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Challenges in the Management of Delayed Port-Site Metastasis in Gallbladder Adenocarcinoma: A Case Study and Review of the Literature

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Abstract

Port-site metastasis after laparoscopic cholecystectomy in patients with gallbladder adenocarcinoma is an uncommon but serious concern in oncology. This disease is often challenging because of its delayed onset and the subsequent impact on prognosis. In this case, a 42-year-old woman developed a metastasis at the epigastric port site, 6 years following her laparoscopic cholecystectomy for gallbladder adenocarcinoma. The metastasis appeared as an ulcerative mass with features of squamous differentiation, and histopathological examination confirmed a poorly differentiated carcinoma. Notably, the patient had not sought follow-up care for cancer evaluation or undergone adjuvant therapy post-surgery, which contributed to this delayed complication. The case highlights the diagnostic difficulties posed by port-site metastasis and stresses the need for long-term surveillance in patients who have undergone gallbladder cancer treatment. Furthermore, this case underlines the importance of considering cutaneous malignancies in the differential diagnosis and addressing the surgical complexities of managing these metastases. Given the location of the mass near the subcostal margin and the risk of infection, the mesh could not be used during surgical excision, which complicated the procedure. This situation also increased the likelihood of an incisional hernia, necessitating further surgical intervention. The findings emphasize the critical role of consistent follow-up after laparoscopic cholecystectomy for gallbladder adenocarcinoma and the surgical challenges of achieving adequate margins, minimizing recurrence at port sites, and managing complications such as incisional hernias.

Keywords: Cutaneous metastasis, Port-site metastasis, Laparoscopic cholecystectomy, Gallbladder adenocarcinoma

Introduction

The occurrence of cutaneous metastases from internal cancers is uncommon, with reported rates between 1.0% and 4.6% [1]. These metastases may present as Sister Mary Joseph nodules (SJNs) or as non-SJN types, which are observed post-surgery, after trauma, or due to lymph node involvement. Metastases of the non-SJN variety after laparoscopic surgeries are extremely rare, occurring in only 1-2% of cases [2].

Surgical intervention remains the primary method for treating resectable gallbladder cancers. However, port-site recurrence after laparoscopic procedures poses a notable challenge. Such recurrences are often attributed to complications like bile leakage or gallbladder rupture during surgery, which may increase the chances of tumor recurrence and decrease survival rates [3].

Cutaneous metastasis specifically from gallbladder carcinoma is highly uncommon, with incidence estimates ranging from 0.7% to 9% [3]. These occurrences often point to more advanced stages of the disease and present considerable surgical difficulties, such as handling infected ulcerative lesions and preventing complications like incisional hernias. This case underscores the critical need for ongoing post-surgical follow-up, including cancer staging, metastasis screening, and possible adjuvant therapies. We describe a case of port-site cutaneous metastasis following laparoscopic cholecystectomy for gallbladder adenocarcinoma.

Case report

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Patient's background and presentation

A 42-year-old female presented with a progressively enlarging ulcerated mass at the site of the epigastric port, which had been growing over four months. The patient had previously undergone laparoscopic cholecystectomy in 2018, initially believed to be for gallstones, but later identified as moderately differentiated gallbladder adenocarcinoma [pT2NxMx]. Despite this diagnosis, she did not follow up for any additional cancer treatment or evaluations. Upon clinical examination, a 5 x 4 centimeters mass with ulcerative features and serosanguinous discharge was observed at the port site. Biopsy results confirmed the presence of poorly differentiated carcinoma along with desmoplastic stroma. Immunohistochemical staining revealed positive markers for CK-7 and CK-20, while GATA-3 and TTF1 showed negative results.

Imaging and diagnostic workup

Contrast-enhanced computed tomography (CECT) performed preoperatively identified a heterogeneous mass measuring 5.6 x 6.1 cm extending into the peritoneum without any lymph node involvement. A PET-CT scan also revealed a 4.7 x 4.4 x 3.7 centimeters mass located at the anterior abdominal wall, involving the skin and subcutaneous tissue, but there were no signs of distant metastatic spread.

Surgical intervention

The patient was then subjected to a wide local excision (WLE) of the epigastric mass. The excised tissue measured 6x6 cm, and the resection included a 1-centimeter margin, extending into the underlying peritoneum. The procedure proceeded without any intraoperative or postoperative complications.

Recovery and follow-up

The patient's recovery was uncomplicated, and she was discharged on the fifth postoperative day. Instructions were given regarding diabetes management and the necessity for regular follow-up visits to monitor her progress.

Pathological findings

The histopathological analysis of the excised specimen revealed a size of 8 x 7 x 7 centimeters, with a central 5 x 4.5 x 3 cm ulcerative growth. Microscopic examination confirmed the diagnosis of adenosquamous carcinoma, with p40 positivity and negative Her-2-neu expression. Lymphovascular invasion was present, but no perineural invasion was observed. The tumor had penetrated through the skin, though the surgical margins were clear of any tumor cells.

Results and Discussion

Skin metastasis originating from internal cancers is infrequent and often indicates an advanced stage of disease with aggressive characteristics. In the case of gallbladder carcinoma, it typically spreads locally to the lymph nodes, liver, neighboring organs, and peritoneum, while cutaneous metastasis remains exceedingly rare [4]. This case's diagnosis was verified through both histological analysis and immunohistochemistry, emphasizing the necessity of diligent follow-up care after laparoscopic cholecystectomy for gallbladder cancer. Gallbladder malignancies rank as the sixth most prevalent among gastrointestinal cancers, with adenocarcinoma being the most common histological form.

Instances of metastasis at the port site in gallbladder adenocarcinoma have been reported in various cases [5, 6], especially when gallbladder carcinoma is diagnosed unexpectedly during pre-surgical evaluations. These metastases can appear even several years after surgery, with some cases showing a delay of up to four years [7]. Tumor cells might spread through several pathways, such as direct implantation, or by hematogenous, lymphatic, or extranodal extension from the lymph nodes into the surrounding subcutaneous tissues. The most probable cause of cutaneous metastasis at surgical or port sites is the direct implantation of exfoliated tumor cells during the operation. Additionally, wound healing responses, including macrophage activity and the promotion of angiogenesis, might aid in the growth of the tumor. Factors such as contamination of the wound, pneumoperitoneum, aerosolization of tumor cells, and patient-related factors—like obesity, immunosuppression, and advanced cancer stage—may all contribute to the development of port-site metastases [2].

Cutaneous metastases, which can resemble inflammatory skin conditions, are typically painless, red, or nodular in appearance and often affect areas such as the chest, abdomen, neck, limbs, scalp, and head [8]. Akhtar and colleagues, along with Padilla and their team have reported similar instances of ulcerating, proliferative skin

metastases at port sites after gallbladder cancer surgery [9].

When an incidental gallbladder malignancy is discovered during routine cholecystectomy, it underscores the necessity for thorough patient follow-up [7]. This follow-up process should involve complete staging, checks for metastatic spread, assessment for any remaining disease, and the consideration of additional treatments like chemotherapy or radiotherapy. It is also vital to conduct histopathological analysis of all gallbladder specimens obtained during laparoscopic cholecystectomy for gallstones [10].

In the case discussed the patient did not return for follow-up care after the initial surgery, resulting in missed opportunities for detecting metastasis and administering necessary postoperative treatments for the carcinoma discovered incidentally. Later, the patient presented with a neglected, ulcerated mass in the epigastric region. The mass, which was exophytic and ulcerated, had infected sores that bled upon examination. The patient's underlying diabetes likely played a role in exacerbating the infection.

The close anatomical relationship of the tumor to the subcostal margin created substantial intraoperative difficulties. Had the resection resulted in an exposed or inadequately covered defect, input from a reconstructive surgical team would have been crucial to performing a flap-based closure [11]. Moreover, due to the presence of infection on the lesion's surface, the use of a prosthetic mesh was contraindicated as it could increase the risk of postoperative complications, including meshoma formation or mesh-related infection, potentially requiring the removal of the prosthesis.

Currently, the patient carries a heightened probability of developing an incisional epigastric hernia. Should this complication arise, corrective surgery involving mesh placement would be needed. Although such hernias are not as prevalent as other types of ventral wall hernias—largely because of the anatomical protection provided by adjacent structures like the liver, spleen, and rib margin—complications cannot be ruled out entirely [12].

In confirming the diagnosis, histopathological findings were integrated with radiological data. Immunohistochemistry was essential to distinguish metastatic disease from primary cutaneous neoplasms, as their morphological similarities can lead to diagnostic confusion. In this scenario, the immunomarker p63 was employed to evaluate squamous differentiation within the tumor.

To mitigate the risk of tumor cell implantation at port sites, several preventative strategies have been recommended. These include pre-surgical irrigation with cytotoxic agents, careful extraction of the tumor mass using specimen retrieval bags, minimal handling of malignant tissue, and secure peritoneal closure at each laparoscopic port [10, 11]. Ultimately, skin involvement by gallbladder cancer reflects an advanced pathological stage and is linked to a dire prognosis, emphasizing the critical importance of prompt recognition and diagnosis.

Summary

Although infrequent, port-site metastasis following laparoscopic cholecystectomy in cases of gallbladder adenocarcinoma presents a serious oncological complication. In the reported case, a 42-year-old woman exhibited ulcero-proliferative cutaneous metastasis at the epigastric port site, which emerged six years after her initial surgery. Despite having undergone cholecystectomy, the patient failed to engage in follow-up care or receive any adjuvant oncological treatment, leading to a substantial delay in both diagnosis and management. Histopathological analysis confirmed that the metastatic growth represented a poorly differentiated carcinoma demonstrating squamous differentiation. This case illustrates the diagnostic difficulties associated with port-site metastases and emphasizes the importance of consistent surveillance in individuals with a prior diagnosis of gallbladder carcinoma. The surgical approach was further complicated due to the mass's location near the subcostal margin and the presence of infection, which ruled out mesh application during resection and heightened the risk of subsequent incisional herniation.

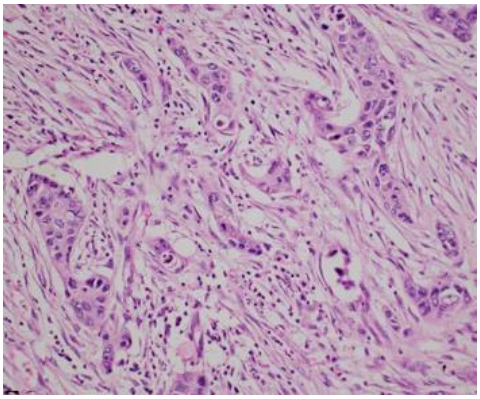
Conclusion

This case powerfully reinforces the necessity for consistent and extended monitoring following laparoscopic cholecystectomy for gallbladder adenocarcinoma to allow for timely recognition and treatment of any arising port-site metastases. The surgical complexities encountered—including achieving clear resection margins, addressing local infection, and mitigating incisional hernia risk—demonstrate the importance of coordinated multidisciplinary care to enhance therapeutic outcomes. Prompt detection and proactive intervention remain fundamental for improving survival prospects in patients facing metastatic

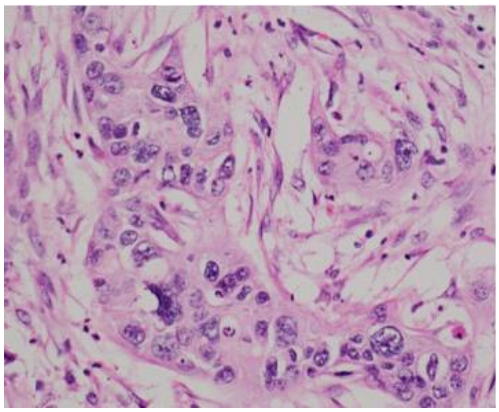
progression of gallbladder carcinoma. Additionally, the case highlights the crucial role of submitting all excised gallbladder specimens for routine histopathological examination to identify incidental gallbladder malignancies and ensure appropriate and early therapeutic management **(Figures 1-3)**.

Figure 1. Preoperative image of epigastric port metastasis

Figure 2. Excised port site metastasis specimen



a)



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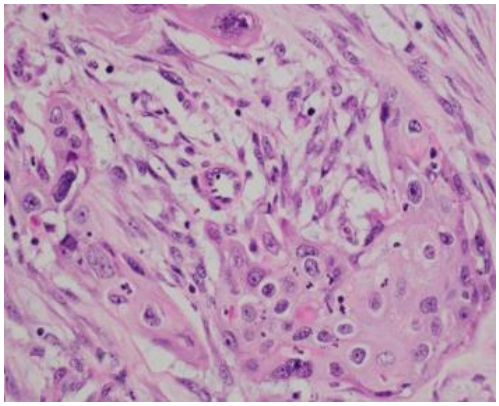
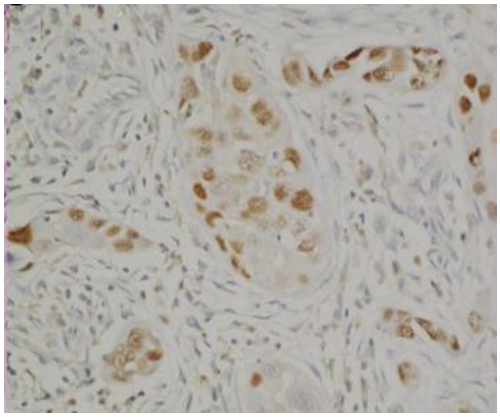


c)



d)

Figure 3. a) sections examined show an infiltrative tumor with both glandular and squamoid areas, H&E X200, glandular (b), and squamoid (c) areas are highlighted, H&E X400; the squamoid areas are immunopositive for P40 (d), X400.

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Conflict of Interest: None

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Ethics Statement: Written informed consent was secured from the patient involved in this case report, including an agreement for the case details to be published in the journal.

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