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Contents

Thrice Monthly Volume 10 Number 10 April 6, 2022

REVIEW

MINIREVIEWS

ORIGINAL ARTICLE

Case Control Study

Retrospective Cohort Study

Retrospective Study

World Journal of Clinical Cases

Thrice Monthly Volume 10 Number 10 April 6, 2022

Contents

World Journal of Clinical Cases

Thrice Monthly Volume 10 Number 10 April 6, 2022

Contents

World Journal of Clinical Cases

Thrice Monthly Volume 10 Number 10 April 6, 2022

Contents

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CASE REPORT

Primary malignant peritoneal mesothelioma mimicking tuberculous peritonitis: A case report

Li-Cheng Lin, Wen-Yen Kuan, Bei-Hao Shiu, Yu-Ting Wang, Wan-Ru Chao, Chi-Chih Wang

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Abstract

BACKGROUND

Malignant peritoneal mesothelioma (MPM) is a rare malignancy arising in mesothelial cells in the peritoneum. It can be mistaken for many other diseases, such as peritoneal carcinomatosis and tuberculous peritonitis (TBP), because its clinical manifestations are often nonspecific. Therefore, the diagnosis of MPM is often challenging and delayed.

CASE SUMMARY

A 42-year-old man was referred to our hospital with lower abdominal pain for 1 wk and ascites observed under abdominal sonography. His laboratory findings revealed an isolated elevated tumor marker of carcinoma antigen 125 (167.4 U/mL; normal, < 35 U/mL), and contrast enhanced computed tomography showed peritoneal thickening. Thus, differential diagnoses of TBP, carcinomatosis of an unknown nature, and primary peritoneal malignancy were considered. After both esophagogastroduodenoscopy and colonoscopy produced negative findings, laparoscopic intervention was performed. The histopathological results revealed mesothelioma invasion into soft tissue composed of a papillary, tubular, single-cell arrangement of epithelioid cells. In addition, immunohistochemical staining was positive for mesothelioma markers and negative for adenocarcinoma

markers. Based on the above findings, TBP was excluded, and the patient was diagnosed with MPM.

CONCLUSION
It is important to distinguish MPM from TBP because they have similar symptoms and blood test findings.

Key Words: Peritoneal neoplasms; Peritoneal diseases; Mesothelioma; Malignant ascites; Tuberculous peritonitis; Laparoscopy; Case report

Core Tip: Malignant peritoneal mesothelioma (MPM) is an uncommon malignant neoplasm that arises from peritoneum. We present a case of malignant peritoneal mesothelioma mimicking tuberculous peritonitis (TBP). This case highlights the difficulty to distinguish MPM from TBP only based on unspecific clinical manifestations, laboratory tests and images especially in high prevalence area of TB, and therefore sheds light on the importance of laparoscopy which finally helps us confirm the diagnosis in this patient with unexplained ascites.

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INTRODUCTION

Malignant peritoneal mesothelioma (MPM) is a rare disease arising in the mesothelial cells in the peritoneum[1]. While it is essential to accurately detect this disease due to its high mortality and poor prognosis with late diagnosis[2], the clinical presentation of MPM is unspecific, causing difficulty with early diagnosis. Clinicians should always consider differential diagnoses, such as peritoneal carcinomatosis, tuberculous peritonitis (TBP), and primary peritoneal neoplasms, in patients with unexplained ascites. To improve our understanding of the disease, avoid misdiagnosis, and provide evidence for clinical treatment and prognosis, we report on this case of MPM mimicking TBP.

CASE PRESENTATION

Chief complaints

This 42-year-old man was admitted to our hospital with lower abdominal pain for 1 wk.

History of present illness

This patient was a Canadian who had lived in Taiwan for 5–6 years. He had suffered from intermittent lower abdominal pain for one week prior to admission. He had visited the clinic, where abdominal ultrasonography showed some ascites. Thus, he was referred to our outpatient department (OPD) for further survey. His accompanying symptoms included intermittent diarrhea, with some "white wire" noted in the stool and tenesmus. He denied fever, cough, dyspnea, weight loss, or urinary symptoms.

History of past illness

The patient had no comorbidity or operation history.

Personal and family history

The patient drinks beer sometimes without addiction. He does not smoke or chew betel nuts. There was no remarkable family medical history.

Physical examination

The height and weight of the patient at admission were 174 cm and 74 kg, respectively. His consciousness was clear, and his vital signs were stable. His physical examination showed lower abdomen tenderness with rebounding pain over the suprapubic area. The remainder of the physical

examination was normal.

Laboratory examinations

Laboratory testing showed an elevated C-reactive protein (2.6 mg/dL), normal procalcitonin level, and no leukocytosis. Tumor markers, such as carcinoembryonic antigen, carcinoma antigen 199, and tissue polypeptide antigen, were within normal limits, but he had an elevated carcinoma antigen 125 (CA-125) of 167.4 U/mL. Screening for autoimmune titers, HIV, amebiasis antibody test, blood culture, and stool all showed negative results. The laboratory results are shown in Table 1.

Imaging examinations

Abdominal sonography showed minimal ascites at the cul-de-sac and negative signs of cirrhosis. Abdominal contrast-enhanced computed tomography (CT) showed irregular peritoneal thickening over the perihepatic and pelvic peritoneum, fat stranding infiltration within the greater omentum, and some ascites in the bilateral subphrenic spaces, paracoclic gutter, and pelvic cavity (Figure 1). Thus, differential diagnoses of TBP and carcinomatosis of an unknown nature were considered.

Further diagnostic work-up

Esophagogastroduodenoscopy (EGD) and colonoscopy revealed no malignant lesion. Because there were not enough ascites under sonography for fine needle aspiration, laparoscopy was performed (Figure 2). In total, 1000 mL of yellow ascites were collected for cytology and other analysis. Multiple whitish nodules were noted over the entire abdominal cavity, and the peritoneal cancer index was over 10. A local resection of dark red papillary lesions on the peritoneum was performed.

Histologically, according to hematoxylin and eosin (HE) staining, biopsy of the peritoneum revealed soft tissue mesothelioma invasion composed of a papillary, tubular, single-cell arrangement of epithelioid cells with oval-round nuclei, conspicuous nucleoli, and moderate eosinophilic cytoplasm (Figure 3). The immunohistochemical (IHC) staining was positive with calretinin and WT-1 (focal+) (Figure 4A and B), which were specific for MPM and negative for markers of adenocarcinomas, such as PAX-8, TTF-1, and CDX-2 (Figure 4C and D). In addition, Ki-67 proliferative index was < 10% and IHC staining of napsin A was negative (Figure 5). Cytology with cell blocking showed atypical mesothelial cells that were positive for calretinin under IHC staining. No definite microorganism was observed under periodic acid-Schiff staining (PAS), Gomori's methenamine silver (GMS), and acid-fast staining. The culture of ascites showed no isolated pathogen.

FINAL DIAGNOSIS

The final diagnosis was MPM.

TREATMENT

Intravenous flomoxef was initially started due to the presence of suspicious bacterial peritonitis in the first four days. After encountering negative EGD and colonoscopy findings, a laparoscopic intervention was performed. The patient was discharged on the ninth day after admission and waiting for histopathological results at home.

OUTCOME AND FOLLOW-UP

The patient was then referred to oncology OPD, where he expressed a desire to return to Canada for further treatment.

DISCUSSION

Mesothelioma is a neoplasm of mesothelial cells in the serous membranes, such as the pleura, peritoneum, pericardium, and tunica vaginalis of the testes, lining the wall of serous cavities[3]. The second most common site of mesothelioma is the peritoneum, following the visceral pleura. MPM occurs in 15%–20% of cases of mesothelioma[3,4].

Metastases to the peritoneum are much more common than primary neoplasms. MPM is an extremely rare and highly lethal disease[3,4]. The first reported case was described by Miller in 1908, where the patient was treated symptomatically and passed away within one year[5]. Boffetta *et al*[3] reported that the incidence rates of MPM range between 0.5 and 3 cases per million in men and between

Table 1 Laboratory tests

Parameter	Reference range	On admission (5/21)	Day 6 (5/26)
Hemoglobin (g/L)	13-17	13.9	
Leucocytes (/μL)	4000-11000	5670	6190
Platelets (/μL)	150000-200000	287000	
Procalcitonin (ng/mL)	0.5	< 0.05	
HS C.R.P (mg/dL)	0.748	2.640↑	3.824↑
Albumin (g/dL)	3.5-5.7	4.2	
Total bilirubin (mg/dL)	0.3-1.2	0.7	
ESR (mm/h)	< 15	30↑	
ANA	Negative	Negative (< 1:80X)	
ANCA	Negative	Negative (< 1:40X)	
Anti-HCV		Nonreactive	
HBsAg	0.05	Nonreactive	
Anti-HIV		Nonreactive	
CA-125 (U/mL)	0-35	167.4↑	
CA19-9 (U/mL)	0-35	2.0	
CEA (ng/mL)	5	0.6	
TPA (U/L)	75	18.49	
IHA for amebiasis	1:32 negative	1:32 negative	

CRP: C-reactive protein; ESR: Erythrocyte sedimentation rate; ANA: Antinuclear antibody; ANCA: Antineutrophil cytoplasmic antibody; HCV: Hepatitis C virus; HBsAg: Hepatitis B surface antigen; CA-125: Carcinoma antigen 125; CA-199: Carcinoma antigen 199; CEA: Carcinoembryonic antigen; TPA: Tissue polypeptide antigen.

0.2 and 2 cases per million in women in industrialized countries.

Toxic exposure to industrial pollutants, especially asbestos, is the main cause of mesothelioma. Other risk factors are exposure to talc, radiation, erionite, mica, and volcanic ash and suffering from chronic peritonitis[3-7]. The presenting symptoms of MPM are nonspecific[4,6]. Abdominal distension is the most common initial complaint, presenting in 30%–80% of patients, while abdominal pain is the second most common symptom, occurring in 27%–58% of patients[5]. In addition, early satiety, nausea, anorexia, weight loss, hernia, fever of unknown origin, night sweats, and the occasional diagnosis found at laparoscopy have been reported in some cases[4-6]. These vague clinical presentations make early diagnosis difficult.

There has been non-specific laboratory data for MPM. Although serum CA-125 Levels were elevated in some cases, the specificity was low[4]. The findings on CT imaging are usually diffuse and have widespread involvement of the peritoneal cavity associated with irregular thickening of the peritoneum, and ascites are present in 60%–100% of newly diagnosed patients[7]. Therefore, clinicians should be suspicious when a radiographic evaluation shows diffuse distribution throughout the abdominal cavity because MPM tends to be more expansive than infiltrative[3].

The CT imaging in our case revealed peritoneal thickening and ascites. Based on these findings, the differential diagnoses of peritoneal carcinomatosis, TBP, and primary peritoneal neoplasms had to be considered[8-10]. Because there were no contributory findings on the upper and lower gastrointestinal endoscopy, peritoneal metastatic carcinomatosis was less likely. TB has always been one of the most severe communicable diseases in Taiwan. Even though TBP is an extremely rare disease and its reported incidence among all forms of TB varies from 0.1%–0.7% worldwide[11], it is one of the differential diagnoses in this situation[12].

The presenting symptoms of TBP are different from the symptoms of MPM in terms of night sweats. Additionally, CA-125 elevation is frequently noticed in TBP[11]. In our case, the gastrointestinal symptoms, such as abdominal pain and ascites, elevated CA-125, and peritoneal thickening that emerged can all present in both MPM and TBP[13]. MPM's mimicry of these features of TBP makes diagnosis especially difficult in high TB prevalence areas.

CT-guided core needle biopsy or laparoscopic biopsy both provide sufficient material to establish the diagnosis[5,6,14]. In TB, an ascitic fluid culture of the mycobacterium remains the gold standard for

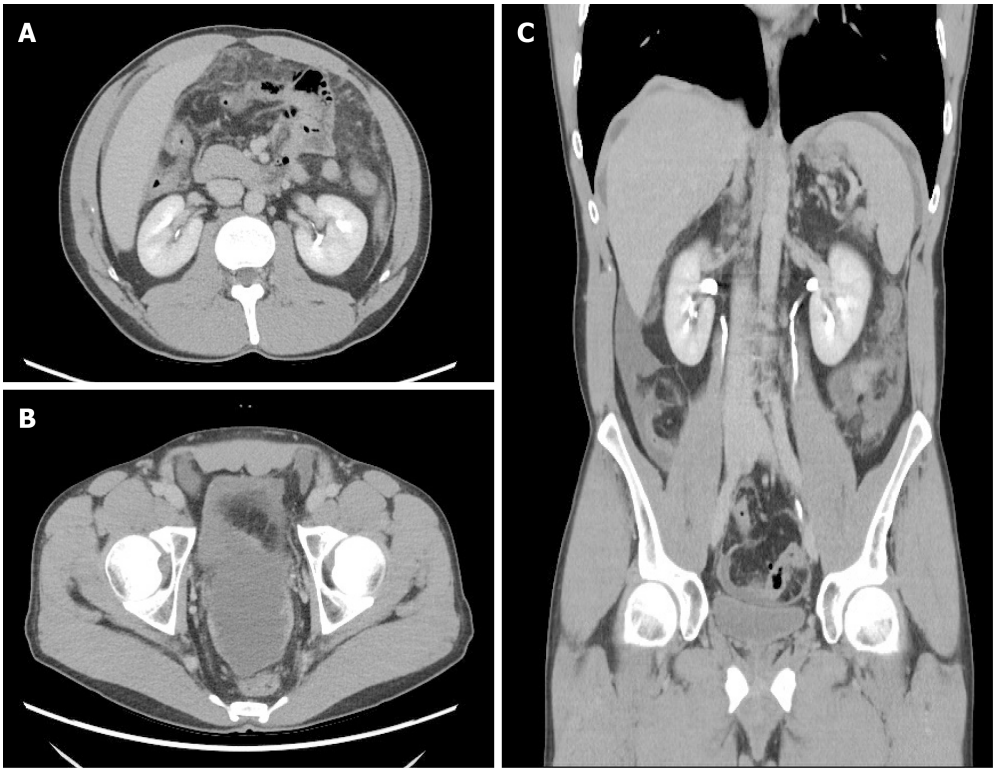

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Figure 1 Abdominal contrast-enhanced computed tomography. A: Axial view, contrast-enhanced computed tomography (CT) showed diffuse fat stranding infiltration within the greater omentum; B: Axial view, thickening of the pelvic peritoneum was enhanced by contrast material; C: Coronal view of the contrast-enhanced CT showed irregular thickening of the perihepatic peritoneum and minimal ascites over the bilateral subphrenic spaces, paracolic gutter, and pelvic cavity.

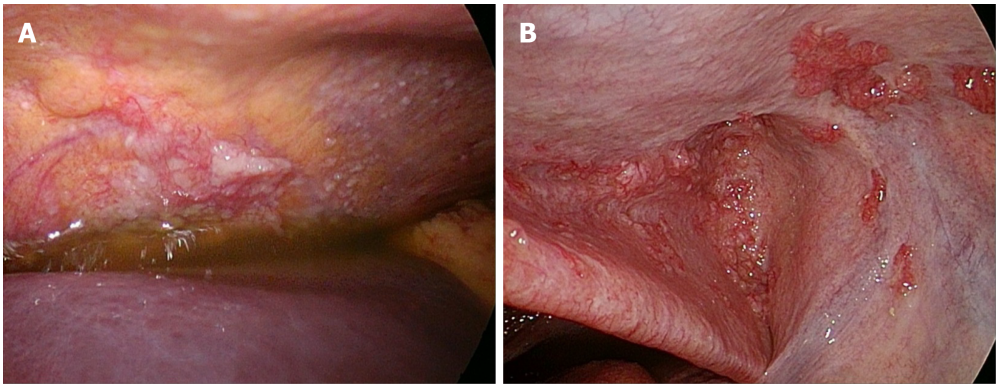

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Figure 2 Laparoscopy. A: Multiple whitish nodules were observed over the entire abdominal cavity with some yellow ascites; B: Grossly red nodular tissue was located on the peritoneum.

diagnosis. Adenosine deaminase of ascitic fluid is a useful tool for identifying patients with a diagnosis of TBP[15]. Histologically, typical lesions of TB are represented by the tuber, which corresponds to caseating epithelioid granuloma containing multinucleated giant cells. By contrast, MPM can be divided into three broad histologic subtypes: Epithelioid, sarcomatoid, and biphasic[15]. The epithelioid type, which is the most common type associated with the best prognosis, forms a tubulopapillary or trabecular pattern of flattened or cuboidal cells with monotonous nuclei that line the papilla or tubules. The sarcomatoid type is typically composed of tightly packed spindle cells. The biphasic type is a mixed form that consists of both epithelial and sarcomatous components[3,5,6,16].

In our case, an ascitic fluid analysis showed no definite microorganism observed under PAS, GMS, or acid-fast staining. The histopathological results revealed mesothelioma invasion into soft tissue composed of a papillary, tubular, single-cell arrangement of epithelioid cells. In addition, immunohistochemical staining was positive for mesothelioma markers and negative for adenocarcinoma markers.

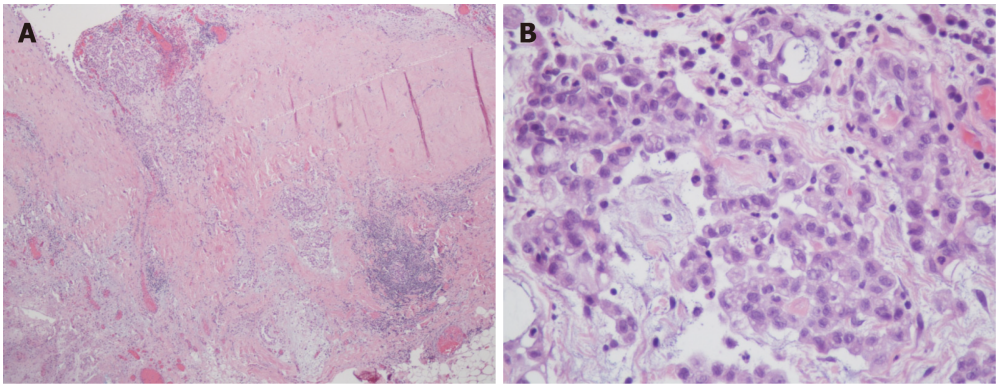

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Figure 3 Pathological findings of the lesion on the peritoneum. A: The peritoneum revealed mesothelioma invasion into the stroma and adipose tissue composed of a tubular or single-cell arrangement of epithelioid cells (x 40; HE stain); B: The tumor cells had large, oval-round nuclei, conspicuous nucleoli, and moderate eosinophilic cytoplasm (x 400; HE stain).

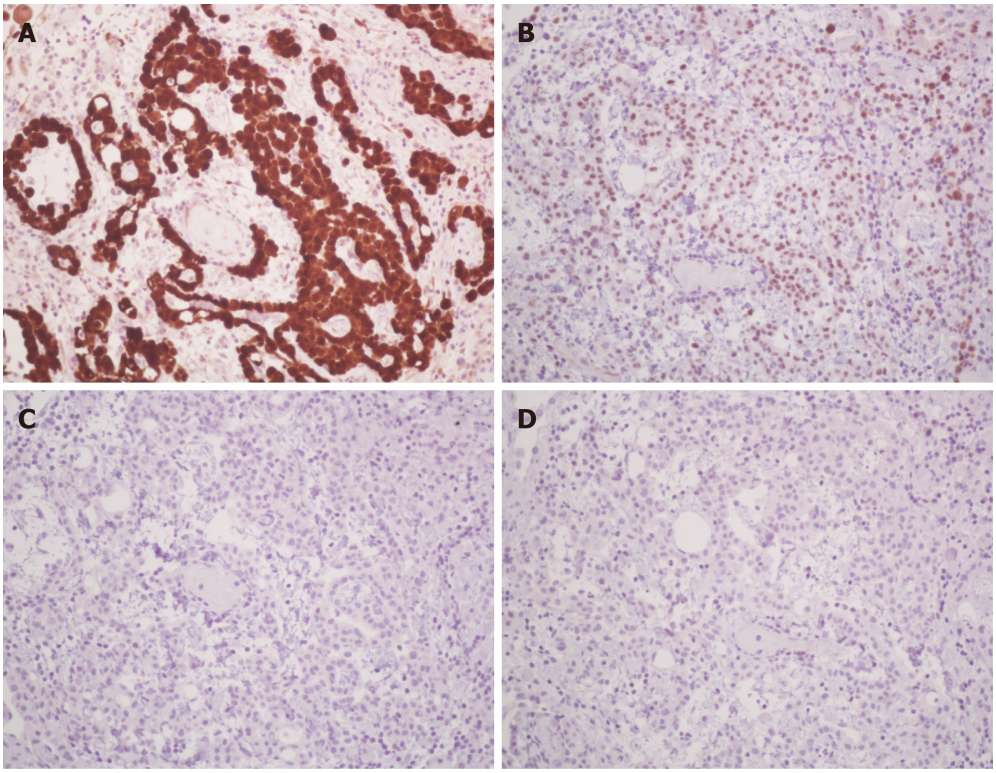

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Figure 4 The immunohistochemical staining results. A: Immunohistochemically, the tumor cells were positive for calretinin (nuclear and cytoplasmic staining, x 200); B: The tumor cells were focally positive for WT-1 (x 200); C: TTF-1 immunostaining was negative for tumor cells (x 200); D: CDX-2 immunostaining was negative for tumor cells (x200).

Based on the above findings, TBP was excluded. Ultimately, this 42-year-old man was diagnosed with MPM, epithelioid subtype.

The median overall survival of MPM without treatment is generally around 6–12 mo after diagnosis. The mainstream treatment for resectable MPM remains cytoreductive surgery with heated intraperitoneal chemotherapy; this approach has a potential survival outcome greater than five years in carefully selected patients. Even though the disease has shown resistance to standard chemotherapeutic agents, patients with inoperable MPM will be offered systemic treatment[4,5]. Due to its high mortality and poor prognosis, it is essential for physicians to diagnose MPM as early as possible and conduct prompt treatment. Our case highlights the need for high clinical suspicion of MPM in patients who present with clinical features mimicking TBP.

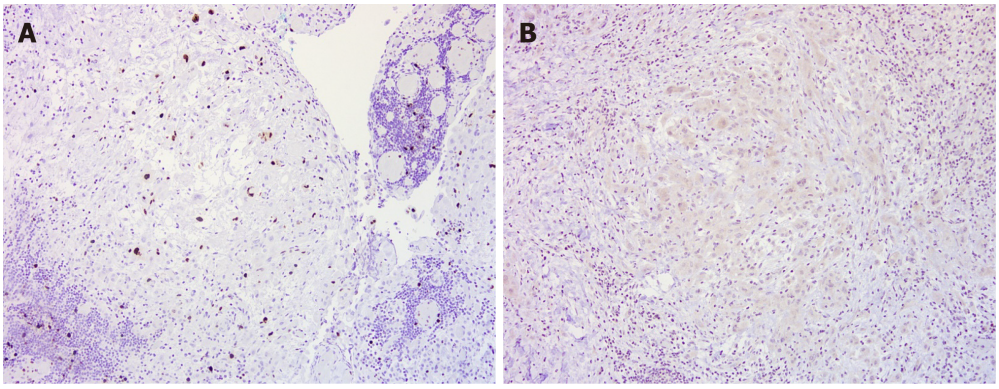

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Figure 5 Additional staining results. A: Ki-67 proliferative index was < 10%(x 100); B: Napsin A immunostaining was negative for tumor cell (x 100).

Limitations

Our patient was a Canadian man who had been living in Taiwan for five years, making it difficult to quantify the detailed influential factors of the disease. For example, while our patient said that many houses had asbestos roofs when he was a child in Canada, we could not weigh this risk factor in our case.

We lost the follow-up of both the treatment and the outcome of this case because the patient decided to return to Canada to receive further treatment.

CONCLUSION

We reported on a rare case of MPM mimicking TBP and showed that diagnostic laparoscopy provided a precise method for confirming the diagnosis in this patient with unexplained ascites.

FOOTNOTES

Author contributions: Lin LC and Kuan WY reviewed the literature and contributed to manuscript drafting; Wang CC was responsible for the revision and final approval of the manuscript; Shiu BH performed the laparoscopy; Wang YT and Chao WR contributed to histopathological testing, interpreted the histopathological and immunohistochemical findings; All authors issued final approval for the version to be submitted.

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