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Gallbladder Metastasis Originating from Renal Cell Carcinoma

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Background	Metastasis of renal cell carcinoma (RCC) to the gallbladder (GB) represents an infrequent clinical finding. Nevertheless, the early detection and accurate diagnosis of GB metastases are increasingly recognized as important factors influencing the prognosis and management strategy for patients with advanced RCC.
Summary	We present the case of a 53-year-old male diagnosed with gallbladder metastasis originating from renal cell carcinoma, identified seven years following a partial right nephrectomy for the primary tumor. The patient presented with intermittent abdominal pain, prompting routine surveillance imaging via computed tomography (CT). Radiological assessment revealed an 8 mm, non-calcified, multilobulated, polypoid soft tissue mass arising from the anterior gallbladder wall. Subsequent cholecystectomy was performed, and histopathological examination coupled with immunohistochemical staining (positive for PAX-8 and CD10) confirmed the diagnosis of metastatic RCC. This report details this case of a pedunculated, polypoid gallbladder lesion representing RCC metastasis and includes a review of pertinent literature, aiming to identify common clinical and imaging features to improve diagnostic accuracy for this rare metastatic site.
Conclusion	Gallbladder metastasis from RCC is a rare occurrence, often detected incidentally during oncologic surveillance. The identification of suspicious polypoid gallbladder lesions, particularly in patients with a history of renal cell carcinoma, mandates a high index of suspicion and thorough investigation to exclude metastatic involvement, as exemplified by this case.
Key Words	gallbladder metastasis; renal cell carcinoma; partial nephrectomy; cholecystectomy

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Case Description

A 53-year-old male with a history of renal cell carcinoma (RCC) presented for gastroenterological consultation regarding a gallbladder mass identified during routine annual imaging surveillance. The patient had undergone a partial right nephrectomy involving the upper pole seven years prior for RCC at an external institution, without receiving subsequent adjuvant immunotherapy. Given the absence of a relevant family history and incomplete information regarding the primary tumor characteristics, hereditary RCC syndromes were not suspected, and the patient was managed with annual surveillance imaging. A surveillance computed tomography (CT) scan performed seven years post-nephrectomy demonstrated no evidence of local recurrence in the right kidney; however, it incidentally revealed a vascular, multilobulated, enhancing lesion within the gallbladder.

Clinically, the patient reported intermittent abdominal pain, which notably did not worsen postprandially. He denied any history of cholelithiasis, nausea, vomiting, diarrhea, melena, hematochezia, jaundice, or significant weight loss. His social history was significant for daily consumption of three to four cigars and previous heavy alcohol use (12 to 14 drinks per week). Physical examination findings were unremarkable, and laboratory investigations revealed no abnormalities. Based on the patient's symptomatology and the identified gallbladder mass, further diagnostic evaluation with magnetic resonance imaging (MRI) with and without contrast, supplemented by magnetic resonance cholangiopancreatography (MRCP), was pursued one month later. Multiplanar, multisequence MRI demonstrated an 8-millimeter, non-calcified, soft-tissue mass arising from the anterior gallbladder wall, consistent in appearance with a polyp. (Figure 1 and Figure 2). T2-weighted imaging confirmed this finding and also identified small superiorly located gallstones without overt gallbladder wall thickening. The MRCP component of the study yielded unremarkable findings regarding the biliary tree.

Given these findings, a cholecystectomy was recommended and subsequently performed two weeks following the MRI/MRCP. Intraoperatively, the gallbladder polyp was identified and marked, with no gross visual evidence suggestive of malignancy. Pathological examination of the specimen revealed a pedunculated polypoid lesion measuring 1.5 × 0.3 × 0.5 cm, exhibiting surface ulceration and erosion. This lesion protruded into the gallbladder fundus, located 3.0 cm from the cystic duct margin on the hepatic aspect. The gallbladder lumen contained debris mixed with black, friable calculi (largest measuring 0.7 × 0.5 × 0.4 cm). Surgical margins, including the liver bed, were negative for metastatic involvement. Although initial assessment based on preoperative imaging and intraoperative appearance favored a diagnosis of a primary gallbladder polyp, definitive histopathological analysis, including immunohistochemical staining, confirmed metastatic RCC. The tumor cells demonstrated positive staining for PAX-8 and CD10, consistent with a renal origin. Consequently, the patient was referred to medical oncology for systemic staging via positron emission tomography (PET).

Figure 1. MRI without contrast with MRCP. Published with Permission

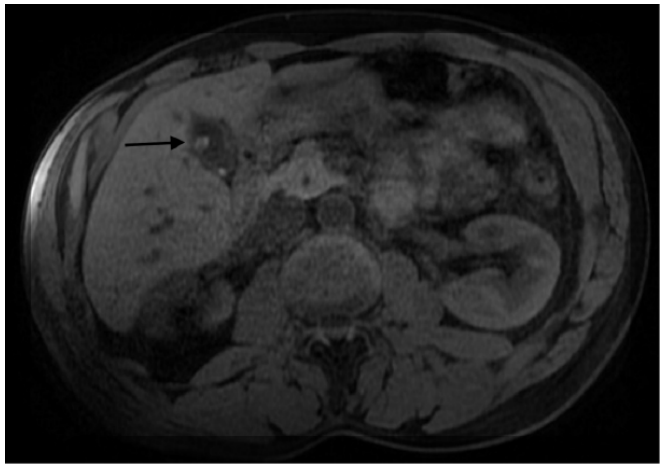
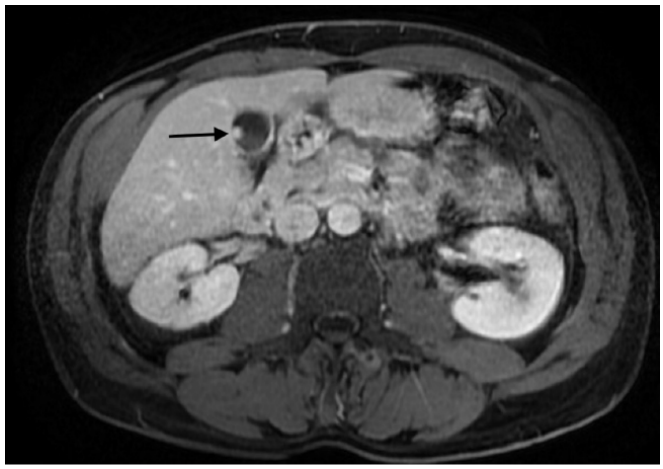


Figure 2. MRI with contrast with MRCP Findings: Non-calcified soft tissue mass arising from the anterior wall of the gallbladder. Published with Permission



Discussion

Metastasis of RCC to the gallbladder represents an infrequent clinical event. Although RCC disseminates metastatically in over one-third of affected individuals, the most commonly implicated sites remain the lungs, liver, bone, brain, and adrenal glands.[1] Given the relative paucity of documented instances in the medical literature, cases of RCC metastasis to the gallbladder warrant reporting to enhance clinical understanding.

This report details the case of a 53-year-old male in whom a gallbladder lesion was incidentally discovered during routine surveillance imaging, seven years following a partial nephrectomy for RCC. Current guidelines from the American Urological Association (AUA) and the National Comprehensive Cancer Network (NCCN) advocate for routine imaging surveillance (CT or MRI) for a minimum of five years post-resection due to the significant risk of local and distant recurrence associated with RCC. Beyond this period, surveillance strategies are typically individualized, balancing recurrence risk against the potential harms of radiation exposure and healthcare costs. In this instance, surveillance was extended beyond the five-year mark due to patient preference and the unavailability of detailed original diagnostic and pathological information. Unfortunately, these original records remain inaccessible, precluding specific conclusions regarding primary tumor characteristics that might predispose to this unusual pattern of metastasis. The surveillance imaging at the seven-year follow-up identified an 8-millimeter, multilobulated, vascular mass within the gallbladder. Considering the rarity of RCC gallbladder metastasis and its anterior wall location, the lesion was initially presumed to be a primary gallbladder polyp.

Gallbladder polyps are broadly classified as either pseudopolyps (benign cholesterol polyps being the most common type) or true polyps, the latter possessing malignant potential, though constituting only about 5% of cases.[2] The decision to pursue cholecystectomy for a polyp requires careful consideration of surgical risks, including bile duct injury, bile leaks, and damage to adjacent structures.[3] Epidemiologically, gallbladder polyps are more prevalent in middle-aged males (male-to-female ratio approximately 1.15:1, average age 49 years).[2] A significant proportion (>64%) are discovered incidentally during investigations for unrelated conditions, with the majority being asymptomatic. Literature reviews suggest that sessile morphology may confer a higher malignant potential compared to pedunculated forms; McCain et al. reported a malignancy rate of 24.8% for solitary sessile polyps, reinforcing cholecystectomy as the recommended management in such cases.[3] Updated European guidelines recommend cholecystectomy for polyps ≥10 mm, or for those measuring 6-9 mm if associated with risk factors such as age >60 years, history of primary sclerosing cholangitis, Asian ethnicity, or sessile morphology with focal wall thickening >4 mm.[4] In our patient, the mass size, symptomatology (despite being atypical), and underlying history of RCC prompted further characterization with contrast-enhanced MRI and MRCP, ultimately leading to a consensus decision for cholecystectomy.

To contextualize this case, a literature review was conducted via PubMed using the terms "Renal Cell Carcinoma AND Gallbladder Metastasis," yielding 88 initial results. After applying exclusion criteria (non-English language articles, cohort studies, systematic reviews, meta-analyses), 51 publications describing 57 unique patients remained for analysis.[5] Our analysis of these published cases revealed a cohort comprising 36 males and 21 females with a mean age of 61 years. This demographic profile is consistent with findings by Patterson et al., who noted an average age of 62 years and a male predominance in their review covering the preceding decade.[6] Our review indicated that RCC metastasis to the gallbladder was detected an average of 4.2 years post-nephrectomy (partial or radical). Data available for 40 patients showed that 25 (62.5%) presented symp-tomatically. Among the 22 patients with incidentally dis-covered gallbladder metastases, 6 presented concurrently with other distant metastatic sites (pancreas, lung, adrenal, stomach, contralateral kidney). All 22 incidental cases were managed with cholecystectomy. Notably, a review of these cases revealed no consistent patterns regarding the depth of invasion, size, or specific location of the metastatic deposit within the gallbladder.

Conclusion

Metastasis of RCC to the gallbladder remains an uncommon manifestation. Including the present case, cumulative data suggest a predilection for males with an average age of approximately 61 years at the time of gallbladder metastasis detection. This case underscores the importance of adhering to established guidelines for the evaluation and management of gallbladder masses, particularly emphasizing that delayed RCC metastasis should be included in the differential diagnosis whenever a polypoid gallbladder lesion is detected during surveillance following nephrectomy, irrespective of the time elapsed since initial treatment. The potential for metastatic disease to mimic benign gallbladder polyps both radiographically and symptomatically necessitates clinical vigilance.

Lessons Learned

This case reinforces the principle that management strategies for gallbladder polyps must integrate the patient's complete medical history, specifically accounting for prior malignancies that elevate the risk profile. Surgeons and clinicians evaluating such lesions should remain cognizant of the possibility of latent RCC metastasis. Ultimately, this report highlights the critical role of sustained, long-term surveillance for all patients with a history of RCC and the necessity for meticulous risk assessment and decision-making when managing incidental gallbladder findings in this population, given the potential for delayed metastatic presentation.

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