World Journal of Biology Pharmacy and Health Sciences
eISSN: 2582-5542
Cross Ref DOI: 10.30574/wjbphs
Journal homepage: https://wjbphs.com/

(CASE REPORT)

The role of imaging in diagnosis and treatment follow-up of gall bladder carcinoma

Manal Saad Mohamed Said *, Ghada Imam Abdelkader, Mohamed Hussein Elsayed Okasha, and Lin Mazen Almadi

Radiology department, primary health care, Dubai Academic Health Corporation, Dubai, UAE.

World Journal of Biology Pharmacy and Health Sciences, 2025, 22(01), 012-019

Publication history: Received on 23 February 2025; revised on 29 March 2025; accepted on 31 March 2025

Article DOI: https://doi.org/10.30574/wjbphs.2025.22.1.0366

Abstract

Imaging plays a critical role in changing the treatment approach for accidentally discovered gallbladder carcinoma (GBC), particularly in determining the extent of disease and staging and guiding surgical and therapeutic decisions. 1

A 62-year-old female patient initially presented with constipation. An abdominal ultrasound scan reveals an incidental large, lobulated mass in the gallbladder. Further imaging with triphasic CT and MRCP was recommended to confirm the diagnosis and evaluate the extent of disease spread. Follow-up CT scans were performed to monitor postoperative recovery and chemotherapy progress.

Keywords: Gall bladder cancer; Adenocarcinoma; Lymph node metastasis; MRCP; Triphasic CT

1. Introduction

Gallbladder cancer (GBC) is a rare but aggressive malignancy arising from the epithelial lining of the gallbladder. Despite its relatively low incidence, it stands as the most common biliary tract malignancy and the sixth most common gastrointestinal cancer worldwide. GBC is characterized by its insidious onset, late presentation, and poor prognosis, making it a significant challenge in oncology.

1.1. Epidemiology

- Incidence varies globally, with higher rates in certain regions like South America and Asia.
- Risk factors include gallstones, chronic inflammation, and genetic predisposition.

1.2. Clinical Presentation

- Often asymptomatic in early stages.
- Symptoms may include abdominal pain, jaundice, and weight loss in advanced stages.

1.3. Diagnosis

- Frequently discovered incidentally during cholecystectomy for benign conditions.
- Imaging modalities like ultrasound, CT, and MRI are crucial in diagnosis and staging.

1.4. Treatment

- Surgery remains the mainstay of curative treatment.
- Advanced cases may require multimodal approaches, including chemotherapy and radiation.

* Corresponding author: Manal Saad Mohamed Said

1.5. Prognosis

- Generally poor, with 5-year survival rates ranging from 5% to 20% overall.
- Early detection and appropriate management significantly improve outcomes.
- Understanding the nuances of GBC diagnosis, staging, and treatment is crucial for improving patient outcomes in this challenging malignancy. [1]

2. Case Presentation

- Age: 62 years
- Medical History: An ultrasound was asked for constipation; no other clinical signs or symptoms.

2.1. Initial ultrasound finding

- The gall bladder shows normal capacity with an echogenic adherent solid cauliflower mass lesion, as seen in Hartman's pouch, about 3 x 2.5 cm in maximum transverse diameters (Figure 1).
- Sludge is also seen within the lumen of the gall bladder—figure 2.
- Multiple enlarged Para Aortic Lymph Nodes are noted. Figure 3

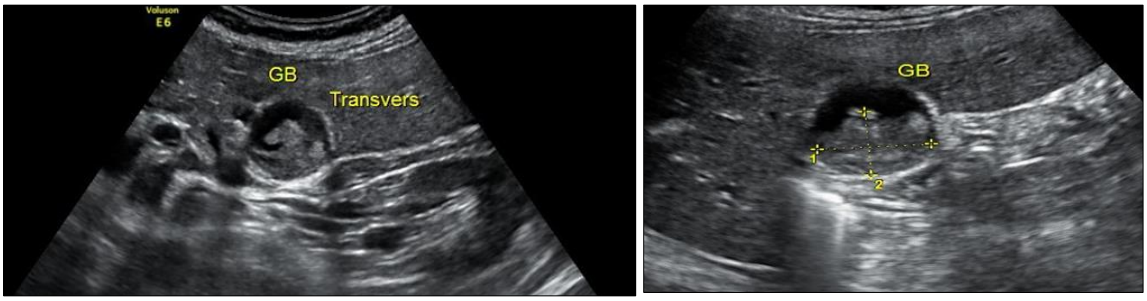


Figure 1 Abdominal ultrasound scan showing gall bladder echogenic adherent solid cauliflower mass lesion seen at Hartman's pouch, about 3 x 2.5 cm in maximum transverse diameters

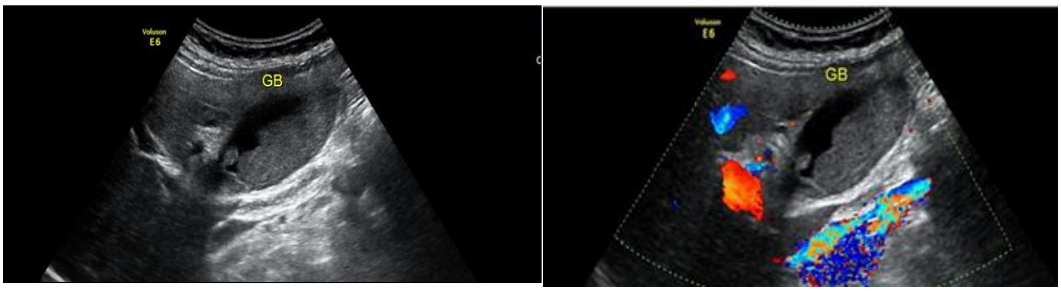
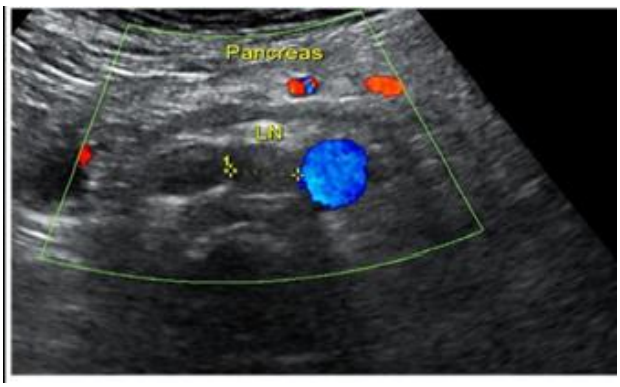


Figure 2 Sludge is also seen within the lumen of the gall bladder



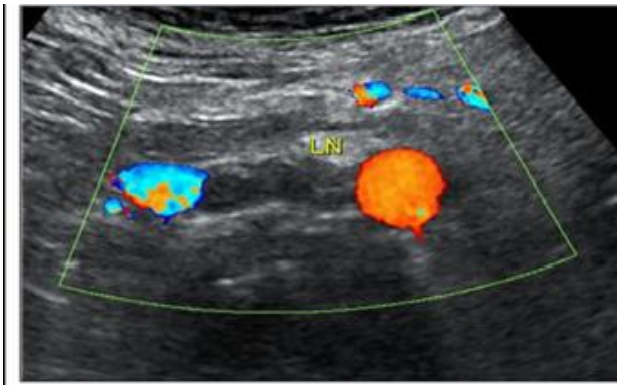


Figure 3 Multiple enlarged Para Aortic Lymph Nodes are also noted

2.2. Primary triphasic CT scan

- The gallbladder shows a hyperdense mass measuring 2.2 x 2 cm in the fundus with no calculi. Figure 4
- A hypodense mass is noted adjacent to the head of the pancreas with poor cleavage. It is a pancreatic-related mass / or a necrotic lymph node. Figure 5
- Multiple para-aortic lymph nodes are also seen, with the largest in the right para-aortic region measuring 3.6 x 3.6 cm. Figure 5

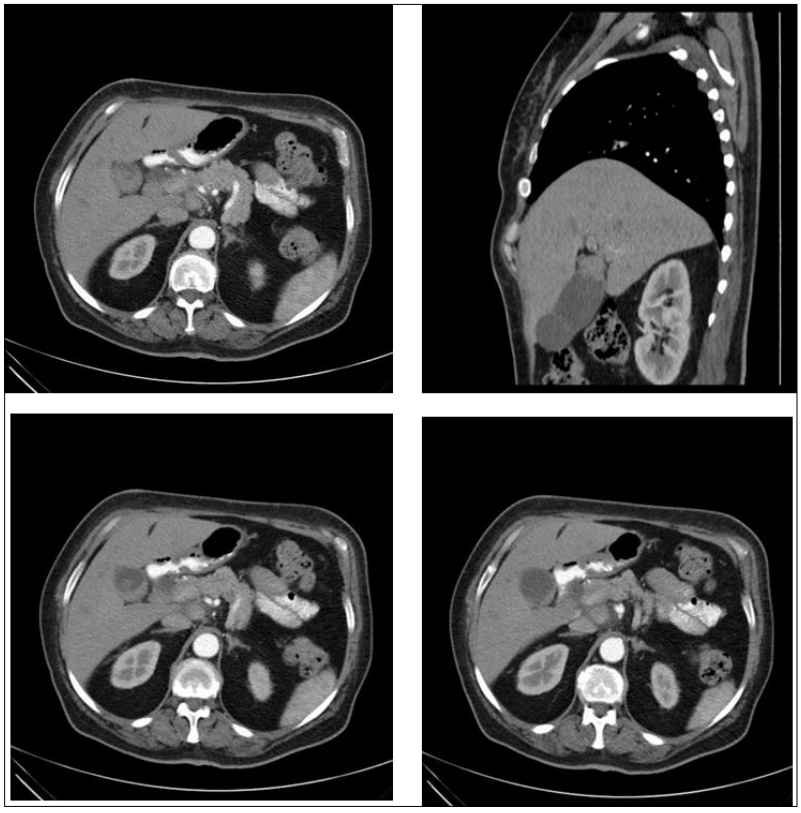


Figure 4 Gallbladder shows a hyperdense mass measuring 2.2 x 2 cm in the fundus with no calculi

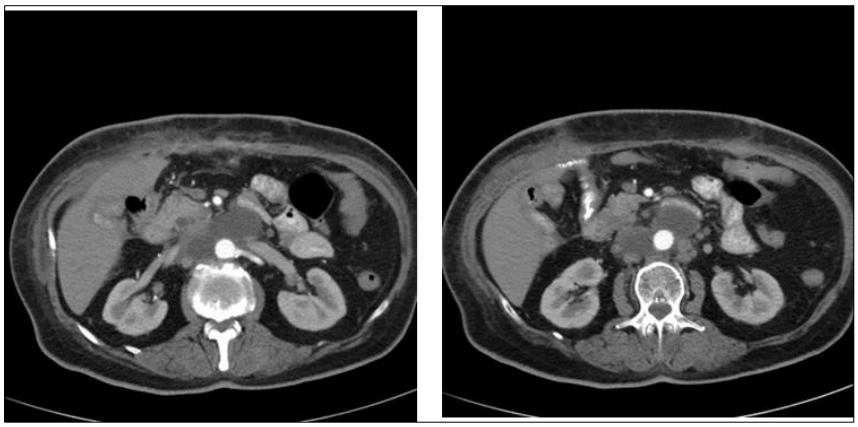


Figure 5 A hypodense mass is noted adjacent to the head of the pancreas with poor cleavage: pancreatic-related mass\ or necrotic lymph node. Multiple para-aortic lymph nodes are also seen, the largest of which are in the right para-aortic region

2.3. MRCP

- The previously depicted mass in the gallbladder represents superior irregular mural thickening.
- The common bile duct measures 9.8 mm. It shows an incomplete defect involving the left posterolateral aspect of its distal segment; ?extrinsic.
- The pancreatic duct measures 3 mm in diameter in the widest distal segment, showing no definite intra-luminal filling defect.
- No dilated intrahepatic biliary radicles. Figure 6

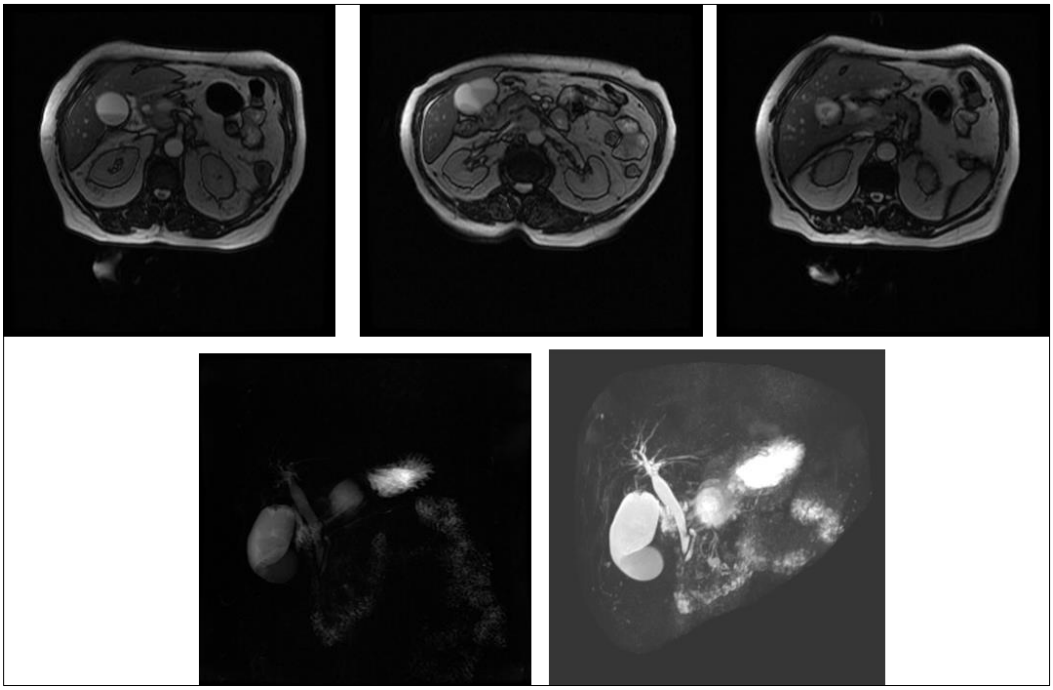


Figure 6 The previously depicted mass in the gallbladder is represented as a superior irregular mural thickening

2.4. Histopathological Diagnosis:

- Lymph node anterior hepatic artery, biopsy: lymph node showing metastatic carcinoma.
- Tissue covering hepatic artery, biopsy: Fibroadipose tissue containing pieces of artery and nerve; no
- evidence of metastatic carcinoma.

- Para-aortic mass, biopsy: lymph node showing metastatic carcinoma; extracapsular extension of tumor present.
- Posterior pancreas, biopsy:
  - lymph node showing metastatic carcinoma; extracapsular extension of tumor present.
  - soft tissue deposit of metastatic carcinoma; lymphovascular invasion present.
  - A small amount of uninvolved pancreas is included in this material.
- Cystic duct, biopsy – Piece of bile duct within normal limits; no evidence of malignancy
- Tissue form CBD bifurcation, biopsy – Fibroadipose tissue showing cautery artifact; no diagnostic
- abnormality recognized.
- Posterior pancreas lymph node biopsy:
  - lymph node showing metastatic carcinoma.
  - A small amount of uninvolved pancreas is included in this material.

2.5 2nd follow-up CT scan for post-surgery evaluation.

* Status postoperative for gallbladder tumor reveals :

- The gallbladder fossa is the seat of pear-shaped fluid-like density, representing a biloma formation. Figure 7.
- The irregular, non-homogenous mass-like lesion is seen at the para-aortic and aortocaval regions, showing non-enhancing hypodense core cystic degeneration / breaking down, most likely nodal in nature. Figure 8
- A mild to moderate amount of fluid density was noticed predominantly within the pelvic and less extent of the peri-hepatic regions. Figure
- Blurring and smudging of the subcutaneous fat planes at both hypochondrial regions.

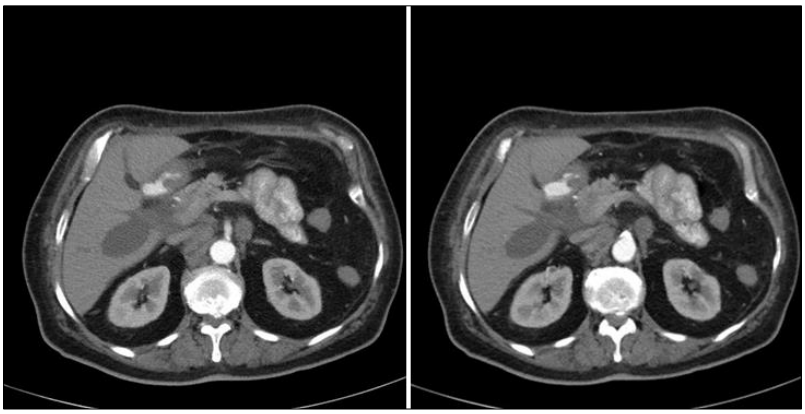


Figure 7 The gallbladder fossa is the seat of pear-shaped fluid-like density, which could represent a biloma formation.

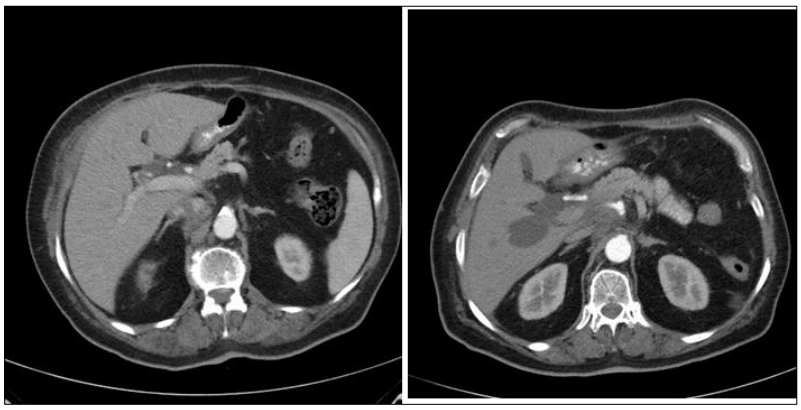


Figure 8 Irregular shape non-homogenous mass-like lesion is seen at the para-aortic and aortocaval regions, showing non-enhancing hypodense core cystic degeneration / breaking down, most likely nodal in nature

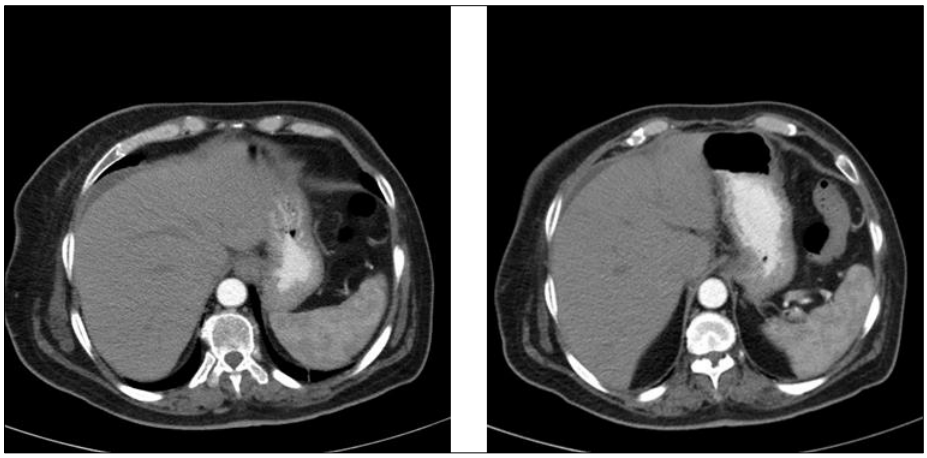


Figure 9 Blurring and smudging of the subcutaneous fat planes at both hypochondrial regions

2.5. Follow-up CT SCAN after chemotherapy

- reduced collection size noted in the GB bed likely favors biloma formation for correlation with operative and clinical data.
- There has been a significant reduction in the size of previously enlarged para-aortic and aortocaval LNs. The largest aortocaval LN is seen, measuring 16 mm on the short axis and showing cystic/necrotic changes. Minimal subhepatic collection is less than seen previously, and mild pelvic ascites previously noted have resolved.
- The resolve of anterior right hypochondrium subcutaneous fat stranding was noted in a previous study—figure 10.

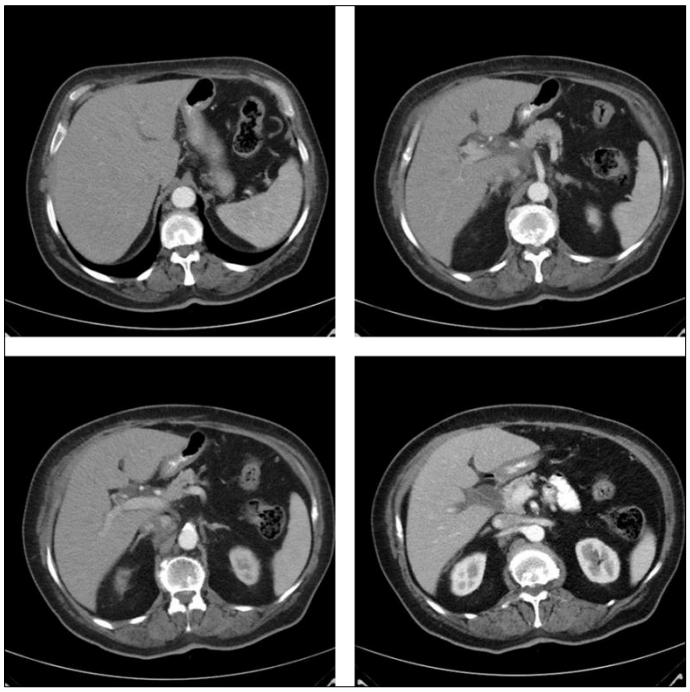


Figure 10 Reduce the size of the collection noted in the GB bed. Significant reduction in the size of previously seen enlarged para-aortic and aortocaval LNs. With the resolve of previously noted mild pelvic ascites. Resolve of anterior right hypochondrium subcutaneous fat stranding was noted in a previous study

3. Discussion

Imaging plays a critical role in changing the treatment approach for accidentally discovered gallbladder carcinoma (GBC), particularly in determining the extent of disease, staging, guiding surgical and therapeutic decisions.

3.1. Key Roles of Imaging and how this could impact treatment

3.1.1. Ultrasound (US)

Initial Modality: Widely available and cost-effective, the US is often the first step in evaluating gallbladder disease. **Findings**: Identifies masses, wall thickening, or polyps but has limitations in detecting early-stage disease and metastases [1][3][8].

*3.1.2. Computed Tomography (CT)***

- Role: Used for staging and assessing local invasion, lymph nodes, and distant metastases. [2]
- Protocol: Multiphase contrast-enhanced scans (arterial and portal venous phases) with 3D reconstructions for surgical planning [1][2][5].

3.1.3. Magnetic Resonance Imaging (MRI)

- Strengths: Superior soft-tissue characterization and sensitivity for hepatic invasion (87.5%-100%) and nodal metastasis (92%) [1].
- Protocol:
  - T1-weighted imaging for gallbladder wall evaluation.
  - T2-weighted sequences for soft-tissue abnormalities.
  - MR cholangiopancreatography (MRCP) to assess bile duct involvement.
  - Dynamic contrast-enhanced imaging to evaluate liver infiltration and metastases [1][4].

3.1.4. Positron Emission Tomography/CT (PET/CT):

- Detects occult metastases and residual tumors after surgery, aiding in staging and treatment decisions [1][2].

*3.1.5. **Endoscopic Ultrasound (EUS)***

- It helps differentiate benign from malignant lesions and evaluate local spread [4][7].

These imaging protocols ensure comprehensive diagnosis, staging, and treatment planning for gallbladder cancer.

Accurate Staging

- CT and MRI are essential for assessing local invasion, nodal involvement, and distant metastases. CT predicts resectability with an accuracy of 85%, while MRI is more sensitive for detecting direct hepatic invasion (87.5%-100%) and nodal metastasis (92%)[1] [4] [11].
- PET/CT is valuable for identifying occult metastases and residual disease post-cholecystectomy[1] [4].

Surgical Planning

- Imaging helps determine the feasibility of radical surgeries like completion cholecystectomy, liver resection, and lymph node dissection. Revisional surgery is often warranted for T2 or more advanced incidental GBCs to achieve R0 resection[3] [5] [9].

Prognostic Insights

- Early detection through imaging improves outcomes, as radical surgery combined with adjuvant therapy offers better survival rates. Residual disease in the gallbladder fossa or liver predicts a poor prognosis [4] [5] [10].

Avoiding Unnecessary Procedures:

- Advanced imaging can prevent futile surgeries by identifying unresectable disease or distant metastases[3] [7].
- In summary, imaging modalities like CT, MRI, MRCP, and PET/CT are indispensable in managing incidental GBC, enabling personalized treatment plans that maximize survival chances.

4. Conclusion

Gallbladder carcinoma is a highly aggressive malignancy with a poor prognosis. Imaging features may overlap with those of common benign gallbladder diseases. It is often diagnosed at locally advanced stages, and a high index of suspicion is required for accurate early diagnosis.

MRI features of early disease include a focal enhancing polypoid mass larger than 1.0 cm and focal mural thickening in the absence of clinical cholecystitis. In these cases, surgical referrals should be considered. In cases of advanced disease, an enhancing mass is often noted to replace and expand the gallbladder lumen with direct involvement of the adjacent liver and biliary tree. There are often local-regional lymph nodes and visceral and peritoneal metastases.

The clinical and radiologic detection of gallbladder carcinoma at a curative stage remains problematic. It is imperative for radiologists to closely scrutinize the gallbladder, particularly in patients who are at increased risk of developing gallbladder carcinoma, for subtle morphologic abnormalities that may indicate cancer. Recognition of the characteristic imaging appearances of primary gallbladder carcinoma and understanding its pathways of spread and staging criteria help optimize patient triage to appropriate treatment regimens

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest is to be disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

References

[1] Lopes Vendrami, C. et al. (2021). 'Gallbladder carcinoma and its differential diagnosis at MRI: What radiologists should know,' RadioGraphics, 41(1), pp. 78–95. doi:10.1148/rg.2021200087.

[2] AA, K. (2014). 'Management of incidentally detected gallbladder carcinomas in a high prevalence area of gall bladder cancer,' Tropical Gastroenterology, 35(1), pp. 39–43. doi:10.7869/tg.162.

[3] Choi, K.S. (2015). 'Clinical characteristics of incidental or unsuspected gallbladder cancers diagnosed during or after cholecystectomy: A systematic review and meta-analysis,' World Journal of Gastroenterology, 21(4), p. 1315. doi:10.3748/wjg.v21.i4.1315.

[4] Furlan, A. et al. (2008). 'Gallbladder carcinoma update: Multimodality imaging evaluation, staging, and treatment options,' American Journal of Roentgenology, 191(5), pp. 1440–1447. doi:10.2214/ajr.07.3599.

[5] Kumar, S. et al. (2018). 'Multimodality management of incidentally detected gall bladder cancer: Long term results from a tertiary care cancer centre', Journal of Gastrointestinal Oncology, 10(1), pp. 128–133. doi:10.21037/jgo.2018.09.10.

[6] Ramachandran, A., Srivastava, D.N. and Madhusudhan, K.S. (2020). 'Gallbladder cancer revisited: The evolving role of a radiologist,' The British Journal of Radiology, 94(1117). doi:10.1259/bjr.20200726.

[7] Muzio, B.D. (2025) Gallbladder carcinoma | radiology reference article | radiopaedia.org. Available at: https://radiopaedia.org/articles/gallbladder-carcinoma-1 (Accessed: 28 March 2025).

[8] Skalicky, T. and Molacek, J. (2024). 'Treatment of accidentally diagnosed gallbladder cancer after laparoscopic cholecystectomy,' HPB, 26. doi:10.1016/j.hpb.2024.03.908.

[9] Rana, P. et al. (2024). 'Update on the role of imaging in the diagnosis, staging, and prognostication of gallbladder cancer,' Indian Journal of Radiology and Imaging [Preprint]. doi:10.1055/s-0044-1789243.

[10] Andrén-Sandberg, Å. (2012) 'Diagnosis and management of gallbladder cancer', North American Journal of Medical Sciences, 4(7), p. 293. doi:10.4103/1947-2714.98586.

[11] Menon, G. (2024). Gallbladder carcinoma, StatPearls [Internet]. Gallbladder Carcinoma - StatPearls - NCBI Bookshelf (nih.gov) (Accessed: 30 March 2025).