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Case Report

Immediate radical cholecystectomy for suspected gallbladder cancer identified intraoperatively: a case report

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ABSTRACT

Gallbladder cancer (GBC) is the most common malignancy of the biliary tract and is associated with poor prognosis due to its aggressive biological behavior and frequent diagnosis at advanced stages. Preoperative diagnosis remains challenging, and a significant proportion of cases are detected incidentally or suspected only during surgery performed for presumed benign gallbladder disease. For tumors staged T1b or higher, current international guidelines recommend radical cholecystectomy with hepatic resection of segments IVb and V and regional lymphadenectomy to achieve adequate oncological control. However, the optimal timing of extended resection when malignancy is suspected intraoperatively remains controversial. We report the case of a 78-year-old woman undergoing evaluation for gastroesophageal reflux disease in whom abdominal ultrasonography revealed a gallbladder fundal lesion suspicious for malignancy. Contrast-enhanced thoracoabdominopelvic computed tomography showed no evidence of distant metastases or invasion of adjacent structures. The patient was scheduled for laparoscopic cholecystectomy with the possibility of extended resection depending on intraoperative findings. During laparoscopy, macroscopic features highly suggestive of malignancy were identified, prompting conversion to open surgery and immediate radical cholecystectomy with non-anatomical resection of liver segments IVb and V and regional lymphadenectomy. Histopathological examination confirmed invasive biliary-type gallbladder adenocarcinoma staged as pT2N0M0 (stage IIA) with negative surgical margins (R0). The postoperative course was uneventful, and adjuvant systemic therapy was initiated. Immediate radical cholecystectomy during index surgery may represent a feasible and oncologically sound approach when GBC is suspected intraoperatively.

Keywords: Gallbladder cancer, Radical cholecystectomy, Intraoperative diagnosis, Liver resection, Lymphadenectomy

INTRODUCTION

Gallbladder cancer (GBC) is the most common malignancy of the biliary tract and represents a highly aggressive disease with poor overall survival, largely due to late diagnosis and early dissemination.[1,2] Its incidence varies geographically, with higher prevalence reported in Latin America and parts of Asia.[3] Adenocarcinoma accounts for more than 90% of cases, and surgical resection remains the only potentially curative treatment for early-stage disease.[1,4]

Despite advances in imaging, preoperative diagnosis remains challenging, and a considerable proportion of cases are detected incidentally after cholecystectomy performed for presumed benign conditions such as cholelithiasis or chronic cholecystitis.[2,5] For tumors staged T1b or higher, simple cholecystectomy is considered oncologically inadequate because of the risk of residual disease in the gallbladder bed and regional lymph nodes.[6,7] Consequently, international guidelines recommend radical cholecystectomy, including hepatic resection of segments IVb and V with regional lymphadenectomy, to achieve R0 resection and accurate staging.[1,8,9]

When malignancy is suspected intraoperatively, immediate radical resection during index surgery may represent the most oncologically appropriate strategy, avoiding delayed reoperation and the additional morbidity associated with staged procedures.[10,11] We report a case of gallbladder adenocarcinoma managed with immediate radical cholecystectomy based on intraoperative findings, emphasizing the role of intraoperative surgical judgment in oncological decision-making.

CASE REPORT

A 78-year-old woman with a history of long-standing hypertension, controlled hypothyroidism, and gastroesophageal reflux disease under medical treatment was referred for surgical evaluation for antireflux management. As part of her preoperative assessment, abdominal ultrasonography revealed a polypoid lesion with irregular borders located at the gallbladder fundus, with sonographic features suspicious for malignancy (Figure 1).

Further staging with contrast-enhanced thoracoabdominopelvic computed tomography (CT) demonstrated a solid intravesical lesion with finely lobulated margins. On the non-contrast phase, the lesion demonstrated homogeneous hypodense attenuation (36 HU), while the arterial phase revealed avid heterogeneous nodular enhancement (120 HU). Focal gallbladder wall thickening with retraction at the site of implantation was observed, suggestive of parietal involvement (Figure 2). The lesion measured 32×34 mm in the transverse plane and 41 mm along its greatest sagittal axis (Figure 3). Maximum intensity projection (MIP) reconstruction demonstrated marked tumoral vascularity, identifying a feeding vessel arising from a direct branch of the gastroduodenal artery (Figure 4). No evidence of distant metastases or invasion of adjacent organs was identified.

Laboratory evaluation revealed no abnormalities. Liver function tests were within normal limits, including bilirubin levels, alkaline phosphatase, gamma-glutamyl transferase, aspartate aminotransferase, alanine aminotransferase, and total protein levels. Tumor markers were also within normal ranges: carbohydrate antigen 19-9 (CA 19-9) 9.65 U/ml, cancer antigen 125 (CA 125) 5.7 U/ml, carcinoembryonic antigen (CEA) 1.73 ng/ml, and alpha-fetoprotein (AFP) 3.29 ng/ml.

Based on these findings, laparoscopic cholecystectomy was scheduled, with the possibility of conversion to radical resection depending on intraoperative findings.

During laparoscopic exploration, dense omentum–gallbladder adhesions were identified. The gallbladder was markedly enlarged (approximately 12×8×6 cm), with a firm, irregular lesion measuring approximately 3×3 cm located in the fundus. Given the strong macroscopic suspicion of malignancy and the unavailability of intraoperative frozen section analysis, the procedure was converted to open surgery to allow oncologically adequate resection (Figure 5).

A radical cholecystectomy was performed, including non-anatomical resection of liver segments IVb and V and portal lymphadenectomy. Enlarged lymph nodes from stations 12b, 12c, 12a, 8a, 8p, and 13a were resected. No macroscopic liver lesions or peritoneal implants were identified.

Histopathological findings and TNM staging

Histopathological examination revealed an invasive gallbladder adenocarcinoma of biliary type (G2, moderately differentiated), with predominantly papillary architecture and a size of 5×3 cm. The discrepancy between radiological and pathological tumor measurements was attributed to specimen orientation and fixation. Gross examination showed a solid, nodular, exophytic lesion located at the gallbladder fundus, associated with wall thickening (Figure 6).

Microscopic examination demonstrated papillary and solid tumor patterns composed of glands lined by pseudostratified columnar epithelium with marked cellular pleomorphism, large hyperchromatic nuclei, loss of polarity, and atypical mitotic figures (Figures 7 and 8). Tumor invasion into the muscular layer and vascular wall was identified, without serosal involvement, corresponding to pT2 disease (Figure 9).

Microscopic vascular and lymphatic invasion was present, with no evidence of perineural invasion. All surgical margins were negative, and all 31 regional lymph nodes examined were free of malignancy. Hepatic tissue showed

inflammatory and obstructive cholestatic changes without evidence of malignant neoplasia. The final pathological stage was pT2N0M0 (stage IIA), according to the TNM classification of the American Joint Committee on Cancer (AJCC), 8th edition.[15]

Intraoperative findings raised a strong suspicion of gallbladder malignancy, leading to conversion from laparoscopic to open surgery and immediate radical cholecystectomy. No macroscopic evidence of metastatic disease was observed.

The postoperative course was uneventful, with no surgical or infectious complications. The patient was discharged in stable condition and referred for adjuvant systemic therapy following multidisciplinary evaluation.

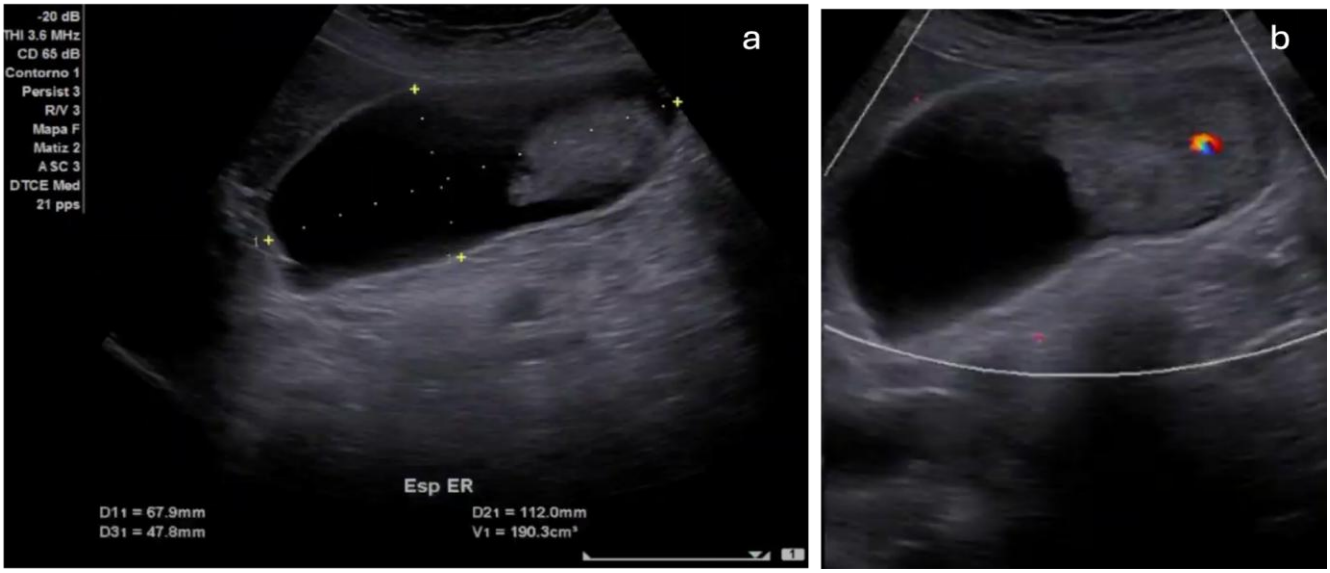

Figure 1 (A and B): A-Solid echogenic intravesical lesion with a vegetative morphology arising from the wall at the gallbladder fundus, with a pedunculated base and finely lobulated margins, without acoustic shadowing or mobility with positional changes. B-Color Doppler demonstrating internal vascularity. No evidence of perivesicular fluid.

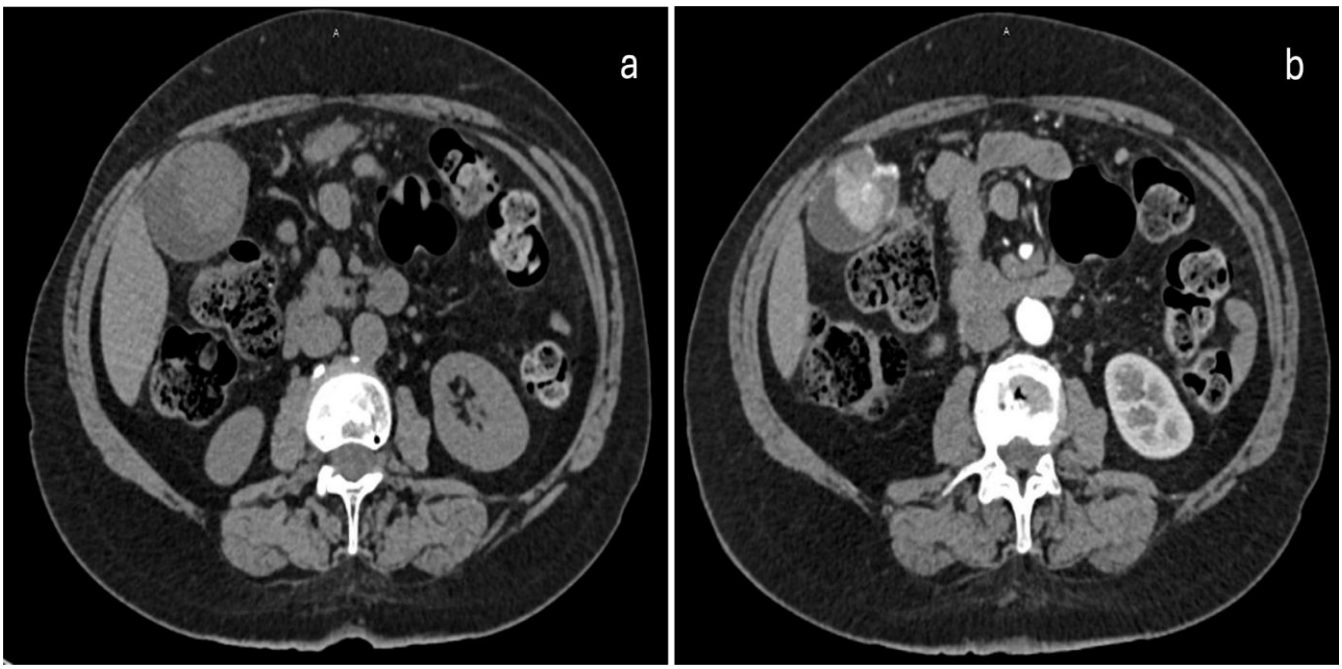

Figure 2 (A and B): On non-contrast and contrast-enhanced computed tomography (CT), a solid intravesical lesion with finely lobulated margins is identified. (A) On the non-contrast phase, it demonstrates homogeneous hypodense attenuation (36 HU). (B) During the arterial phase, it shows avid heterogeneous nodular enhancement (120 HU). Focal gallbladder wall thickening with retraction at the site of implantation is observed, suggestive of parietal involvement.

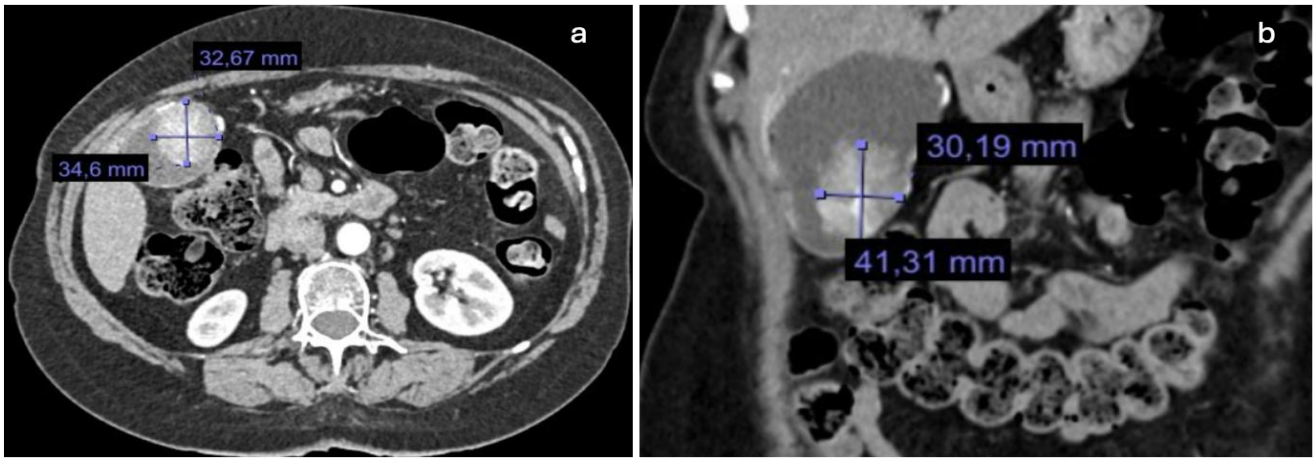

Figure 3 (A and B): (A) Contrast-enhanced computed tomography (CT) in the axial plane showing a solid intravesical lesion measuring 32×34 mm. (B) Maximum sagittal axis measuring 41 mm.

Figure 4: Maximum intensity projection (MIP) reconstruction of the contrast-enhanced phase demonstrating marked tumoral vascularity, with identification of a feeding vessel arising from a direct branch of the gastroduodenal artery.

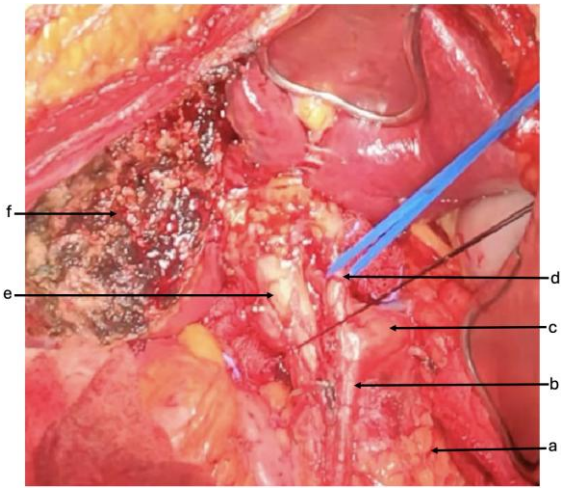

Figure 5: Operative field following portal lymphadenectomy demonstrating complete exposure of the common hepatic artery (c), proper hepatic artery (d), gastroduodenal artery (b), pancreas (a), and common bile duct (e), with the hepatic surface and biopsy site visible (f).

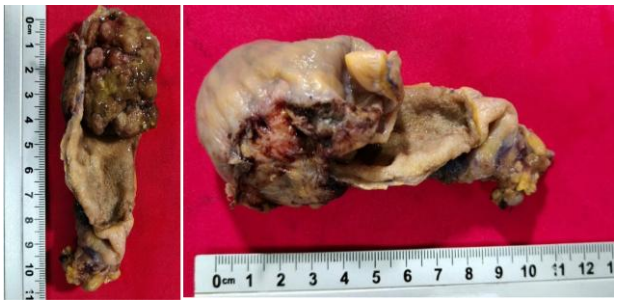

Figure 6: Macroscopic view of the surgical specimen showing a gallbladder with a solid, nodular, exophytic lesion occupying the fundic lumen and associated wall thickening.

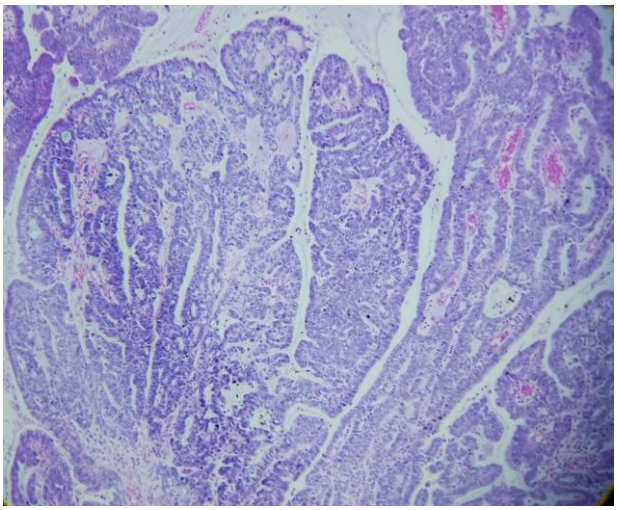

Figure 7: Photomicrograph of gallbladder tissue stained with hematoxylin and eosin (H and E) demonstrating a moderately differentiated gallbladder adenocarcinoma.

*The glands display papillary and solid architectural patterns. These papillae are lined by pseudostratified columnar epithelium with evident cellular pleomorphism, enlarged hyperchromatic nuclei, loss of polarity, altered nuclear-to-cytoplasmic ratio, and atypical mitotic figures.

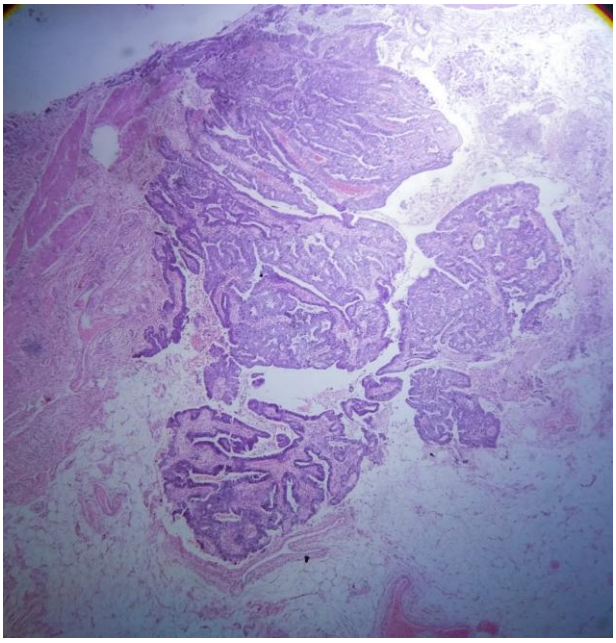

Figure 8: H and E-stained photomicrograph of gallbladder histologic sections demonstrating a moderately differentiated adenocarcinoma with vascular wall invasion extending to the muscular layer.

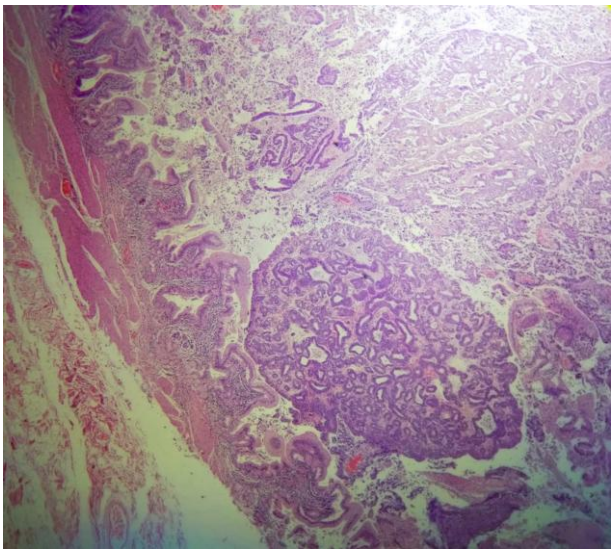

Figure 9: H and E-stained photomicrograph of gallbladder histologic sections demonstrating a moderately differentiated adenocarcinoma with papillary and solid growth patterns.

DISCUSSION

GBC remains a highly aggressive malignancy with poor prognosis, largely due to late diagnosis and early dissemination.[1,2,12] Although imaging advances have improved preoperative detection, a substantial proportion of cases are still diagnosed incidentally or suspected only during surgery for presumed benign disease.[2,5]

For tumors staged T1b or higher, simple cholecystectomy is oncologically insufficient. Several studies have demonstrated a significant risk of residual disease in the gallbladder bed and regional lymph nodes, supporting extended cholecystectomy with hepatic resection of segments IVb and V and regional lymphadenectomy.[6,7,9] These recommendations are consistently supported by major international guidelines, including those of the National Comprehensive Cancer Network (NCCN) and the European Society for Medical Oncology (ESMO).[1,8]

The optimal timing of radical surgery remains controversial. Delayed reoperation after initial cholecystectomy has been associated with increased operative complexity, higher morbidity, and delays in adjuvant treatment.[10,11,13] In contrast, radical cholecystectomy performed during index surgery allows definitive oncological management in a single procedure and may facilitate earlier recovery and adjuvant therapy initiation.[11,14]

In the present case, intraoperative macroscopic findings strongly suggested malignancy, prompting immediate radical resection. Although intraoperative frozen section analysis can aid decision-making, it is not universally available and may be limited in accurately assessing tumor depth. Evidence from specialized centers supports proceeding with radical resection based on macroscopic findings when malignancy is suspected and no distant disease is evident.[16,17]

Adequate lymphadenectomy plays a critical role not only in accurate pathological staging but also in prognostic stratification and therapeutic decision-making. Current consensus recommends evaluation of at least six lymph nodes.[6,15] In this case, extensive lymph node harvest enabled precise pathological staging and confirmed node-negative disease, supporting the adequacy of the surgical approach.

This report is limited by its single-patient nature, which precludes generalization of outcomes. Nevertheless, this case illustrates the feasibility and oncological adequacy of immediate radical cholecystectomy when gallbladder malignancy is strongly suspected intraoperatively, particularly when performed in experienced centers with appropriate surgical expertise.

CONCLUSION

Immediate radical cholecystectomy during index surgery is a safe and oncologically sound strategy when gallbladder malignancy is suspected intraoperatively. In selected patients and experienced centers, this approach may prevent reoperation, reduce morbidity, ensure accurate staging, and allow timely initiation of adjuvant therapy in accordance with international guidelines.

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