

# Role of Multidetector Computed Tomography (MDCT) in Diagnosis and Staging of Gall Bladder Carcinoma

Dr. Chirag Prajapati<sup>1</sup>, Dr. Asutosh Dave<sup>2</sup>, Dr. Ajay Upadhyay<sup>3</sup>

<sup>1</sup>3<sup>rd</sup> year Resident in GCS Medical College, Ahmedabad, India

<sup>2</sup>Professor & Head of Radio-diagnosis Department, GCS Medical College, Hospital and Research Centre, Ahmedabad, India

<sup>3</sup>Professor of Radio-diagnosis Department, GCS Medical College, Hospital and Research Centre, Ahmedabad, India

**Abstract:** ***Introduction:** Gall bladder carcinoma is primary epithelial malignancy. Gall bladder mass is 5<sup>th</sup> common neoplasm of Gastrointestinal tract after ca colon, ca pancreas, ca stomach and ca oesophagus. It is more common in women of old age. It presents to clinician mostly in advance stage because in early stage it has nonspecific symptoms. It has two varieties – Adenocarcinoma (most common) and squamous cell carcinoma. It presents as infiltrating mass, focal intraluminal mass and focal mural thickening of gall bladder. **Subject and methods:** In our study, 30 patients were included of ages between 50 to 70 years. It was prospective study done during august 2018 to September 2019. All patients were examined by ultrasound before MDCT. After MDCT examination diagnosis were confirmed by histopathologically. **Results:** In our study, from 30 patients – 18 females & 12 males. All the patients were examined by ultrasound and MDCT which were confirmed by histopathologically. Infiltrating mass found in 18 patient (60 %), intraluminal polypoidal growth found in 10 patient (36 %) and focal mural thickening of GB wall found in only 2 patient (4%). **Conclusion:** After this study we concluded that MDCT is choice of investigation in detection, extension and staging of gall bladder cancer. MDCT also helps clinician before starting the management of ca gall bladder.*

**Keywords:** GB mass, infiltrating mass, intraluminal polypoidal mass and focal mural thickening

## 1. Introduction

Gall bladder carcinoma is the 5<sup>th</sup> most common malignancy of gastrointestinal tract after ca colon, ca pancreas, ca stomach and ca esophagus. Its incidence 1-3 % in cholecystectomy specimen and 0.5-0.7% in autopsies.

Risk factors of GB malignancy includes – chronic cholecystitis, gall stones, familial adenomatous polyposis, IBD, porcelain gall bladder, GB polyp > 1 cm, primary sclerosing cholangitis, anomalous junction of pancreaticobiliary ducts.

Gall bladder malignancy is mostly found in old age women (6<sup>th</sup> – 7<sup>th</sup> decades). Early diagnosis of ca GB is difficult, because it presents with no specific symptoms in early stage like weight loss, anorexia, jaundice, and vomiting. Mostly patients of ca GB present to clinician in advanced stage.

For staging of ca gall bladder, we used American joint committee on cancer TNM system in our study. In this system **T** indicates tumour grows into wall of gall bladder or involves adjacent organs. **N** indicates involvement of regional lymph nodes. **M** indicates metastasis to distant organ of body.

Ultrasound, MDCT and MRI are primary investigations tools in ca gall bladder. Histopathologically, Ca Gall bladder has two varieties – adenocarcinoma (most common) and squamous cell carcinoma. Pathologically, it has 3 varieties – infiltrating mass, intraluminal polypoidal mass and focal intramural wall thickening of gall bladder.

Tumour confined to gall bladder fossa & infiltrating into adjacent liver segment is operable and they are managed by cholecystectomy and localized liver segmentectomy. Invading other nearby organ or vessels, metastatic lymphadenopathy are considered as inoperable tumour. The 5 year survival rate of this tumour is less than 5 %. Palliative surgery – choledocojejunostomy is performed in patient of ca gall bladder.

MDCT is investigation of choice in patient of ca gall bladder and it is helpful to clinician in evaluation and management of gall bladder malignancy.

## 2. Materials and Methods

It was prospective study, including 30 patients. Duration of our study ranged from august 2018 – September 2019. Age group of the patients ranged from 50-70 years (mean age 60 years). Clinical features, lab investigation and surgical findings were included in our study.

### Inclusion criteria

Patients present with signs and symptoms of right hypochondriac pain, abdominal distension, jaundice and weight loss. Patients whose USG findings: multiple GB stones, h/o chronic cholecystitis, porcelain gall bladder, gall bladder polyp >2 cm that are sessile and solitary, IBD, primary sclerosing cholangitis.

### Exclusion criteria

Patient whose data is incomplete. Patients who have allergic reaction to contrast.

Ultrasound was performed prior MDCT in all patients and findings are included in our study.

Patients were examined performed using a 16 slice MDCT machine (SEIMENS). The patients were prepared with neutral oral contrast (iso – osmotic manitol). The study included a non contrast series, followed by triple phase scan after automatic IV injection of 120 ml non-ionic contrast (Ultravist). Three phases were done in MDCT examination – Arterial, venous and delayed phase. Scan was done with bolus tracking and automated triggering technology during arterial and portal venous phase. Auotimatic triggering was put in abdominal aorta with starting of scan in arterial phase with 60s delayed for portal venous phase. Delayed scan was performed after 3 min which cover liver and Gall bladder.

#### **The American Joint Committee on Cancer (AJCC) TNM system for the staging of gall bladder carcinoma.**

**Stage 0:** Tis, N0, M0: There is a small cancer only in the epithelial layer of the gallbladder. It has not spread outside the gallbladder

**Stage I:** T1 (a or b), N0, M0: The tumor has grown into the lamina propria (T1a) or the muscle layer (T1b). It has not spread outside the gallbladder.

**Stage II:** T2, N0, M0: The tumor has grown into the perimuscular fibrous tissue (T2). It has not spread outside the gallbladder

**Stage IIIA:** T3, N0, M0: The tumor extends through the serosa layer and/or directly grows into the liver and/or one other nearby structure (T3). It has not spread to lymph nodes or to tissues or organs far away from the gallbladder

**Stage IIIB:** T1 to T3, N1, M0: The tumor has spread to nearby lymph nodes (N1) (Metastasis in cystic duct, pericholedochal, or hilar lymph nodes), but it has not invaded the main blood vessels leading to the liver or reached more than one nearby organ other than the liver. It has not spread to tissues or organs far away from the gallbladder.

**Stage IVA:** T4, N0 or N1, M0: The tumor invades the main blood vessels leading to the liver or has reached more than one nearby organ other than the liver (T4). It may or may not have spread to nearby lymph nodes. It has not spread to tissues or organs far away from the gallbladder

**Stage IVB:** Either of the following is true: Any T, N2, M0: The main tumor may or may not have grown outside the gallbladder. It has spread to lymph nodes further away from the gallbladder (N2) including metastasis in peripancreatic (head only), periduodenal, periportal, celiac, or superior

mesenteric lymph nodes. It has not spread to tissues or organs far away from the gallbladder.

**Any T, any N, M1:** The main tumor may or may not have grown outside the gallbladder. It may or may not have spread to lymph nodes. The tumor has spread to tissues or organs far away from the gallbladder (M1).

### **3. Results**

In our study, we had 30 patients, among these patients 18 were females and 12 were males. All patents were between age group of 50-70 years. All patients (100%) present with right hypochondriac pain, 10 patients (40%) presented with anorexia and 15 patients (60%) with weight loss. Anemia found in 12 patients (48%) and jaundice was found in 9 patients (32%).

All patients were examined by ultrasound and MDCT (Tripple phase). We found that infiltrating gall bladder mass in 18 patients (60%), intraluminal polypoidal mass in 10 patients (36%) and 2 patient (4%) of focal mural thickening of gall bladder wall. GB stones were found in 10 patients (40%). Mild dilatation of IHBR noted in 6 patients (24%).

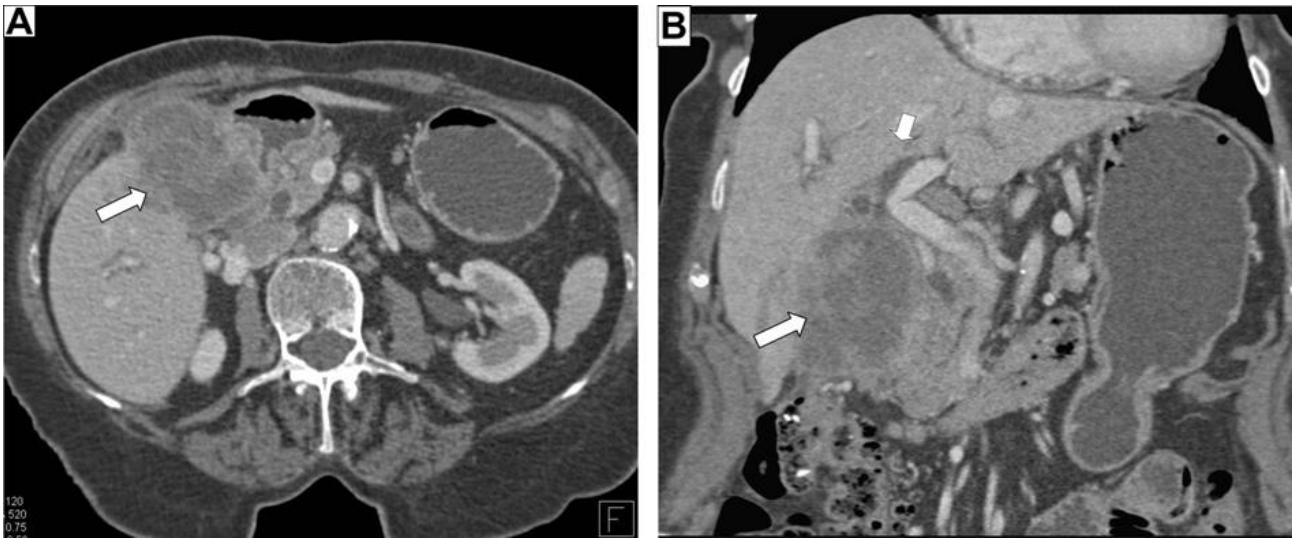
Infiltrating GB mass found in 18 patients (60%). Preliminary diagnosis is based on USG and confirmed by MDCT examination. Among these patients we found that only 6 patients had segment V involvement in MDCT and only 1 patient had additional segment IV involvement. Infiltration of gastric antrum and duodenum was found in 2 patient. Out of 18 patients, 10 patients showed mild to moderate heterogeneous enhancement. And 8 patients shows that no significant enhancement.

Intraluminal polypoidal GB mass was found in 10 patients (36%). They were examined by ultrasound and MDCT. Size of polyp ranged from from 2-5 cm and shows moderate enhancement on MDCT.

Only 2 patients (4%) who had focal mural thickening shows mild heterogeneous enhancement on MDCT.

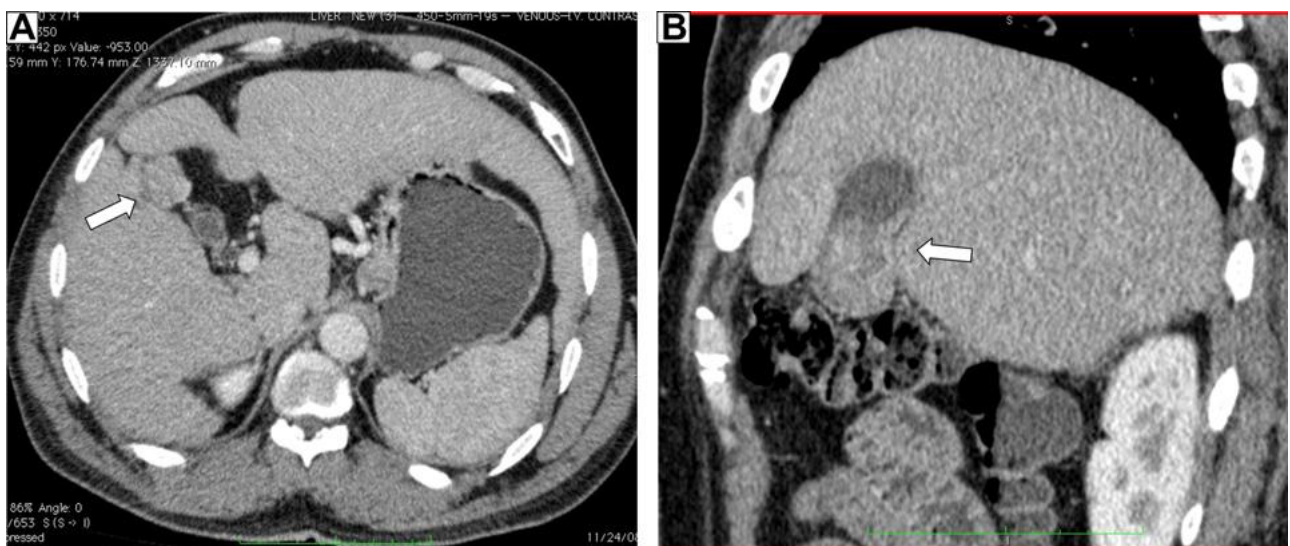
About metastatic lesion detected by MDCT, enlarged metastatic abdominal lymph nodes found in 8 patients (32%), metastatic hepatic depositis (12%) found in 3 patients , metastatic pulmonary nodule found in 2 patients (8%) and vertebral metastasis found in 1 patient (4%).

About surgical management, cholecystectomy was done in 9 patient, cholecystectomy plus localized segmentectomy was done in 7 patients, palliative surgery – choledocojejunostomy was done in 6 patients. 3 inoperable case were treated be chemotherapy.

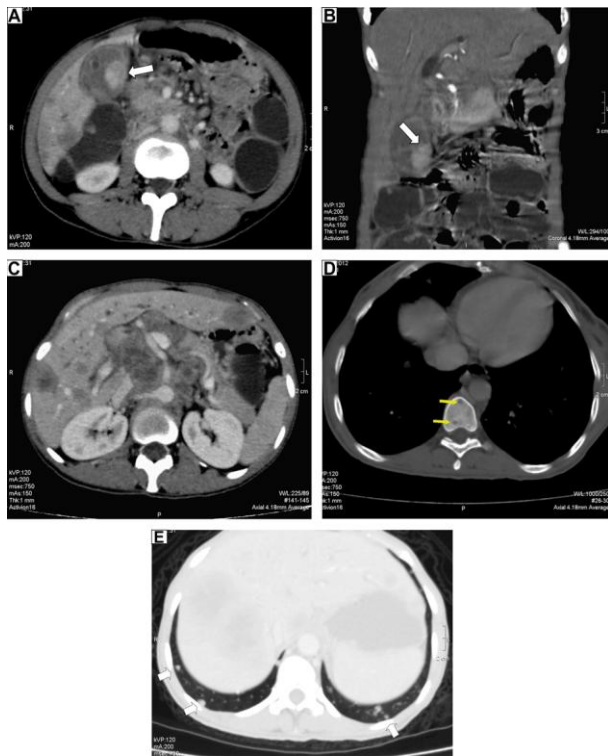


A 65-year old female presenting with right upper abdominal pain, anorexia and jaundice. Multislice contrast enhanced CT images of the abdomen: axial (A) and coronal (B) images showing a sizable heterogeneously enhancing mass infiltrating the gall bladder as well as segment V of the right lobe of the liver (large white arrow in (A) & (B) and the adjacent portion of the gastric antrum and first part of the duodenum. This is associated with mild central intrahepatic

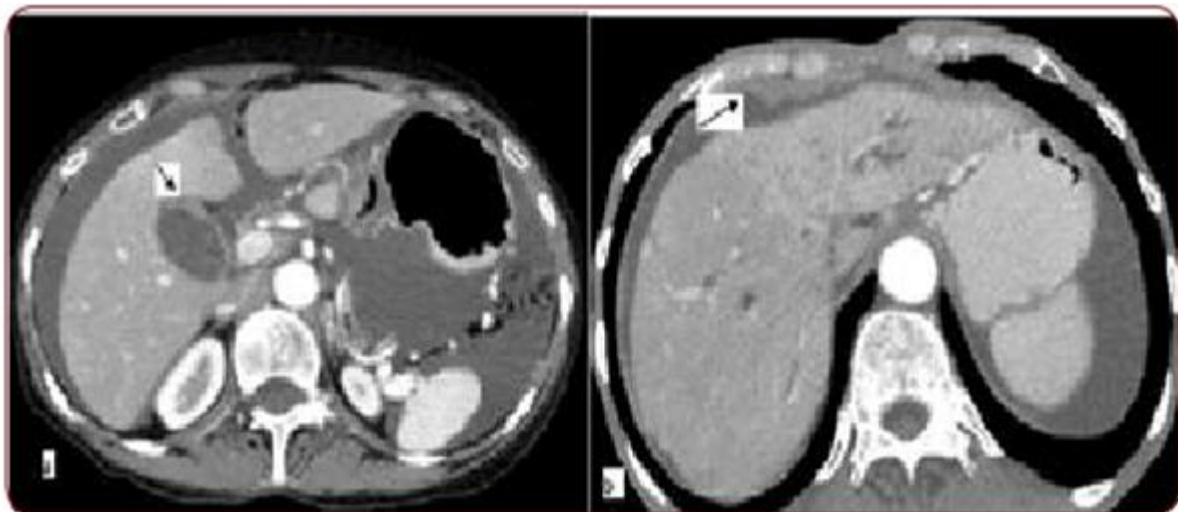
biliary dilatation (small white arrow in (B) and multiple enlarged lymph nodes are seen including the portahepatis, peripyloric and para aortic lymph nodes. Radiological diagnosis of infiltrating gall bladder carcinoma (Stage IVB (T3N2M0) was suggested. Palliative surgery in the form of choledochojejunostomy was performed.



70-year old male presenting with right upper abdominal pain. Multislice contrast enhanced CT images of the abdomen: axial (A) and sagittal (B) images showing marked focal mural thickening of the gall bladder wall with encroachment upon its lumen with heterogeneous enhancement following intravenous contrast injection (large white arrow in (A) and (B)). Radiological diagnosis of gall bladder carcinoma (Stage I (T1N0M0) was suggested and was proved histopathologically after cholecystectomy.



A 53-year old male presenting with right upper abdominal pain, severe weight loss and jaundice. Multislice contrast enhanced CT images of the abdomen: axial (A) and coronal (B) images showing a polypoidal enhancing mass arising from the wall of the gall bladder wall and protruding into its lumen (large white arrow in (A) & (B)). Multiple metastatic liver deposits, mild intrahepatic biliary dilatation and enlarged lymph nodes including the portahepatis, celiac, pre and para aortic groups are seen in axial image (C). Metastatic osseous vertebral deposits are seen in the image (D) (small arrows) and metastatic pulmonary deposits are seen in the image (E) (small arrows). Radiological diagnosis of metastatic polypoidal gall bladder carcinoma (Stage IVB (T1, N2, and M1) was suggested. The patient was treated with chemotherapy and no surgery was performed.



A 56-year old male presenting with right upper abdominal pain, severe weight loss and jaundice. Multislice contrast enhanced CT images of the abdomen: axial (A and B images) – Presence of diffuse irregular enhancing wall thickening noted in posterior wall of GB (small arrow) with mild dilatation of IHBR in image B.

#### 4. Discussion

In our study, 30 patients were examined by radiologically (USG & MDCT) and confirmed by histopathologically during august 2018 to September 2019. In this study we found 18 patients (60%) of infiltrating GB mass, 10 patient (36%) of intraluminal GB polypoidal mass and 2 patient (4%) of focal mural thickening of GB wall.

Infiltrating GB carcinoma was found in 18 patients (60%) in this study. Infiltration in segment V of right lobe of liver was found in 9 patient. Additional involvement of segment IV was found in 1 patient. In all patient of infiltrating GB

mass shows hypodense initially. 10 patients showed mild to moderate heterogeneous enhancement while 8 patient showed no significant enhancement. Our aim in this study to use MDCT tripple phase to rule out other liver pathology. The key diagnostic features of infiltrating GB mass were absence of blush enhancement on arterial phase, rapid wash out in venous phase & enhancement on delayed phase. These features helped in differentiating infiltrating GB mass from other liver pathology.

Intraluminal polypoidal GB mass was found in 10 patients (36%) which were examined by USG and MDCT and confirmed by histopathologically. The size of polyp ranged from 2-5 cm and it showed moderate enhancement. 2 patient (4%) showed irregular focal mural thickening of one layer heterogenous enhancement pattern. It was confirmed histopathologically after cholecystectomy.

In MDCT, sagittal and coronal images were very beneficial in assessing the origin and extension of infiltrating GB

mass. Main goal of our study was applying TNM system for staging of GB carcinoma by use of MDCT. MDCT with its multiplanner capability was able to detect direct hepatic infiltration in 15 patients of infiltrating GB mass. Local infiltration in gastric antrum and duodenum was found in 2 patient. Enlarged metastatic abdominal lymphnodes was found in 8 patients (32%), hepatic metastasis was found in 3 patients (12%), lung metastasis was found in 2 patients (8%) and bony metastasis was found in 1 patient (4 %).

Cholecystectomy was done in 9 patients of stage I of ca GB. Cholecystectomy plus segmentectomy was done in stage IIIa of ca GB. Palliative surgery (Choledoco jejunostomy) was done in 6 patients of stage IV of ca GB. 3 patients were inoperable, they were treated only with chemotherapy.

## 5. Conclusion

After this study, we conclude that MDCT is the investigation of choice in detection, extension and staging of GB malignancy. It is so much helpful to clinician before surgical and palliative management of patients of ca GB.

## References

- [1] Vriesman AC, Engelbrecht MR, Smithuis RH, Puylaert JB.
- [2] Diffuse gall bladder wall thickening: differential diagnosis. *AJR* 2007;188:495-501.
- [3] Sons HU, Borchard F, Joel BS. Carcinoma of the gallbladder: Autopsy findings in 287 cases and review of the literature. *J Surg Oncol* 1985;28:199-206.
- [4] Levy AD, Murakata LA, Rohrman Jr CA. Gallbladder carcinoma: Radiologic-pathologic correlation. *Radiographics* 2001;21:295-314.
- [5] Fong Y, Jarnagin W, Blumgart LH. Gallbladder cancer: comparison of patients presenting initially for definitive operation with those presenting after prior noncurative intervention. *Ann surg* 2000;232:557-69.
- [6] Webe SM, DeMatteo RP, FONG Y, Blumgart LH, Jarnagin WR. Staging laparoscopy in patients with extrahepatic biliary carcinoma: analysis of 100 patients. *Ann Surg* 2002;235:392-9.
- [7] Teefey SA, Baron RL, Bigler SA. Sonography of the gallbladder: significance of striated (layered) thickening of the gallbladder wall. *AJR* 1991;156:945-7.
- [8] Jung SE, Lee JM, Lee K, et al. Gallbladder wall thickening: MR imaging and pathologic correlation with emphasis on layered pattern. *Eur Radiol* 2005;15:694-701.
- [9] Baron RL. Computed tomography of the biliary tree. *Radiol Clin North Am* 1991; 29:1235-50.
- [10] Grand D, Horton KM, Fishman EK. CT of the gallbladder: spectrum of disease. *AJR* 2004; 183:163-70.