



Intracholecystic papillary neoplasm misdiagnosed as adenomyomatosis on imaging: a case report

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Abstract

Intracholecystic papillary neoplasm (ICPN) is a rare preinvasive neoplasm of the gallbladder. The lesion typically appears as a polypoid lesion or gallbladder wall thickening. We report a case involving a 40-year-old man with an ICPN that lacked typical polypoid lesions and was difficult to differentiate from adenomyomatosis because of the presence of intramural cysts. Initial contrast-enhanced computed tomography and magnetic resonance imaging showed edematous gallbladder wall thickening. The lumen was constricted and surrounded by a cluster of small cysts that were suspected to be Rokitansky–Aschoff sinuses (RAS). There were also large cysts within the gallbladder wall. No mucosal irregularities or polypoid lesions were observed, and the mucosal continuity was preserved. After antimicrobial therapy, follow-up computed tomography revealed improvement in the thickening of the gallbladder wall; however, the cysts persisted and some had enlarged. The patient underwent laparoscopic cholecystectomy. Pathologically, a tubulopapillary lesion with atypical epithelial cells was observed in the lumen of the gallbladder, extending continuously into the RAS and cysts within the gallbladder wall. High-grade dysplasia was occasionally found, and microscopic foci of invasion were present. ICPN with associated invasive carcinoma was diagnosed. In conclusion, ICPN may not exhibit polypoid lesions or significant wall thickening on imaging. ICPN may present with secondary RAS dilatation, and the presence of large intramural cysts may be helpful in the diagnosis.

Keywords Intracholecystic papillary neoplasm · Rokitansky–Aschoff sinuses · Computed tomography · Magnetic resonance imaging

Introduction

Intracholecystic papillary neoplasm (ICPN) is a noninvasive epithelial neoplasm that develops in the mucosa of the gallbladder and extends into the lumen, as defined in the

World Health Organization classification [1]. With similarities to intraductal papillary mucinous neoplasm of the pancreas and intraductal papillary neoplasm of the bile duct, ICPN is a preinvasive neoplasm of the gallbladder [2, 3]. ICPN is an uncommon disorder detected in 0.4–0.8% of

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Fig. 1 Coronal (a) and axial (b) contrast-enhanced computed tomography images showing an edematous thickened gallbladder wall, a large cyst within the gallbladder wall (arrowheads), and a constricted gallbladder lumen (arrows). No mucosal irregularities or polypoid lesions are present, and mucosal continuity is preserved

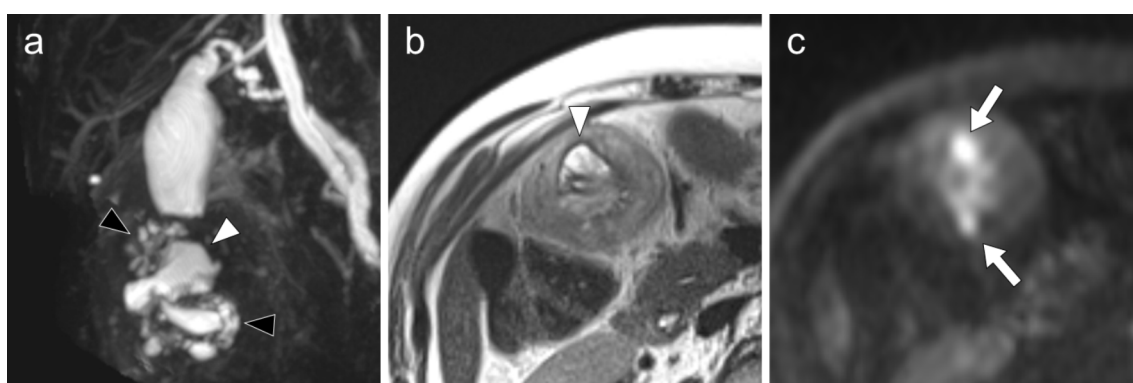
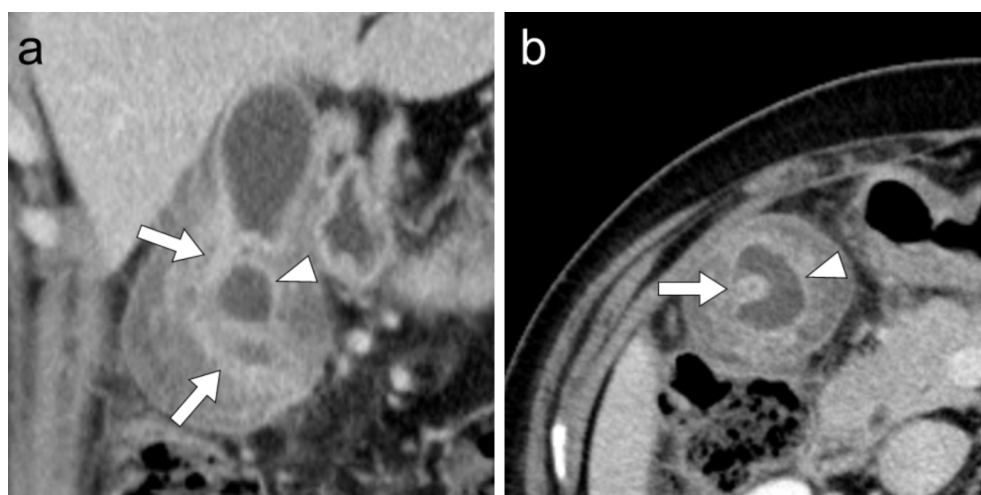


Fig. 2 Magnetic resonance cholangiopancreatography (a) and axial T2 weighted image (b) showing a cluster of small cysts (black arrowheads) that are considered Rokitsansky–Aschoff sinuses, and relatively

large cysts (white arrowheads). Axial diffusion-weighted image (c) showing diffusion restriction in parts of the cysts (arrows)

cholecystectomy specimens [4–6]. On imaging examinations, the lesion typically appears as a polypoid lesion protruding into the lumen or wall thickening of the gallbladder [7]. In this report, we present a case of ICPN that lacked the typical polypoid lesions, making it difficult to differentiate from adenomyomatosis.

Case report

A 40-year-old man presented to our hospital with right upper abdominal pain that had persisted for several days. Laboratory tests revealed leukocytosis (9200/ μ L), elevated C-reactive protein (17.4 mg/dL), and mildly elevated total bilirubin (1.6 mg/dL). Tumor markers were not evaluated as a neoplastic lesion was not suspected.

Initial contrast-enhanced abdominal computed tomography (CT) and magnetic resonance imaging showed severe edematous thickening of the gallbladder wall extending from the body to the fundus (Figs. 1 and 2). The lumen of the gallbladder was constricted in the area of the thickened

wall and surrounded by a cluster of small cysts, which were suspected to be Rokitsansky–Aschoff sinuses (RAS). In addition to the RAS, there were large cysts within the wall with debris-like deposits and restricted diffusion in certain areas. Although the mucosa was thickened and contrast-enhanced, no irregularities or polypoid lesions were observed, and mucosal continuity was preserved. On the basis of these findings, the clinical diagnosis was cholecystitis and adenomyomatosis with intramural bile leak and abscess, and antimicrobial therapy was administered. The patient's clinical symptoms improved, and laboratory data normalized quickly. Follow-up CT 2 months later revealed improvement in the thickening of the gallbladder wall; however, the cysts within the wall persisted and some had increased in size (Fig. 3).

Subsequently, the patient underwent laparoscopic cholecystectomy. During the surgery, the gallbladder was observed to be enlarged; however, there was no significant inflammation or severe adhesions. The histological examination revealed atypical epithelial cells with gastric- or biliary-type morphology that formed a tubulopapillary

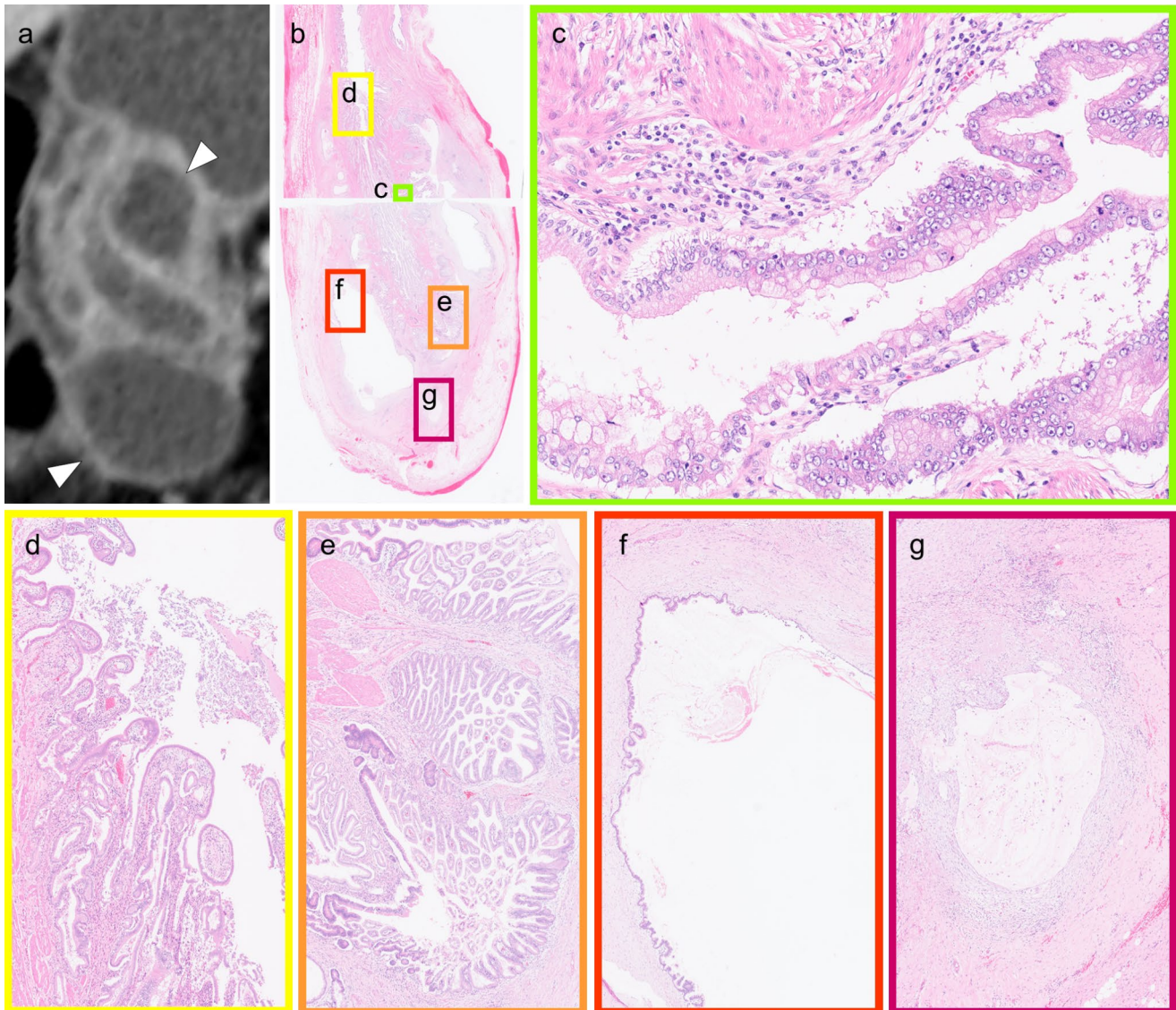


Fig. 3 (a) Coronal contrast-enhanced computed tomography two months after the initial presentation showing improvement in the edematous gallbladder wall thickening; however, the intramural cysts are enlarged compared with the pre-treatment images (arrowheads). Histological examination showing a tumor with tubulopapillary architecture at the funds ((b) H&E, loupe view; (d), H&E, $\times 50$)), extending into the Rokitansky–Aschoff sinuses ((e) H&E, $\times 50$)) and cysts within

the wall ((f), H&E, $\times 50$)). The tumor was composed of columnar cells with clear cytoplasm, partly showing loss of polarity and nuclear pleomorphism, indicating a high-grade ICPN ((c), H&E, $\times 200$)). One of the cysts is ruptured with mucus leakage and xanthogranulomatous reaction ((g), H&E, $\times 50$). H&E, hematoxylin and eosin; ICPN, Intra-cholecystic papillary neoplasm

lesion in the lumen of the gallbladder (Fig. 3). The tumor extended continuously into the RAS and cysts located in the fibromuscular and subserosal layers of the gallbladder wall. All of the RAS were replaced by ICPN, and there were no remaining areas that could be diagnosed as adenomyomatosis without tumor component. High-grade dysplasia was seen occasionally, and microscopic foci of invasion were present. One of the cysts ruptured at the fundus, leading to mucus leakage and a xanthogranulomatous reaction. The final diagnosis was ICPN with associated invasive carcinoma (pT2, in accordance with the 8th edition of the Union

for International Cancer Control Tumor-Node-Metastasis classification).

One month later, regional lymph node dissection was performed, confirming the absence of lymph node metastases. No recurrence was observed during the 3-year postoperative follow-up.

Discussion

ICPN is a rare preinvasive neoplastic lesion of the gallbladder. The mean age of patients is 45.7–63.3 years, with a range of 7–94 years [1, 6, 7]. Male-to-female ratios vary in reports, but women tend to be affected slightly more often than men [4, 6, 7]. Pathologically, lesions present as epithelial tumors with granular, polypoid, or bulky lesions that extend into the gallbladder lumen on gross examination [1]. Approximately 88% of ICPNs are located in the fundus and body of the gallbladder [4]. Microscopically, ICPN is characterized by the intraluminal growth of back-to-back epithelial units, either in a papillary or tubular configuration, or both, with minimal or no intervening stroma [4]. High-grade dysplasia is prevalent (95%), and invasive carcinoma is observed in 50–55% of ICPNs, which is called ICPN with associated invasive carcinoma [4, 6]. The prognosis of ICPN is better than that of conventional gallbladder carcinoma [4]. Even cases of ICPN with associated invasive carcinoma appear to have a significantly better prognosis than those with pancreatobiliary-type gallbladder carcinomas, with median survival times of 35 months versus 9 months, respectively [4]. Therefore, the correct preoperative diagnosis of ICPN and prediction of ICPN with invasive carcinoma are important for estimating prognosis.

On radiological imaging, polypoid lesions or gallbladder wall thickening are often observed. Kiruthiga et al. reported the radiological imaging findings of 26 ICPN cases, noting that 69% had polypoid lesions, 15% had nodular thickening of the gallbladder wall, and 15% had no polyps (sludge, cholelithiasis, or adenomyomatosis) [6]. Kim et al. reported the ultrasonographic or CT findings in 119 ICPN cases [7]. Of the 119 patients with ICPNs, 110 (92.4%) showed measurable polypoid lesions on preoperative CT or ultrasonography. Four imaging patterns have been reported: (1) polypoid lesions without wall thickening (≥ 4 mm) (50.4%); (2) wall thickening without polypoid lesions (5%); (3) wall thickening with polypoid lesions (41.2%); and (4) no abnormal wall thickening or polypoid lesions (3.4%) [7]. Wall thickening may result from intramural tumors, edema, or fibrosis [8]. Maximum wall thickness, mucosal discontinuity, and tumor base wall thickening are independent predictors of ICPN with invasive carcinoma on preoperative CT [7].

In some cases of ICPN, the lesion extends into the RAS, creating invaginations and a pseudoinvasive appearance [4]. ICPN can arise from various sites on the gallbladder mucosa and may also be located inside the RAS, either arising from the RAS mucosa or extending onto it, resulting in RAS expansion secondary to tumor growth or mucus production [8–10]. In our case, the initial examination revealed wall thickening and intramural cysts, raising the suspicion of adenomyomatosis and cholecystitis with intramural bile

leak or abscess. Despite the improvement in wall thickening with antimicrobial therapy, the intramural cysts persisted and some increased in size. Considering the partial diffusion restriction on diffusion-weighted imaging and limited size reduction for an abscess, and the large size for an RAS, it might have been possible to recognize the cysts within the wall as dilated RAS secondary to the tumor. Therefore, ICPN might have been diagnosable even though no polypoid lesions were noted in the gallbladder lumen or intramural cysts on imaging.

In conclusion, some cases of ICPN may not exhibit polypoid lesions or significant wall thickening on imaging. ICPN may present with secondary RAS dilatation, and the presence of large intramural cysts may be helpful in the diagnosis.

Author contributions B.T. and O.S. wrote the main manuscript; M.H. and T.I. wrote the pathology part text and prepared Fig. 3; K.K. and T.O. managed the patients and summarized the clinical information. All authors reviewed the manuscript.

Data availability No datasets were generated or analysed during the current study.

Declarations

Competing interests The authors declare no competing interests.

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