Case Report

Urachal adenocarcinoma: a rare case report

Bo Bao*, Muhammed Hatem MD, MRes, Jason K. Wong MD, FRCPC

Department of Radiology, Foothills Medical Center, 1403–29 Street N.W., Calgary, AB T2N 2T9, Canada

ARTICLE INFO

Article history:
Received 31 August 2016
Received in revised form
8 October 2016
Accepted 23 October 2016
Available online xxx

Keywords:
Urachus
Adenocarcinoma
Bladder
Lung metastasis

ABSTRACT

Urachal carcinoma is a rare and aggressive form of bladder cancer involving the urachus, a fibrous remnant of the allantois that extends from the bladder to the umbilicus. We report this case of a 49-year-old women with primary urachal adenocarcinoma treated with partial cystectomy who relapsed 5 years after surgery with lung metastases. This patient with unremarkable medical history presented with abdominal discomfort and a palpable pelvic mass. Follow-up imaging reveals a large mass on the dome of the bladder extending from the urachus. Subsequent ultrasound-guided biopsy result was suggestive of an urachal mucinous adenocarcinoma. The patient was treated surgically with a partial cystectomy.

Case report

A 49-year-old female patient with unexceptional past medical history presented to her primary care physician with complaints of a 12-month history of abdominal pain and an enlarging mass sensation along her previous cesarean section scar. On physical examination, a large anterior pelvic mass was palpable, firm, and nontender in the midline of supra-pubic region slightly to the left. Other than increased frequency and nocturia, she did not complain of urgency, incontinence, pain with voiding, or hematuria.

Imaging of the abdomen was ordered to further assess the mass. Initial ultrasound (US) examination revealed a 15-cm mass localized to the dome of the urinary bladder (Figs. 1A and B). Subsequent magnetic resonance imaging (MRI) scan confirmed a mass measuring 14 × 8.5 × 7.3 cm arising from the left lower rectus abdominis muscle (Figs. 2-4). It extends anteriorly into the subcutaneous tissue and posteriorly imparts significant mass effect on the dome of the bladder. Contrast-enhanced computed tomography (CT) scan of the abdomen also confirms an enhancing mass lesion on the wall of the urinary bladder (Fig. 5). Given the imaging findings, the differential diagnosis at the time included: soft tissue sarcoma, dermatofibrosarcoma protubersans, and desmoid tumor. The patient underwent a cystoscopy, which detected the presence of a submucosal bulge at the urinary bladder dome in the expected area of the residual urachus, consistent with large urachal adenocarcinoma. An US-guided biopsy of the cystic mass showed significant histologic findings indicative of low grade mucinous adenocarcinoma. Colonoscopy at the time did not reveal evidence of primary cancer involving the colon. Also, CT scan of chest, abdomen, and pelvis in addition to positron emission tomography (PET) scan did not reveal regional nor distant metastasis at the time.

Competing Interests: The authors have declared that no competing interests exist.

* Corresponding author.
E-mail address: bbao@ualberta.ca (B. Bao).
http://dx.doi.org/10.1016/j.radcr.2016.10.019
1930-0433/© 2016 Published by Elsevier Inc. on behalf of copyright license from the University of Washington. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).
The tumor was removed surgically. The patient underwent a partial cystectomy, hysterectomy, bilateral salpingo-oophorectomy, ureterolysis, and left iliac node biopsy. Pathology confirmed the diagnosis of urachal adenocarcinoma with negative margins. No adjuvant chemotherapy treatment took place. After surgery, the patient is assessed by CT scan of chest, abdomen, and pelvis performed every 6 months (Fig. 6). Five years after her surgery, follow-up chest CT scan revealed multiple pulmonary metastasis.

Discussion

The urachus is a vestigial musculofibrous band of tissue located in the space of Retzius surrounded anteriorly by the transversalis fascia and posteriorly by the peritoneum [1]. During early embryonic development, the urachal canal connects the allantois to the early fetal bladder [2]. Following the descend of the bladder into the pelvis during the 4th month of fetal development, it is stretched until it becomes the median umbilical ligament that joins the umbilicus to the dome of the bladder. Although the tubular structure diminishes with advancing age, it persists in a small proportion of adults [3].

Urachal cancer was originally described by Hue and Jacquin in 1963. As a rare and devastating malignancy of the bladder, it accounts for an estimated 0.01% of all adult cancers, 0.5%-2.0% of all bladder malignancies, and 20%-40% of primary bladder adenocarcinomas [1,4–6]. The mean survival for a locally advanced or metastatic disease is between 12 and 24 months, and the 5-year survival rate is only 43% [7–9]. Late symptom presentation, propensity for early local invasion, and distal metastasis are 3 characteristics of urachal cancer that lead to its poor prognosis [9].

Because early urachal cancer is not accompanied with symptoms, patients often present at the time of diagnosis with higher stage and poor prognosis [7]. Only when invasion of the bladder takes place, patients would present with common symptoms such as irritative voiding, mucous-like discharge, and hematuria [10]. The strongest predictors of urachal malignancy are hematuria and age greater than 55 years [9]. As the predominant presenting symptom, hematuria occurs in 90% of patients and increases the risk of malignancy by 17-fold [7,9,11,12]. Abdominal symptoms such as umbilical pain and discharge have also been reported.

On rare occasions, urachal adenocarcinoma can metastasize to the ovaries. These metastases are similar to primary mucinous ovarian adenocarcinomas both macroscopically and microscopically [13]. Mucin stains are positive in 69% of urachal adenocarcinoma [4]. To differentiate primary ovarian tumors from secondary, immunohistochemistry panel consisting of CK7, CK20, CDX2, MUC2, 34βE12, and β-catenin can be used. Although this panel of biochemical markers can differentiate primary vs secondary ovarian tumors, it can also help in defining the secondary tumor [13].

Diagnosis of urachal cancers has been made easier by the MD Anderson Cancer Center (MDACC) criteria consisting of
2 main criteria and 4 supportive criteria [11]. The 2 main criteria consist of: midline location of the tumor and a sharp demarcation between the tumor and normal surface epithelium [10]. Supportive criteria include: an enteric histology; the absence of urothelial dysplasia; the absence of cystitis cystica; and the absence of a primary adenocarcinoma of another origin [8,10]. However, urothelial surface involvement and presence of cystitis cystica are not grounds for excluding urachal carcinomas from differential diagnosis [14].

Fig. 3 — T1 FS postcontrast axial MRI image through the pelvis showing enhancing septations within the mass lesion anterior lateral to the urinary bladder.

Fig. 4 — T1 FS postcontrast axial MRI image through the pelvis showing loss of tissue plane between the mass and urinary bladder suggesting bladder origin and/or invasion (arrows).

Fig. 5 — Axial image, contrast-enhanced CT scan of the abdomen and/or pelvis in the portal venous phase demonstrates heterogeneously enhancing mass lesion adjacent to the anterior lateral wall of the urinary bladder with associated left external iliac lymph node. There is a loss of fat plane with associated soft tissue stranding, highly suspicious for invasion into anterior abdominal wall.

Fig. 6 — Contrast-enhanced CT scan of the abdomen and pelvis in the portal venous phase 4 years after surgical removal of the tumor. No evidence of local recurrence. Incisional hernia.
Nonetheless, accurate diagnosis of urachal carcinoma is facilitated by a high degree of clinical suspicion and imaging correlation.

Standard imaging workup for urachal cancer includes US, CT scan, and/or MRI evaluation of the abdomen and pelvis. US is often the initial imaging modality. On US, the tumor is observed as a soft tissue mass, which may consist of heterogeneity and calcification. While nonspecific, internal vascularity can sometimes be seen with Doppler imaging. CT scan and MRI, on the other hand, are often used for local staging and evaluation of distant metastasis. On CT scan, in 84% of cases, the tumor is mixed solid and cystic [15], whereas in the reminder of the cases, the tumor appears solid. The cystic component commonly seen in these tumors is mucin. As a sensitive modality for detecting calcifications, peripheral calcification is also commonly seen in the CT scan. Regarding positioning, the bulk of the tumor can be seen outside the lumen of the bladder in 88% of the cases. To distinguish it from urothelial cancer, bladder wall invasion is seen in 92% of adenocarcinomas, and distant metastasis is found in 48% of the cases. On MRI, sagittal images are important to define the location of the tumor. Focal areas of high intensity on T2 sequence are produced by mucinous component, and are highly suggestive of adenocarcinoma. The solid component is isointense to soft tissue [84], whereas in the reminder of the cases, the tumor appears solid. The cystic component commonly seen in these tumors is mucin. As a sensitive modality for detecting calcifications, peripheral calcification is also commonly seen in the CT scan. Regarding positioning, the bulk of the tumor can be seen outside the lumen of the bladder in 88% of the cases. To distinguish it from urothelial cancer, bladder wall invasion is seen in 92% of adenocarcinomas, and distant metastasis is found in 48% of the cases. On MRI, sagittal images are important to define the location of the tumor. Focal areas of high intensity on T2 sequence are produced by mucinous component, and are highly suggestive of adenocarcinoma. The solid component is isointense to soft tissue.

Table 1 shows the staging systems for urachal cancer. The staging systems proposed by Sheldon et al. [9] and Ashley et al. [16] are the most commonly used systems. The Sheldon system is a three-stage system that classifies urachal cancer into localized, regional, and distant metastasis. The Ashley system is a four-stage system that classifies urachal cancer into localized, regional, and distant metastasis, as well as metastasis to the extraperitoneal structures.


correlation.

can be seen outside the lumen of the bladder in 88% of the cases. To distinguish it from urothelial cancer, bladder wall invasion is seen in 92% of adenocarcinomas, and distant metastasis is found in 48% of the cases. On MRI, sagittal images are important to define the location of the tumor. Focal areas of high intensity on T2 sequence are produced by mucinous component, and are highly suggestive of adenocarcinoma. The solid component is isointense to soft tissue.

Standard imaging workup for urachal cancer includes US, CT scan, and/or MRI evaluation of the abdomen and pelvis. US is often the initial imaging modality. On US, the tumor is observed as a soft tissue mass, which may consist of heterogeneity and calcification. While nonspecific, internal vascularity can sometimes be seen with Doppler imaging. CT scan and MRI, on the other hand, are often used for local staging and evaluation of distant metastasis. On CT scan, in 84% of cases, the tumor is mixed solid and cystic [15], whereas in the reminder of the cases, the tumor appears solid. The cystic component commonly seen in these tumors is mucin. As a sensitive modality for detecting calcifications, peripheral calcification is also commonly seen in the CT scan. Regarding positioning, the bulk of the tumor can be seen outside the lumen of the bladder in 88% of the cases. To distinguish it from urothelial cancer, bladder wall invasion is seen in 92% of adenocarcinomas, and distant metastasis is found in 48% of the cases. On MRI, sagittal images are important to define the location of the tumor. Focal areas of high intensity on T2 sequence are produced by mucinous component, and are highly suggestive of adenocarcinoma. The solid component is isointense to soft tissue.

Table 1 - The urachal cancer staging system as defined by Sheldon et al in 1984.

<table>
<thead>
<tr>
<th>Stage</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage I</td>
<td>Urachal cancer confined to urachal mucosa</td>
</tr>
<tr>
<td>Stage II</td>
<td>Urachal cancer with invasion confined to urachus itself</td>
</tr>
<tr>
<td>Stage IIIA</td>
<td>Local urachal cancer extension to bladder</td>
</tr>
<tr>
<td>Stage IIIB</td>
<td>Local urachal cancer extension to abdominal wall</td>
</tr>
<tr>
<td>Stage IIIC</td>
<td>Local urachal cancer extension to peritoneum</td>
</tr>
<tr>
<td>Stage IIID</td>
<td>Local urachal cancer extension to viscera other than bladder</td>
</tr>
<tr>
<td>Stage IV A</td>
<td>Metastatic urachal cancer to lymph nodes</td>
</tr>
<tr>
<td>Stage IV B</td>
<td>Metastatic urachal cancer to distant sites</td>
</tr>
</tbody>
</table>

Further resection of the urachal ligament and umbilicus is recommended to ensure negative margins as 7% of urachal cancer can occur at the umbilicus [4,9,17].

Tumor stage at presentation has been important in predicting outcome after surgery [16]. Three different staging systems of urachal cancer have been proposed, although they are yet to be validated: Sheldon, Mayo, and Ontario staging systems. Sheldon et al. [4] proposed a staging system involving localization of the tumor (Table 1). It classifies early stage urachal cancer as localized in the urachal mucosa, whereas late stage cancer involves the extraperitoneal structures: pT1—no invasion beyond the urachal mucosa; pT2—invasion confined to the urachus; pT3—local extension to the (A) bladder, (B) abdominal wall, and (C) viscera other than the bladder, and pT4—metastasis to (A) regional lymph nodes and (B) distant sites. A more simplified system has been proposed by Ashley et al. [9]. The Ontario staging system is yet another simplified classification of urachal tumor involving 4 stages: confined to urachus (T1), confined to bladder (T2), Invading surrounding fat (T3), and extending to the peritoneum (T4) [5].

Currently, there are no standard protocol for the treatment of urachal adenocarcinoma with adjuvant chemotherapy. The role of chemotherapy and radiation therapy and its benefit to patient is yet unclear [7].

REFERENCES


