallbladder disease.

In this paper, we provide a comprehensive, contemporary review of the pertinent cross-sectional imaging features of numerous gallbladder inflammatory, infective and malignant conditions.

**OBJECTIVES:**

- To evaluate and characterize different pathologies of gall bladder.
- To differentiate between benign and neoplastic wall thickening of the gall bladder.
- To demonstrate different unusual presentations of the infections of gall bladder.

**METHOD:**

- This study was conducted in the Department of Radiology, D Y Patil University School of Medicine, Nerul, Navi Mumbai, over a period of 1.5 years.
- 100 cases of different GB pathologies were evaluated by USG, CT scan and MRCP studies. However, in this study we focus on the cross sectional CT and MRCP imaging of the GB pathologies.
- Cases of the neoplastic lesions of the gall bladder were correlated with the Histopathological diagnosis.
- GE optima 128 slice CT scanner and 1.5 Tesla GE MRI scanners were used for the scans.

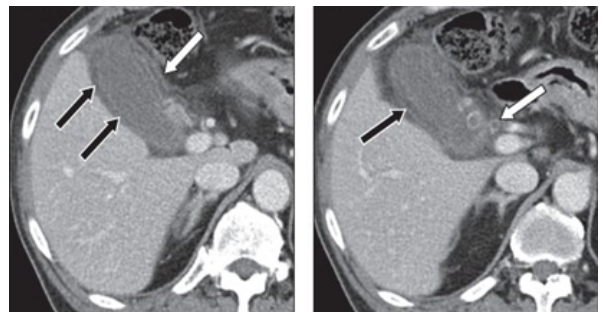
**INFLAMMATORY CONDITIONS:**

**ACUTE CHOLECYSTITIS**

Acute cholecystitis is the most frequent acute inflammatory condition of the gallbladder. Approximately 90-95% of cases occur in the setting of cystic duct or gallbladder neck obstruction related to cholelithiasis. This condition characteristically affects middle-aged women, often those

who are obese.

Clinical findings may include acute persistent right upper quadrant abdominal pain, fever, nausea and emesis, and focal tenderness directly overlying the gallbladder.



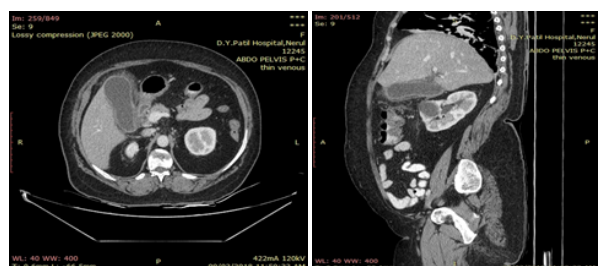
**Acute calculus cholecystitis**

**ACALCULUS CHOLECYSTITIS**

Acute acalculus cholecystitis refers to the development of cholecystitis in a gallbladder either without gallstones or with gallstones where they are not the contributory factor. It is thought to occur most often due to biliary stasis and/or gallbladder ischemia.

Acute acalculus cholecystitis represents 5-10% of cases of acute cholecystitis.

Acute acalculus cholecystitis usually occurs in critically ill or injured patients (e.g. trauma, burns, sepsis).



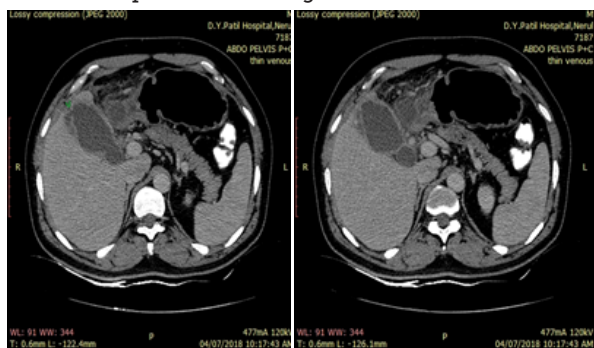
**GALLBLADDER PERFORATIONS**

Gallbladder perforations are a relatively rare complication that occur most frequently as a result of acute cholecystitis, with a relatively high mortality.

Clinical presentation can range from benign non-specific abdominal symptoms to an acute generalized peritonitis. Symptoms and clinical signs can be indistinguishable from those of an uncomplicated acute cholecystitis.

The sequence of events that leads subsequently to perforation is thought to result from occlusion of the cystic duct (most often by a calculus) with resultant retention of intraluminal secretions.

Distension of the gallbladder with a consequent rise in intraluminal pressure can impede venous and lymphatic drainage, leading to vascular compromise and ultimately to necrosis and perforation of the gallbladder wall.



**CHRONIC CHOLECYSTITIS**

It is a prolonged inflammatory condition that is almost always seen in a setting of cholelithiasis.

It is caused by intermittent obstruction of the cystic duct or infundibulum.

It is usually associated with gall bladder dysmotility and helicobacter pylori infection.

Imaging findings include cholelithiasis, wall thickening and contracted or reduced volume of the gall bladder.



**CHRONIC CHOLECYSTITIS**

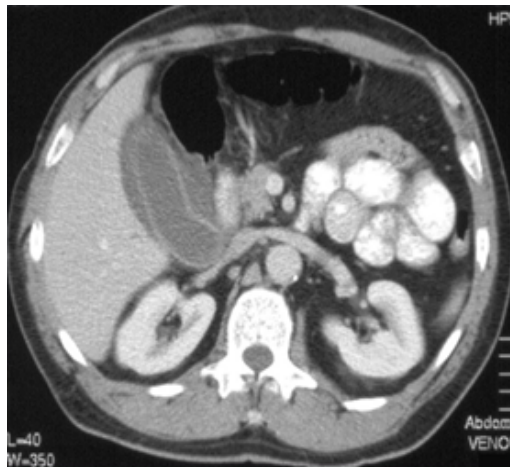
**PSEUDOTHICKENING OF GALL BLADDER**

Pseudothickening of gall bladder is a great mimicker of pathological thickening of the gall bladder wall.

However, most of the times it is associated with free fluid in the abdomen.

Almost all cases of dengue fever presented with pseudothickening of gall bladder.

Therefore, in cases of diffuse gall bladder wall thickening possibility of pseudothickening should be kept in mind.



**Pseudothickening of gall bladder.**

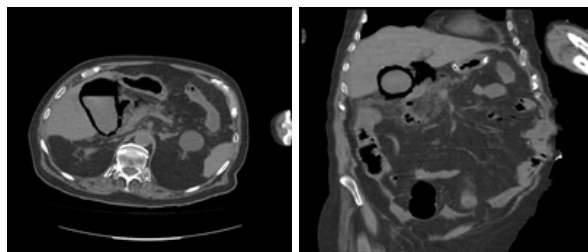
**EMPHYSEMATOUS CHOLECYSTITIS**

Emphysematous cholecystitis is a rare form of acute cholecystitis where gallbladder wall necrosis causes gas formation in the lumen or wall. It is a surgical emergency, due to the high mortality from gallbladder gangrene and perforation.

Clinical manifestation is often insidious and may then progress rapidly. Up to one-third of patients may be afebrile and localized tenderness is often not a dominant clinical feature.

Vascular compromise of the cystic artery is thought to play a significant role in causing emphysematous cholecystitis. It is associated with acalculus cholecystitis (present in ~50% of cases 9-11) and carries a higher incidence of gallbladder perforation. Commonly isolated organisms include Clostridium welchii / perfringens, Escherichia coli and Bacteroides fragilis.

CT is considered the most sensitive and specific imaging modality for identifying gas within the gallbladder lumen or wall. The presence of a pneumoperitoneum indicates perforation.



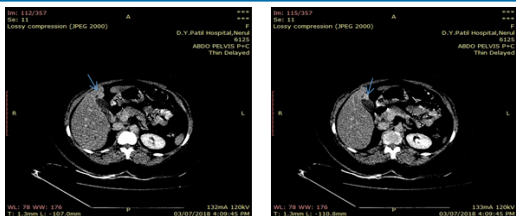
**Emphysematous cholecystitis**

**ADENOMYOMATOSIS OF THE GALLBLADDER**

Adenomyomatosis of the gallbladder is a hyperplastic cholecystitis of the gallbladder wall. It is a relatively common and benign cause of diffuse or focal gall bladder wall thickening.

Adenomyomatosis is relatively common, found in ~9% of all cholecystectomy specimens. It is typically seen in patients in their 5th decade. The incidence increases with age, presumably the result of protracted inflammation. There is a female predilection (M:F= 1:3).

It is most often an incidental finding and usually requires no treatment. It may be found more often in chronically inflamed gallbladder (which are at higher risk for carcinoma), but it is not a premalignant lesion in itself.



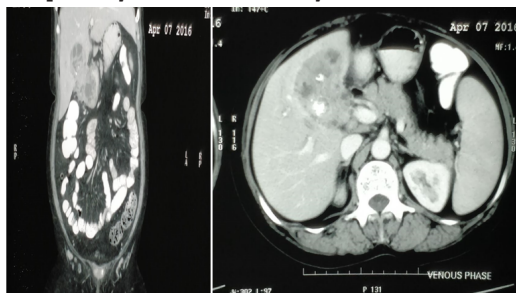
**Focal adenomyomatosis of gall bladder**

**GALLBLADDER TUBERCULOSIS**

Gallbladder TB is still extremely rare, and the diagnosis of this disease is almost always overlooked unless there is a high index of suspicion. Since the first case of gallbladder TB reported in 1870 by Gaucher, less than 120 cases have been reported in the English medical literature, according to the reported literature and the statistics results of searching PubMed

Gallbladder TB can be manifested by a relatively nonspecific clinical presentation. Mean age of presentation is 4th decade. Incidence is more common in females.

Gallbladder TB is rare as compared to other abdominal TB, as the gallbladder is highly resistant to tubercular infection, which is possibly due to the inhibitory function of bile



**Gallbladder TB**

**BILIARY ASCARIASIS**

Ascariasis is the commonest helminthic infection world wide and estimated to affect nearly 1 billion people (25% of population). The disease is transmitted by Ascaris lumbricoides which belongs to the nematode family (roundworms).

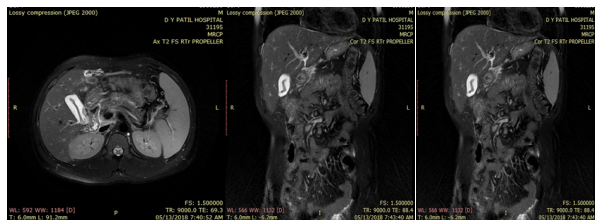
The infected patients are usually asymptomatic however, migration through the lung may cause eosinophilic pneumonia. Moreover, the adult worms cause mechanical obstruction to the intestinal lumen or may penetrate and obstruct the common bile duct leading to obstructive jaundice.

**CT**

Dilated CBD or the lumen of gallbladder harbors a long curved hyperdense structure with central hypodensity. Within the intestine they appear as a filling defect within the contrast in the lumen.

**MRCP**

Best non-invasive method to detect biliary ascariasis. The worm appears as hypointense structure within the hyperintense CBD or the lumen of the gallbladder.



**BILIARY ASCARIASIS  
NEOPLASTIC ETIOLOGY**

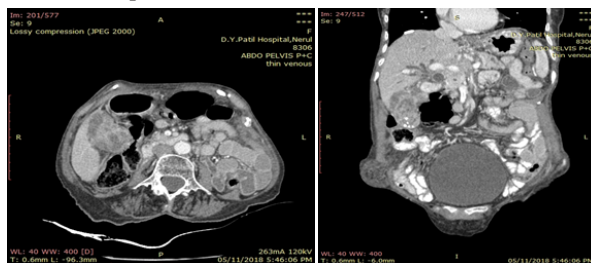
**GALLBLADDER ADENOCARCINOMA**

Gallbladder adenocarcinoma is the most common primary biliary carcinoma and the 5th most common malignancy of the gastrointestinal tract.

Predominantly affects older persons with long-standing cholecystolithiasis, and as such is most common in elderly women (>60 years of age, F:M ratio = 4:1)

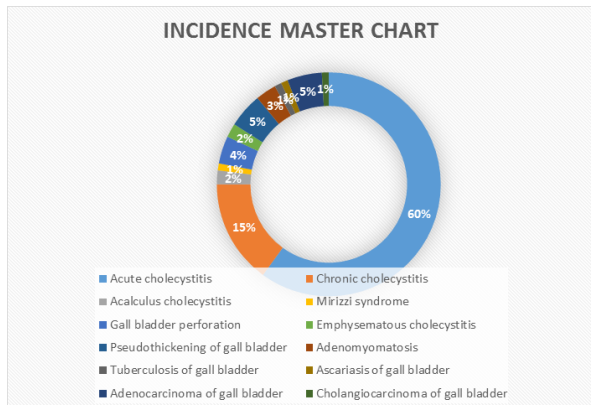
Gallbladder adenocarcinomas present in one of three morphologies:

- Intraluminal mass.
- Diffuse mural thickening.
- Mass replacing the gallbladder- Presumably the end result of progression from either 1 or 2 and is most common presentation



**Adenocarcinoma of the gall bladder causing central IHBR**

**RESULT**



**Out of the hundred cases of gall bladder pathologies:**

- 60 cases of acute cholecystitis.
- 15 cases of chronic cholecystitis.
- 2 cases of acalculous cholecystitis
- 1 case of Mirizzi syndrome.
- 4 cases of gall bladder perforation.
- 2 cases of emphysematous cholecystitis.
- 5 cases of pseudothickening of gall bladder (Dengue sequelae).
- 3 cases of adenomyomatosis.
- 1 case of tuberculosis of gall bladder.
- 1 case of Ascariasis of gall bladder.
- 6 cases of Adenocarcinoma of gall bladder.

**INFERENCE**

- This study shows that the incidence of inflammatory condition is most prevalent among all the gall bladder pathologies which accounts for almost 90 % of all the pathologies.
- Second most common are the malignant conditions with incidences of around 7-8 %.
- Infective conditions of the gall bladder are the least

common because the gallbladder is highly resistant to infection, which is possibly due to the inhibitory function of bile.

**REFERENCE:**

1. Bennett GL, Balthazar EJ. Ultrasound and CT evaluation of emergent gallbladder pathology. *Radiol Clin North Am* 2003; 41:1203-1216 [Crossref] [Medline]
2. Van Breda Vriesman AC, Engelbrecht MR, Smithuis RHM, Puylaert JBCM. Diffuse gallbladder wall thickening: differential diagnosis. *AJR* 2007; 188:495-501 [Abstract]
3. Harvey RT, Miller WT. Acute biliary disease: initial CT and follow-up US versus initial US and follow-up CT. *Radiology* 1999; 213:831-836 [Crossref] [Medline]
4. Rumack CM, Wilson SR, Charboneau JW, Johnson JA. *Diagnostic ultrasound, 3rd ed.*, vol. 1. St. Louis, MO: Elsevier Mosby; 2005:197-201
5. Ralls PW, Colletti PM, Lapin SA, et al. Real-time sonography in suspected acute cholecystitis: prospective evaluation of primary and secondary signs. *Radiology* 1985; 155:767-771 [Medline]
6. Bennet GL, Rusinek H, Lisi V, et al. CT findings in acute gangrenous cholecystitis. *AJR* 2002; 178:275-281 [Abstract]
7. Fidler J, Paulson EK, Layfield L. CT evaluation of acute cholecystitis: findings and usefulness of diagnosis. *AJR* 1996; 166:1085-1088 [Abstract]
8. Grand D, Horton KM, Fishman EK. CT of the gallbladder: spectrum of disease. *AJR* 2004; 183:163-170 [Abstract]
9. Yamashita K, Lin MI, Hirose Y, et al. CT finding of transient focal increased attenuation of the liver adjacent to the gallbladder in acute cholecystitis. *AJR* 1995; 164:343-346 [Abstract]
10. Altun E, Semelka RC, Elias J, et al. Acute cholecystitis: MR findings and differentiation from chronic cholecystitis. *Radiology* 2007; 244:174-183 [Crossref] [Medline]