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COMMUNICATION

Primary retroperitoneal cystic mucinous borderline tumour mimicking an ovarian neoplasm: a case report and literature review

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Abstract Ovarian-type mucinous tumours occur very rarely in the retroperitoneum. We present a case of primary retroperitoneal mucinous tumour of borderline malignancy in a 58-year-old woman, detected as an incidental finding. The patient presented with acute renal failure, investigation for which revealed a complex pelvic mass initially thought to be in the right adnexa and consistent with an ovarian neoplasm. Surgical findings revealed a 130-mm, right-sided non-communicating retroperitoneal pelvic mass, posterior to the appendix, which was completely resected. Both ovaries were normal. Macroscopically, it was a multiloculated cystic structure with a smooth external surface containing clear and mucinous fluid. Microscopic examination showed a mucinous tumour of borderline malignancy. The literature contains approximately nine other cases of primary mucinous retroperitoneal tumour of borderline malignancy. These cases have occurred in women aged 36–60 years. Most patients were asymptomatic and the mass was detected as an incidental finding. The patients have been followed up for up to 6 to 18 months and, to date, none have recurred. There are limitations to pre-operative radiological imaging. A definitive diagnosis can only be made after complete surgical excision and histological examination, having excluded retroperitoneal involvement by mucinous tumours from sites such the ovaries, bowel, appendix and pancreas.

Keywords Retroperitoneum · Primary · Cystic mucinous borderline tumours

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Introduction

Primary cystic mucinous tumours of the retroperitoneum are rare tumours and have been reported in women with normal ovaries [1, 2]. The histological appearances of these tumours are similar to ovarian mucinous tumours, spanning the entire spectrum from benign, borderline and malignant. Immunohistochemical and molecular studies have also shown similarities to their ovarian counterparts [1]. The precise aetiology of these neoplasms is uncertain and various theories have been proposed [3]. In the majority of instances, preoperative diagnosis is not possible, as radiological findings are not able to distinguish the exact nature and origin of these lesions [4]. A definitive diagnosis can only be made after complete surgical excision and histological examination, having excluded retroperitoneal involvement by mucinous tumours from sites such the ovaries, bowel, appendix and pancreas.

Due to the rarity of these tumours and the limited information available about the biological behaviour, the optimal treatment options, survival and exact prognosis are uncertain.

We report an additional case of a primary retroperitoneal mucinous tumour of borderline malignancy in a 58-year-old woman with normal ovaries. Also, cystic mucinous tumours of the retroperitoneum in the available literature

have been reviewed with regards to clinical presentation, diagnostic histological appearances, treatment options and survival data.

Case history

A 58-year-old lady was incidentally found to have a large abdominal mass, on investigation for acute renal failure and dyspnoea. Imaging revealed a complex 160×140×130-mm mass in the right adnexa, intimately related to the small and large bowel superiorly, initially thought to be consistent with an ovarian neoplasm. It was separate from the kidney and pancreas. The liver, spleen, pancreas, urinary bladder and uterus appeared normal. The serum levels of CEA, CA 125 and CA 19-9 were within normal limits.

At laparotomy, a non-communicating mass was found, which was confirmed to be a right-sided retroperitoneal pelvic mass with small bowel adhesions and the appendix draped over. Posteriorly, this was attached to the psoas major muscle. The uterus, both ovaries and the fallopian tubes were macroscopically normal, as were the peritoneum, intestines and omentum. During surgical intervention, on mobilisation, the mass ruptured, with some spillage of mucinous and clear material. The mass was completely resected, the appendix was also removed and the uterus and ovaries were left intact. Post-operatively, chemotherapy was not given. She made a reasonably good recovery and has been followed up until now for a period of 12 months without evidence of recurrence.

Pathological findings

The specimen received was a 130-mm cystic mass with a smooth shiny external surface and which contained clear and mucinous fluid. The internal surface showed a multilocular mass with thin-walled cystic structures and an occasional solid nodule (Fig. 1a,b) The appendix was received separately and appeared to be grossly normal.

Microscopic examination of the mass showed a predominantly intestinal-type mucinous tumour surrounded by a fibrous capsule with adherent mature adipose tissue. Much of the tumour showed a complex glandular architecture with epithelial pseudostratification, mild to moderate cytological atypia and mitotic activity. An occasional focus of stromal micro-invasion was also seen. The tumour cells were immunoreactive for CK 7 and CK 20. A capsular breach or extracapsular tumour was not seen. A diagnosis of a mucinous tumour of borderline malignancy with focal stromal micro-invasion was made. No separate ovarian tissue was identified in the cyst (Fig. 2a–f). The appendix was sampled extensively. There was no evidence of tumour

Pathological Findings

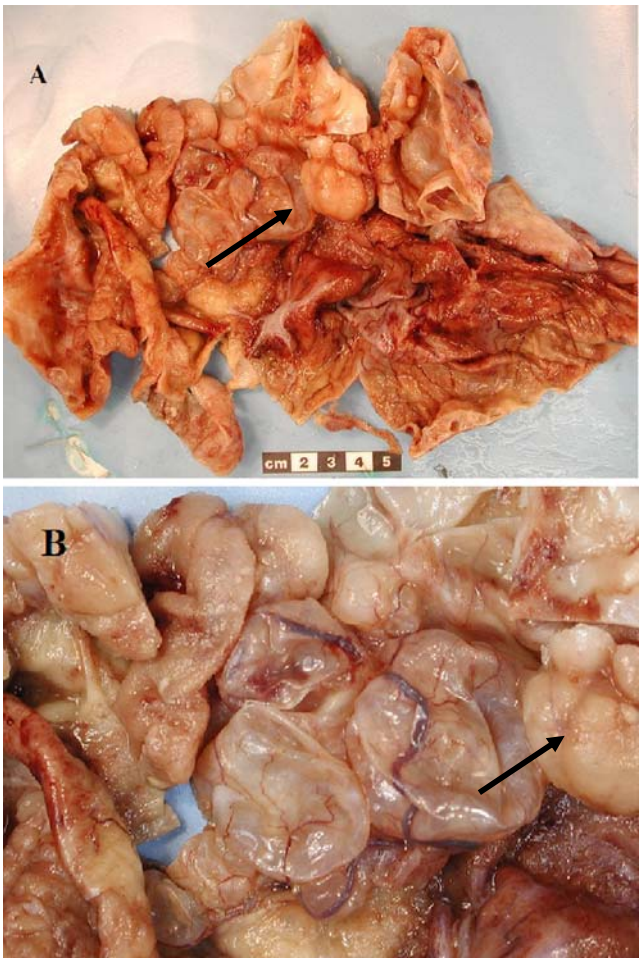

Fig. 1 Internal surface of the cyst wall; multi-loculated mass with multiple thin-walled cystic structures and a solid nodule (*arrow*)

within the appendix or in the surrounding connective tissue. The serosal surface showed mild chronic inflammation with haemosiderin-laden macrophages, a few multi-nucleated giant cells and interstitial haemorrhage.

Discussion

Primary cystic mucinous tumours of the retroperitoneum are rare tumours and cases with borderline pathology are even rarer. Approximately 33 cases of cystadenomas, 35 cases of cystadenocarcinoma and nine cases of borderline malignancy have been published in the literature to date. These tumours have been described exclusively in females; however, very rarely, they have been described in male patients [4, 5].

The histogenesis of these tumours is not clear and several theories have been proposed. Most authors suggest mucinous metaplasia in pre-existing mesothelium-lined

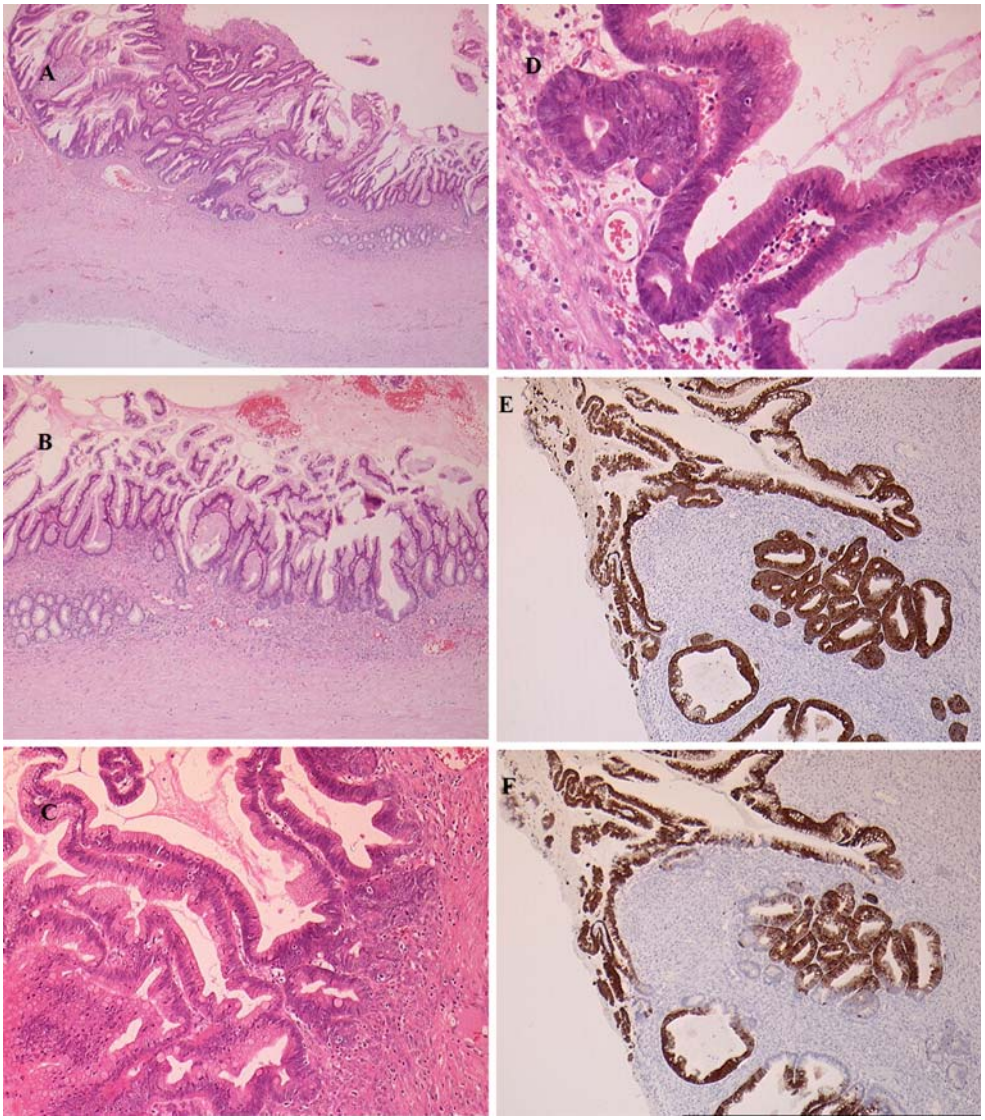

Fig. 2 Microscopy: cyst lining comprising intestinal-type columnar mucous-secreting epithelium. The tumour displays a complex glandular architecture without stromal invasion (**a**–**d**). Stratification of the epithelium with a thickness of two to three cell layers (**c**, **d**). High-power view showing mild to moderate nuclear atypia with mitoses (**d**). Immunohistochemistry: the tumour exhibits diffuse strong expression of CK 7 (**e**) and patchy strong expression of CK 20 (**f**)

cysts, which are more common in this location. Invaginations of peritoneum/mesothelium result in these inclusion cysts that undergo mucinous metaplasia, thus, resulting in a mucinous cystadenoma [1, 3, 6]. Some have suggested that clusters of coelomic epithelial cells could be deposited along the route of ovarian descent and, by proliferation or metaplastic differentiation, develop into these cystic tumours [7, 8]. Other theories include an origin from ectopic ovarian tissue and teratomas [9].

The differential diagnosis includes metastatic mucinous tumours, from sites such as ovaries, the intestines, including the appendix and pancreas [9]. Other neoplastic lesions in this site include cystic lymphangioma, cystic teratoma, cystic mesothelioma, mullerian cyst, epidermoid cyst and tailgut cyst [2].

The three main categories of cystic mucinous tumours of the retroperitoneum are reviewed with regards to clinical presentation and diagnostic histological appearances, together with treatment options and survival data.

Mucinous cystadenomas Patients with mucinous cystadenomas presented at an age ranging from 19 to 67 years. Macroscopically, these tumours are usually large, ranging from 60 to 300 mm in diameter [3, 10]. Microscopic examination shows mucin-filled, thin-walled uni- or multiloculated cysts lined by a single layer of columnar mucinous epithelial cells with basal nuclei. Cytological atypia is not seen [2, 11, 12]. It is noted that tumour excision has been the main treatment modality. These patients have been followed up for a period ranging from 6 months to 18 months with no evidence of recurrence [3, 11, 12].

Mucinous cystadenocarcinomas These patients have presented at an age ranging from 17 years to 86 years. The

maximum diameters of these tumours varied from 60 to 240 mm [13, 14]. Microscopic examination reveals varying degrees of differentiation from areas of benign mucinous columnar epithelium through borderline areas and frankly malignant adenocarcinomatous foci [1, 4]. The malignant foci show cysts lined by papillae with atypical stratified mucinous epithelium and occasional mitoses. Also seen are islands of closely packed and moderately well formed glands with focal areas of cribriform patterns lined by cells with enlarged pleomorphic nuclei and prominent nucleoli. Focal central necrosis and stromal invasion was also exhibited [6, 15]. Extra-capsular extension was not seen in most cases [1, 14]. Mural nodules composed of pleomorphic sarcomatoid cells with numerous mitoses have been reported in rare cases and were associated with an aggressive clinical course [14]. Patients were treated with tumour excision alone [9, 15] or with subsequent combined total hysterectomy and bilateral salpingo-oophorectomy [1, 6]. Post-operative chemotherapy was offered to some of these patents independent of the surgical modality of treatment [1, 4, 9]. The follow up period ranged from 6 months to 6 years after surgery. In most cases, the prognosis seems to be good when additional surgery was performed and patients have remained free of recurrence or metastasis [1, 6, 13]. The development of tumour recurrences and metastasis have been known to occur when simple tumour excision was performed with or without chemotherapy [9, 14].

Cystic mucinous borderline tumours On reviewing the literature, nine cases of borderline pathology have been previously reported. It is noted that the terminology used in cases with borderline tumours is not consistent. They have presented at an age ranging from 36 to 48 years. Their size ranged from 60 to 210 mm [7, 8, 16–22]. Microscopically, the wall thickness varies from 2 to 4 mm. The cyst lining consists of pseudostratified columnar epithelial cells displaying mild to moderate cytological atypia containing mucinous cytoplasm with well-differentiated mucous glands or papillary architecture without stromal invasion [7, 8]. These cases have been treated by tumour excision and followed up for a period from 6 months to 18 months with no evidence of recurrence or metastasis (Table 1).

The majority of patients in the three groups of mucinous tumours (benign, borderline and malignant) have been asymptomatic, some presented with vague symptoms of abdominal fullness and, rarely, others presented as an abdominal mass. Most reports have included information regarding the uterus, tubes and ovaries being normal [3, 4, 12, 13].

There are limitations in the role of pre-operative radiological imaging; a final diagnosis can only be made after histological examination and the exclusion of a mucinous tumour elsewhere in the abdomen by careful clinical and radiological examination.

Regarding treatment, there is agreement on complete surgical excision of the lesion. The role of additional surgery and how extensive it should be is not clear when the uterus and ovaries are macroscopically normal.

For malignant lesions, some authors have recommended more aggressive treatment. Hysterectomy with bilateral salpingo-oophorectomy performed simultaneously or later

Table 1 Primary retroperitoneal cystic mucinous borderline tumours; a review of the available literature

	Author	Age (years)	Size (mm)	Diagnosis (terminology used)	Treatment	Follow up period and outcome
1	Nagata et al. 1987	41	120	Mucinous cystadenoma of low-grade malignancy	Tumour excision	NA
2	Banerjee and Gough 1987	47	35	Borderline mucinous cystadenocarcinoma	Tumour excision	Not described
3	Motoyama et al. 1994	63	60	Borderline mucinous tumour	Tumour excision	Not described
4	Pearl et al. 1996	33	ND	Primary retroperitoneal mucinous cystadenocarcinoma of low malignant potential	Tumour excision	10 month NE recurrence
5	Papadogiannakis et al. 1997	33	130	Ovarian-like mucinous tumour of low malignant potential	Tumour excision	12 month NED
6	Chen et al. 1998	48	150	Mucinous cystadenoma with borderline malignancy	Tumour excision	8 month NED
7	Gutsu et al. 2003	41	210	Mucinous cystadenoma of borderline type	Tumour excision	18 month NED
8	Matsubara et al. 2005	36	120	Primary retroperitoneal mucinous cystic tumour of borderline malignancy	Tumour excision appendectomy myomectomy	6 months NED
9	Bakker et al. 2007	45	160	Mucinous cystadenoma with foci of borderline malignancy	Tumour excision	12 month NED
10	Present case 2008	58	160	Primary retroperitoneal cystic mucinous borderline tumour	Tumour excision and appendectomy	12 month NED

may be necessary to improve survival [6, 9]. Omentectomy and pelvic/para-aortic lymph node resection were also performed in a few cases [1, 6]. However, Kessler et al. suggest that an extensive surgical procedure with serious consequences cannot be justified when the uterus and ovaries are macroscopically normal, and also when follow up in the majority of the reported cases is deficient. The only reason for this procedure to be performed is in post-menopausal women or patients who have completed child-bearing [23]. More conservative surgery has been proposed by Law et al., who advocate for laparoscopic excision of the tumour and complete evaluation of the abdominal and pelvic organs, sparing fertility in these women [24]. Adjuvant chemotherapy is not a standard treatment and its effectiveness is uncertain [13]. It is suggested that it is beneficial in cases with spillage of cyst fluid associated with tumour rupture during surgical intervention [1] or when the invasion of adjacent structures is macroscopically evident [4].

In borderline lesions, there is no clear evidence about the additional removal of the uterus, tubes and ovaries or about post-operative chemotherapy. The literature suggests that prognosis in these cases is good and complete surgical excision appears to be curative (Table 1). The prevention of cyst fluid spillage during surgical manipulation is important [20].

Bearing in mind the differential diagnosis of primary retroperitoneal mucinous tumours, it will allow appropriate pre-operative planning, enabling the surgeon to consider an extra-peritoneal surgical approach and remove the cyst in toto (without any spillage) with intact peritoneum possible.

Biological behaviour can be better defined and survival data can be collected as more cases are reported. Our case is another addition to the literature on this rare tumour with borderline pathology, which was treated by tumour excision without additional therapy, and has been disease-free in the 12 months of follow up, until now.

From the available evidence, we feel that the experience of retroperitoneal mucinous tumours remains limited and minimal data exists to define the appropriate management. In view of the rarity and possible malignant potential of these lesions, we are of the opinion that an early diagnosis and treatment with multi-disciplinary review is essential. Further follow up should be individualised and is dependent on factors like peri-operative spillage and tumour load.

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