

Case Report

Giant gallbladder mucocele with interparietal abdominal wall extension: a case report

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ABSTRACT

Gallbladder mucocele (hydrops) is an uncommon consequence of prolonged cystic duct obstruction, usually caused by an impacted gallstone at the gallbladder neck or cystic duct. Giant gallbladder mucoceles are rare, and extension into the abdominal wall with interparietal displacement has seldom been described. This case is reported in accordance with the CARE (CAse REport) guidelines. A 73 year old woman presented with a four-week history of a progressively enlarging right upper quadrant mass associated with mild abdominal discomfort. She had no fever, jaundice, or biochemical evidence of biliary obstruction. Contrast-enhanced computed tomography demonstrated a markedly distended gallbladder measuring approximately 15×12×13 cm, with an impacted gallbladder-neck calculus and anterior extension into the abdominal wall between the rectus sheath layers. Open cholecystectomy was performed because of significant anatomical distortion and concern regarding iatrogenic rupture and safe biliary dissection. Intraoperatively, the gallbladder was massively distended, densely adherent to the abdominal wall, and displaced between the anterior and posterior rectus sheaths. Controlled decompression released approximately 800 mL of mucinous fluid, allowing improved operative exposure. Intraoperative cholangiography demonstrated normal biliary anatomy without choledocholithiasis. Histopathological examination confirmed chronic cholecystitis with obstruction-related gallbladder distension, Rokitsansky–Aschoff sinus formation, fibrosis, and chronic inflammatory changes, without evidence of dysplasia or malignancy. This case describes an unusual presentation of giant gallbladder mucocele mimicking an abdominal wall mass. Cross-sectional imaging was essential for diagnosis and operative planning, while controlled decompression, intraoperative cholangiography, and open cholecystectomy facilitated safe management in the setting of severe anatomical distortion.

Keywords: Gallbladder mucocele, Gallbladder hydrops, Chronic cholecystitis, Abdominal wall mass, Open cholecystectomy, Intraoperative cholangiography

INTRODUCTION

Gallbladder mucocele (or hydrops) is an uncommon condition caused by prolonged cystic duct obstruction, most frequently due to an impacted gallstone at the gallbladder neck or Hartmann's pouch.^{1,2} Persistent obstruction prevents gallbladder emptying, resulting in progressive accumulation of clear or mucinous fluid and marked gallbladder distension.³ Chronic distension may

lead to inflammatory changes, mural fibrosis, and structural alterations such as Rokitsansky–Aschoff sinus formation.⁴

Although gallbladder mucoceles are recognised complications of cystic duct obstruction, extreme enlargement resulting in a giant gallbladder is rare, with only isolated cases reported in the literature.^{5,6} Reported giant gallbladders have measured up to 30×31×18 cm and

have contained several litres of fluid, and have typically presented as large intra-abdominal masses causing displacement of surrounding structures.⁵⁻⁷ Extension into the abdominal wall with interparietal displacement between the rectus sheath layers, however, is exceptionally uncommon.⁵⁻⁷

The diagnosis of giant gallbladder mucocele can be challenging because the presentation may mimic other cystic abdominal or abdominal wall lesions. Cross-sectional imaging is essential to identify the organ of origin, demonstrate the underlying obstructive pathology, assess anatomical distortion, and exclude features concerning for malignancy.^{7,8} Mass effect from a progressively enlarging mucocele may also produce compressive complications, including gastric outlet obstruction from extrinsic compression of the duodenum.⁹

Management of giant gallbladder mucoceles requires careful operative planning. Severe distension and distortion of normal biliary anatomy may increase the risk of bile duct injury during conventional laparoscopic cholecystectomy, and open surgery may be required to achieve safe dissection.¹⁰

Here an unusual case of giant gallbladder mucocele secondary to chronic gallbladder-neck obstruction, presenting as a right upper quadrant abdominal wall mass due to extension between the rectus sheath layers is presented. This case highlights the diagnostic challenges and operative considerations associated with extreme gallbladder enlargement.

CASE REPORT

A 73-year-old woman was referred to the emergency department following outpatient imaging arranged by her general practitioner that demonstrated a markedly enlarged gallbladder. She reported a four-week history of a progressively enlarging right upper quadrant mass associated with mild upper abdominal discomfort, intermittently radiating to the right flank. She denied fever, nausea, vomiting, anorexia, weight loss, jaundice, or pruritus.

Her medical history included treated hyperthyroidism and osteoporosis managed with denosumab. On examination, she was haemodynamically stable and afebrile. Abdominal examination revealed a firm, mildly tender right upper quadrant mass without guarding or signs of peritonitis.

Laboratory investigations, including full blood count, liver function tests, and renal function tests, were within normal reference intervals. Tumour markers, including carbohydrate antigen 19-9 (CA19-9) and carcinoembryonic antigen (CEA), were not elevated.

Contrast-enhanced computed tomography demonstrated a markedly distended gallbladder measuring approximately 15×12×13 cm, with an impacted calculus at the gallbladder neck causing chronic cystic duct obstruction (Figure 1).



Figure 1: Contrast-enhanced computed tomography demonstrating a markedly distended gallbladder extending anteriorly into the abdominal wall.

The gallbladder body and fundus extended anteriorly into the abdominal wall, with displacement between the rectus sheath layers. The gallbladder wall remained thin and regular, without mural nodularity, irregular enhancement, hepatic invasion, or regional lymphadenopathy. Magnetic resonance cholangiopancreatography confirmed the calculus impacted at the gallbladder neck and demonstrated no choledocholithiasis (Figure 2).

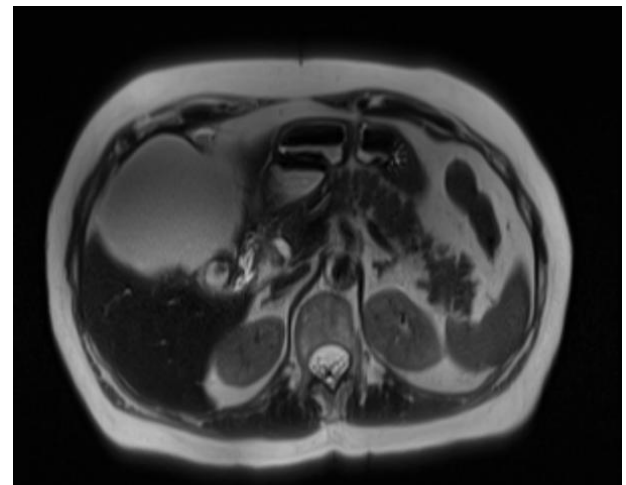


Figure 2: Magnetic resonance cholangiopancreatography demonstrating an impacted calculus at the gallbladder neck causing chronic cystic duct obstruction.

Mild intrahepatic biliary dilatation was present; however, the distal common bile duct was normal in calibre. These findings were consistent with a giant gallbladder mucocele secondary to chronic gallbladder-neck obstruction. Similar cases of giant gallbladder enlargement have demonstrated the importance of cross-sectional imaging in identifying the gallbladder as the source of a large abdominal mass and excluding malignant features.⁵⁻⁸

Operative management

Given the marked gallbladder distension, abnormal anatomical position, and concern regarding distorted biliary anatomy, an open cholecystectomy was planned. A midline laparotomy with right transverse extension was performed. Intraoperatively, the gallbladder was massively distended, densely adherent to the abdominal wall, and displaced between the anterior and posterior rectus sheath layers (Figure 3).



Figure 3. Intraoperative image demonstrating the massively distended gallbladder displaced between the rectus sheath layers.

There was no macroscopic evidence of malignancy. Due to significant wall tension, limited operative exposure and concern for possible malignancy, controlled decompression was performed. Approximately 800 ml of thick mucinous fluid was aspirated, resulting in reduced gallbladder tension and improved surgical access.

The hepatocystic triangle was approached cautiously. The cystic duct was identified, clipped, and opened to allow intraoperative cholangiography. Contrast demonstrated free flow into the duodenum, normal filling of the intrahepatic biliary tree, and no filling defects suggestive of choledocholithiasis (Figure 4).



Figure 4. Intraoperative cholangiogram demonstrating free flow of contrast into the duodenum without filling defects.

The cystic duct and cystic artery were subsequently divided, and cholecystectomy was completed. Due to dense adherence between the gallbladder and abdominal wall structures, a portion of posterior rectus sheath tissue was removed en bloc with the specimen.

The decision to proceed with an open approach was based on the degree of anatomical distortion rather than the presence of malignancy. Although laparoscopic cholecystectomy is considered the standard treatment for benign gallbladder disease, severe distortion of Calot's triangle and inability to safely achieve the critical view of safety may increase the risk of bile duct injury.¹⁰ In complex cases, conversion or planned open surgery allows improved exposure and safer identification of biliary anatomy.¹⁰

Histopathology

Gross examination demonstrated a markedly enlarged gallbladder containing mucinous fluid with an impacted calculus at the gallbladder neck. Microscopic examination showed chronic cholecystitis with obstruction-related gallbladder distension. Histological findings included mucosal ulceration, fibromuscular wall thickening, Rokitansky–Aschoff sinus formation, chronic inflammatory infiltrates, and subserosal fibrosis (Figure 5).

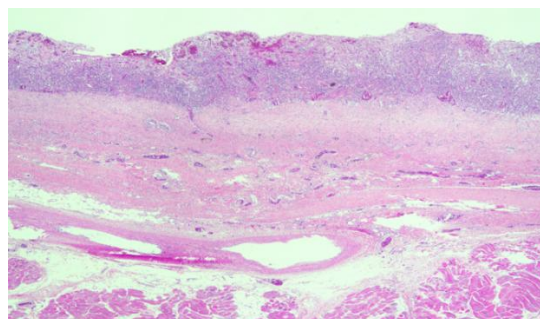


Figure 5. Photomicrograph demonstrating ulcerated mucosa with obliteration of the gallbladder wall, the muscularis replaced by fibrosis, adherent to abdominal wall connective tissue (pink central band) and skeletal muscle (dark pink fibres at the lower edge of the image).

No epithelial dysplasia or malignancy was identified. These findings were consistent with longstanding cystic duct obstruction causing chronic gallbladder distension. Fibrosis, mural thickening and chronic inflammatory change are recognised histological features of longstanding calculous cholecystitis.^{3,4}

Outcome

The postoperative course was uncomplicated. The patient recovered well and was discharged with routine follow-up. At two-week review, she remained clinically well, with complete resolution of the abdominal wall mass and associated discomfort. Histopathological findings confirmed a benign obstructive process, and no further oncological intervention was required.

DISCUSSION

Gallbladder mucocele (also termed gallbladder hydrops) is an uncommon consequence of prolonged cystic duct obstruction, most frequently resulting from an impacted calculus at the gallbladder neck or cystic duct.¹ The pathophysiological process involves continued secretion by the gallbladder mucosa with progressive accumulation of clear or mucinous fluid, leading to gradual gallbladder enlargement.³ Although uncomplicated mucocèles may remain clinically silent, extreme distension can result in significant anatomical distortion and may mimic other intra-abdominal or abdominal wall pathologies.⁴

The present case represents an unusual manifestation of giant gallbladder mucocele, characterised by a markedly enlarged gallbladder measuring approximately 15×12×13 cm with extension between the rectus sheath layers. With respect to gallbladder size, the present case is smaller than several previously reported giant gallbladders. Kuznetsov et al described a gallbladder measuring 17.2×16.1×24.0 cm on computed tomography in a 77-year-old woman, from which approximately 3,350 ml of contents were evacuated at open cholecystectomy; although the anterior gallbladder wall distended the right anterior abdominal wall, interparietal extension between the rectus sheath layers was not described.⁵ Zong et al reported a congenital giant gallbladder measuring 30×31×18 cm containing approximately 3,800 ml of fluid that mimicked a celiac cyst, and Maeda et al described an 18 cm giant gallbladder in a 36 year old woman; in both cases the distended organ remained within the peritoneal cavity.^{6,11} The distinguishing feature of the present case is therefore not absolute size but the anatomical plane of extension, with displacement of the gallbladder between the anterior and posterior rectus sheath layers producing a clinically apparent abdominal wall mass.⁵⁻⁷

In comparison with previously reported cases, the clinical presentation in the present patient was relatively indolent. Despite significant gallbladder enlargement, she had minimal symptoms, presenting mainly with a

progressively enlarging right upper quadrant mass and mild discomfort. This differs from reported cases in which patients present with acute pain or features suggestive of acute cholecystitis, such as the 53 year old woman described by Mirali et al who presented with acute right hypochondrial pain.⁷ Reyes et al reported a 39 year old woman with a massive gallbladder mucocele who, similar to the present patient, had only mild right upper quadrant pain and intermittent postprandial epigastric discomfort, emphasising that the severity of anatomical enlargement does not necessarily correlate with systemic inflammatory manifestations.⁸ Symptoms in giant mucocèles may also arise from mass effect rather than inflammation: Loh et al described a 63 year old man in whom a mucocele caused by a 1 cm calculus impacted in the proximal cystic duct produced gastric outlet obstruction through compression of the second part of the duodenum, presenting with vomiting and weight loss.⁹ In the present case, the mass effect was directed anteriorly into the abdominal wall rather than towards the gastrointestinal tract, which accounts for the absence of obstructive gastrointestinal symptoms.

Second, laboratory findings in the present case were unremarkable, including normal inflammatory markers, liver function tests, and tumour markers. This absence of biochemical abnormality is consistent with the chronic obstructive nature of gallbladder mucocele, in which cystic duct obstruction occurs without necessarily producing infection or common bile duct obstruction.^{1,3} Comparable findings have been reported previously: Zong et al documented normal bilirubin, transaminases, and tumour markers (CA19-9 5.47 kU/l, CEA 1.21 ng/ml) despite a 30 cm gallbladder, and Reyes et al described clinical and laboratory findings that were equivocal and non-specific.^{6,8} By contrast, Kuznetsov et al reported a mild leucocytosis of $11 \times 10^9/l$ with low-count *Enterococcus faecalis* cultured from the gallbladder contents, indicating that secondary infection may occasionally complicate chronic distension.⁵ The absence of jaundice and a normal distal common bile duct calibre in the present case supported isolated cystic duct obstruction rather than choledocholithiasis or malignant biliary obstruction. Clinicians should nevertheless remain aware that normal laboratory findings do not exclude significant pathology, particularly in patients with progressive abdominal masses.

Imaging played a crucial role in establishing the diagnosis and defining operative anatomy. In the present case, contrast-enhanced computed tomography identified the gallbladder as the origin of the mass, demonstrated the impacted gallbladder-neck calculus, and revealed extension into the abdominal wall. Previous reports have similarly emphasised the importance of cross-sectional imaging in patients with atypical gallbladder enlargement: Mirali et al reported that ultrasonography demonstrated a large cystic mass with gallstones while computed tomography confirmed the diagnosis of giant

gallbladder, and Kuznetsov et al used computed tomography to define the relationship between the distended gallbladder, the right kidney, and the anterior abdominal wall.^{5,7} Where ultrasonography is inconclusive or computed tomography is contraindicated, magnetic resonance cholangiopancreatography provides additional anatomical information; Reyes et al relied on magnetic resonance cholangiopancreatography after ultrasonography was limited by body habitus and computed tomography was precluded by contrast allergy, and Loh et al used it to demonstrate the calculus impacted in the proximal cystic duct.^{8,9} In the present case, magnetic resonance cholangiopancreatography complemented computed tomography by confirming the obstructing gallbladder-neck calculus.

A significant consideration in cases of giant gallbladder enlargement is exclusion of malignancy. Chronic cystic duct obstruction may rarely occur secondary to gallbladder carcinoma, and large gallbladder masses may create diagnostic uncertainty; giant gallbladders harbouring adenocarcinoma complicated by empyema have been reported.¹² Imaging assessment for mural thickening, irregular enhancement, hepatic invasion, and lymphadenopathy is therefore essential in this setting.^{7,8} In the present case, the absence of mural nodularity, invasive features, elevated tumour markers, and the subsequent histopathological findings of chronic cholecystitis without dysplasia or malignancy supported a benign obstructive process. Similar findings have been reported in previous giant gallbladder cases, where marked enlargement was ultimately attributed to benign obstruction secondary to gallstone disease.^{5,7}

The surgical management of this patient differed from routine cholecystectomy because of the degree of gallbladder enlargement, abnormal anatomical position, and adherence to the abdominal wall. While laparoscopic cholecystectomy remains the preferred approach for most benign gallbladder conditions, giant mucocoeles may present technical challenges due to limited working space, difficulty achieving the critical view of safety, and increased risk of bile duct injury.¹⁰ Both approaches have been described in previously reported giant gallbladder cases, depending on anatomical complexity and surgeon experience: Kuznetsov et al and Maeda et al performed open cholecystectomy, whereas Reyes et al and Loh et al completed laparoscopic cholecystectomy, the latter after intraoperative decompression because the hepatocystic triangle could not initially be accessed.^{5,8,9,11}

In the present case, an open approach was selected because the gallbladder was displaced between the rectus sheath layers and densely adherent to the abdominal wall. Controlled decompression released approximately 800 mL of mucinous fluid, reducing wall tension and improving exposure. This volume was substantially smaller than the 3,350 mL and 3,800 mL evacuated in the cases reported by Kuznetsov et al and Zong et al, yet

decompression served the same purpose of restoring working space and permitting safe manipulation of the distended organ.^{5,6,9} Additionally, intraoperative cholangiography confirmed normal biliary anatomy and excluded choledocholithiasis before division of the cystic duct. This was particularly valuable given the severe distortion of normal anatomical landmarks and the recognised difficulty in achieving the critical view of safety in such cases.¹⁰

Histopathological examination in this case demonstrated chronic cholecystitis, fibrosis, Rokitsky–Aschoff sinus formation, and obstruction-related distension without malignancy. These findings are consistent with the expected pathological changes associated with longstanding cystic duct obstruction, and correspond closely with previous reports: chronic cholecystitis was the final histological diagnosis in the giant gallbladder described by Mirali et al, and inflammatory cell infiltration was reported by Zong et al.^{6,7} Chronic inflammation and progressive fibrosis are recognised consequences of persistent gallbladder distension and may contribute to reduced tissue compliance and further anatomical distortion.^{1,4} An additional feature in the present case was fibrous adherence of the gallbladder to abdominal wall connective tissue and skeletal muscle, requiring en bloc excision of a portion of posterior rectus sheath, which has not been described in previously reported giant gallbladders.^{5–7}

The postoperative outcome was favourable, with complete resolution of the abdominal wall mass and no complications at follow-up. This mirrors the uneventful recoveries reported in other giant gallbladder cases, including complete symptom resolution by two weeks in the patient described by Loh et al and an uncomplicated course in the case reported by Mirali et al.^{7,9} The consistently favourable outcomes across these reports reinforce the importance of recognising giant gallbladder mucocoele as a potential differential diagnosis for large right upper quadrant or abdominal wall masses. Early recognition using cross-sectional imaging allows appropriate operative planning and reduces the risk of injury associated with unexpected anatomical distortion.

This case adds to the limited literature on giant gallbladder mucocoeles by demonstrating an exceptionally unusual pattern of extension between the abdominal wall fascial planes. Although previous reports have described massive gallbladder enlargement and atypical presentations, abdominal wall involvement with displacement between the rectus sheath layers has rarely been described.^{5–9,11} A comparison of the present case with previously reported giant gallbladder and mucocoele cases is summarised in Table 1. Awareness of this possibility is important because such lesions may be mistaken for primary abdominal wall pathology, potentially delaying appropriate diagnosis and management.

Table 1: Comparison of the present case with previously reported giant gallbladder and gallbladder mucocele cases.

Case	Age / sex	Gallbladder size	Presentation	Laboratory findings	Imaging	Operative approach	Histopathology and outcome
Present case	73 / F	15 × 12 × 13 cm; 800 mL aspirated	4-week enlarging right upper quadrant mass, mild discomfort; no fever or jaundice	Full blood count, liver and renal function, CA19-9 and CEA all normal	CT and MRCP: impacted gallbladder-neck calculus, interparietal extension between rectus sheath layers	Open cholecystectomy with controlled decompression, intraoperative cholangiography, en bloc excision of posterior rectus sheath	Chronic cholecystitis, Rokitansky–Aschoff sinuses, fibrosis; no dysplasia. Uncomplicated recovery, mass resolved at 2 weeks
Kuznetsov et al, 2014⁵	77 / F	17.2 × 16.1 × 24.0 cm; ~3,350 mL evacuated	6-month right abdominal pain, palpable mass, 15 kg weight loss	Leucocytosis 11 × 10 ⁹ /L; Enterococcus faecalis (100 CFU/mL) in bile	CT: distension of right anterior abdominal wall, displacement of right kidney; two calculi	Open cholecystectomy	Chronic cholecystitis with cholelithiasis; uneventful recovery
Zong et al, 2013⁶	55 / F	30 × 31 × 18 cm; ~3,800 mL drained	>6-month right upper abdominal mass, distension, epigastric compression; no fever or jaundice	Bilirubin and transaminases normal; CA19-9 5.47 kU/L, CEA 1.21 ng/mL	Ultrasound and CT: giant cystic lesion mimicking celiac cyst	Cholecystectomy after trocar decompression	Inflammatory cell infiltration; congenital giant gallbladder with hydrops; uneventful
Mirali et al, 2021⁷	53 / F	Giant gallbladder (dimensions not stated)	Acute right hypochondrial pain	Not reported	Ultrasound: large cystic mass with gallstones; CT confirmatory	Cholecystectomy	Chronic cholecystitis; uneventful outcome
Reyes et al, 2017⁸	39 / F	Massive mucocele (dimensions not stated)	Mild right upper quadrant pain, intermittent postprandial epigastric discomfort	Equivocal and non-specific	Ultrasound limited by body habitus, CT contraindicated (contrast allergy); MRCP diagnostic	Urgent laparoscopic cholecystectomy	Not reported; uneventful recovery
Loh et al, 2019⁹	63 / M	9.8 × 8.5 cm	8 months of intermittent vomiting, weight loss, epigastric fullness from gastric outlet obstruction	Child-Pugh B8 cirrhosis secondary to hepatitis B	CT: duodenal compression; MRCP: 1 cm calculus in proximal cystic duct	Laparoscopic cholecystectomy after intraoperative decompression	Mucocele with chronic inflammation; symptoms fully resolved at 2 weeks
Maeda et al, 1979¹¹	36 / F	18 cm	Abdominal mass	Not reported	Pre-computed tomography era imaging	Open cholecystectomy (pre-laparoscopic era)	Congenital giant gallbladder; detailed histopathology not available in the accessible record

CONCLUSION

Giant gallbladder mucocele is a rare consequence of chronic cystic duct obstruction and may present as an abdominal wall mass due to progressive anatomical distortion. In this case, cross-sectional imaging was crucial for diagnosis and operative planning. Controlled decompression, intraoperative cholangiography, and open cholecystectomy enabled safe management despite severe gallbladder enlargement and altered anatomy. Giant gallbladder mucocele should be considered in the differential diagnosis of large right upper quadrant or abdominal wall masses.

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