Case Report

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Fine Needle Aspiration Cytology Diagnosis of an Urachal Adenocarcinoma

Pathology Section

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ABSTRACT

Urachal Carcinoma (UC) is a rare malignancy of urinary bladder. It is usually found in adults in advanced stages because the tumour often grows outside the bladder without producing clinical symptoms. Most of the cases are mucinous, intestinal or signet ring cell adenocarcinoma and the diagnosis is usually made on biopsy. Radiographic images of this tumour may show characteristic features with a midline solid or cystic mass in the anterior wall of bladder associated with small calcification, which is considered as a pathognomonic sign for the diagnosis of UC. We report a case of UC in an adult, whose radiographic images suggested an urachal tumour and Fine Needle Aspiration (FNA) cytology revealed an adenocarcinoma. Laparoscopic partial cystectomy with umbilectomy and pelvic node dissection was done without further histopathological confirmation. Surgical intervention of UC on the basis of FNA diagnosis has not been reported in the literature.

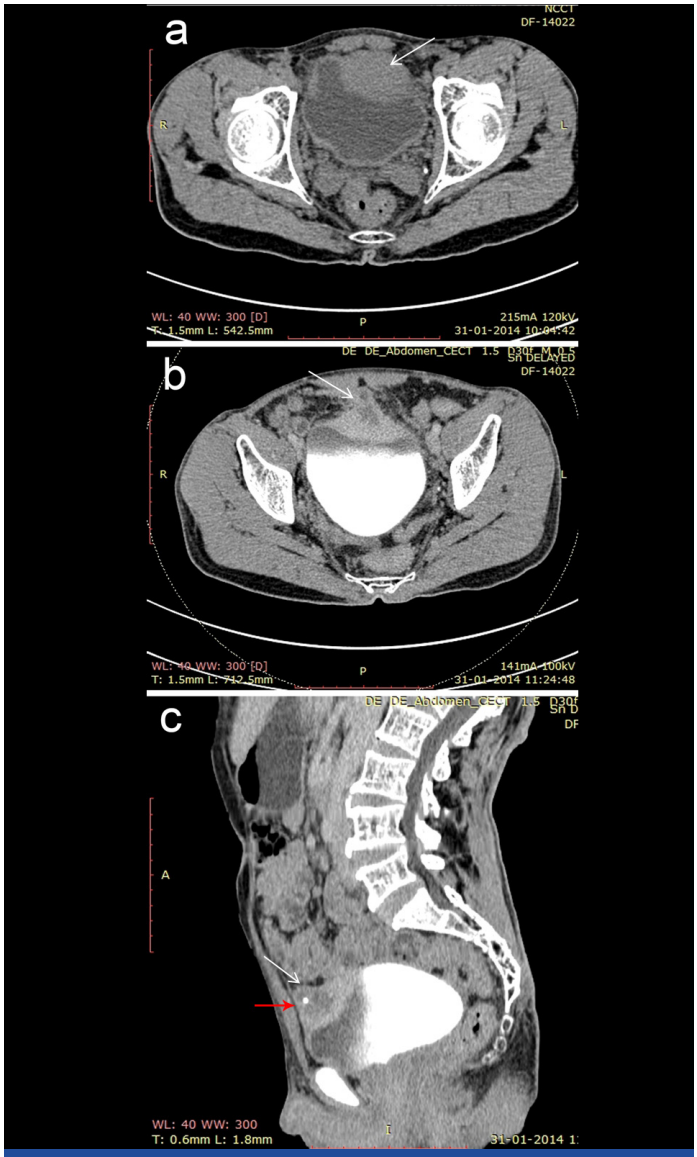
Keywords: Bladder, Signet ring cell adenocarcinoma, Urachus

CASE REPORT

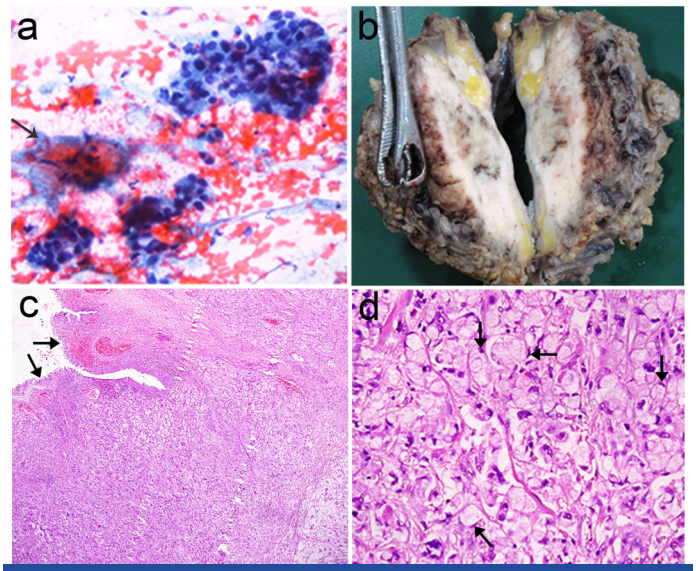
A 45-year-old, non-smoker, male presented with complaints of dysuria, nocturia, increased urinary frequency and urgency for the past six months. There was no history of fever, haematuria, anorexia and weight loss. Physical examination revealed a 4x4cm mobile, non-tender lump in the suprapubic region. Urine cytology showed no malignant cells. Abdominal CECT revealed a 5x3cm midline mass in the anterosuperior wall (dome) of urinary bladder (white arrow) [Table/Fig-1a]. There was anterosuperior extension of the mass along the urachal remnant (white arrow) [Table/Fig-1b&c]. Mild anterior perivesicle infiltration, necrosis and focal calcification (red arrow) were noted [Table/Fig-1c]. No ascites or peritoneal deposits were seen. Ultrasound guided FNA revealed malignant epithelial cells in small groups. The epithelial cells were cuboidal to polygonal with hyperchromatic nuclei, clumped chromatin and moderate amount of vacuolated cytoplasm. Mucin was present in the background [Table/Fig-2a]. Cytomorphology in the context of characteristic imaging findings suggested a primary urachal adenocarcinoma. Chest radiograph, upper and lower gastrointestinal endoscopy were normal. Laparoscopic partial cystectomy [Table/Fig-2b] with umbilectomy and bilateral pelvic node dissection were performed. Microscopic examination revealed normal bladder epithelium (black arrows) [Table/Fig-2c]. The wall showed diffuse infiltration by polygonal cells with presence of intracellular mucin and eccentrically located hyperchromatic nuclei forming signet ring cell morphology (black arrows) [Table/Fig-2d]. Tumour cells were immunonegative with CK7 (1:800) (Dako, US), CK20 (1:100) (Spring BioScience, UK) and β-catenin (1:200) (BD Biosciences, US) [Table/Fig-3]. Histopathological diagnosis was a primary urachal signet ring cell adenocarcinoma. There was infiltration into perivesical adipose tissue and metastasis to the regional lymph nodes (Mayo Clinic stage III/ Sheldon stage IV A). Postoperative period was uneventful.

DISCUSSION

The urachus is a trilaminar structure which connects allantois to the early fetal bladder. UCs arise in the epithelium of urachus anywhere along urachal remnants. It accounts for only 0.5% of all urinary bladder malignancies and 20-40% of primary bladder adenocarcinomas [1-3]. Hue and Jacquin first described this tumour in 1863 [3]. The tumour is usually found in adults (40-70



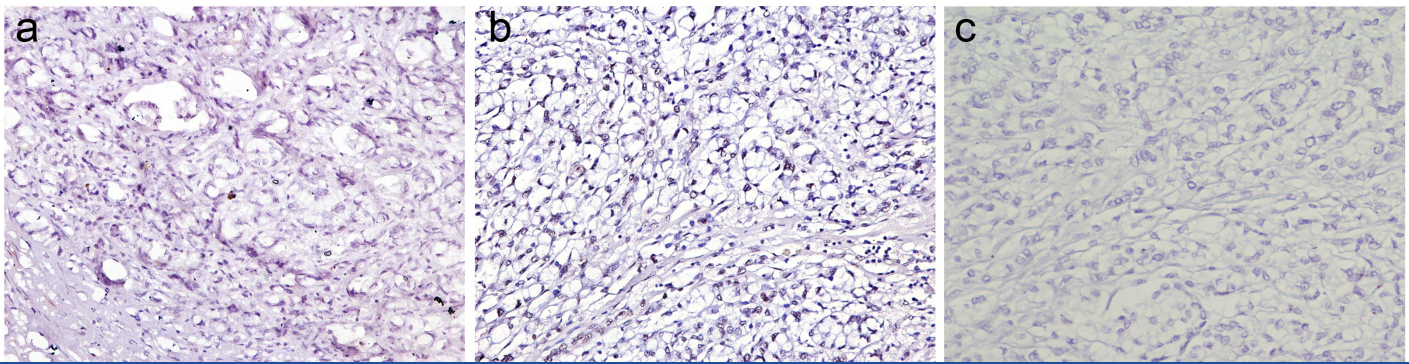
[Table/Fig-1]: (a) Axial CT image (a) shows soft tissue attenuation mass arising from anterior part of the dome of urinary bladder (white arrow). (b and c) Axial and Sagittal CT urogram images show anterosuperior extension of the mass along the urachal remnant (white arrow) and a small calcification in the mass (red arrow).



[Table/Fig-2]: (a) Smear shows groups of malignant epithelial cells with hyperchromatic nuclei and moderate amount of vacuolated cytoplasm. Mucin was present in the background (black arrow) (Pap; 200x). (b) Partial cystectomy specimen shows thickened bladder-wall with a solid tumour and glistening cut surface. (c) Section shows an infiltrating tumour in the bladder-wall with preserved epithelium (black arrows) (H&E; 40x). (d) The round to polygonal tumour cells have eccentrically placed hyperchromatic nuclei and intracellular mucin giving the appearance of signet ring cells (black arrows) (H&E; 400x).

years) with slightly male predilection (male:female=1.4:1) [4]. Often it is detected late in the course of disease, because UC generally grows outside the bladder, escaping from clinical detection, facilitating its local invasion and systemic spread. The clinical presentations include haematuria, mucosuria, less frequently bloody and/or mucoid urethral discharge, draining sinus to skin, recurrent urinary tract infections, obstructive urinary symptoms and palpable suprapubic mass. Haematuria occurs when the tumour erodes through the wall [5]. In our case, the patient presented with increased urinary frequency and urgency. UC often arises in the anterior wall of bladder. The radiographic images of CT or Magnetic resonance imaging (MRI) show a midline solid or cystic mass in the bladder. However, the pathognomonic radiological feature includes small calcification in the mass as seen in our case [6]. The primary treatment of UC is surgical intervention with partial cystectomy, en-bloc resection of the tumour, urachal tract, umbilicus and pelvic lymph nodes; whereas, urothelial carcinomas are managed either conservatively or by radical cystectomy depending on the deep muscle invasion and the grade of tumour [7,8]. Because of this, a biopsy is essential for the decision of treatment modality of bladder cancer. FNA diagnosis of UC is limited in the literature. Similar to our case Mardi *et al*., reported a case of urachal papillary mucinous cystadenocarcinoma on FNA in a 30-year-old female with abdominal mass which on FNA comprised of papillary fragments of tumour cells [9]. The typical radiographic features and a cytomorphology of a mucin secreting adenocarcinoma in our case suggested an UC on FNAC. Though most of the UCs are adenocarcinomas, infrequently they can be squamous or transitional cell carcinoma. Adenocarcinomas can be mucinous (75%), intestinal, signet ring cell, and unspecified type. Morphology of an UC resembles colorectal carcinoma with presence of glands, mucin, and signet-ring cells. Hence, the diagnosis of primary UC should be established after excluding metastasis from other sites. The diagnostic criteria for UC include: i) midline location; ii) a sharp demarcation between the tumour and normal surface transitional epithelium; iii) an enteric histomorphology; iv) absence of urothelial dysplasia; cystitis cystica or glandularis transitioning to the tumour; and v) the absence of an adenocarcinoma of another origin. In our case there was signet ring cell adenocarcinoma with normal bladder epithelium, and no other primary tumour was seen. Though focal areas of signet ring cell can be seen, pure primary urachal signet ring cell adenocarcinoma are rare. Jasreman *et al.,* found such tumour only in a single case out of 46 cases [10]. UCs are immunoreactive to CK20, CDX-2, GATA-3, S100, Uroplakin II, p63, variably CK7 and 34BE12; while negative (nuclear) for β-catenin. Diffuse β-catenin positivity militates against a diagnosis of UC [11]. In our case β-catenin, CK7 and CK20 were negative.

As UCs often resemble colorectal carcinoma, they are thought to arise from enteric rests. Some authors believe that they arise from a metaplastic pathway, since adenocarcinomas are known to arise in cystitis glandularis and exstrophy of bladder [12]. This hypothesis was also supported by Sirintrapun *et al*., in a study comprising of 7 cases of UC, where most of the cases showed microsatellite instability or KRAS mutation; but, none revealed BRAF mutation [13]. Radical surgical excision of the tumour is the treatment of choice. Since metachronous or synchronous UC can occur along the urachal tract, partial cystectomy with en-bloc resection of mass, urachal tract, umbilicus, and pelvic lymph nodes are done. Prognosis of the patients depends on type, grade and stage of tumour and extent of surgery. Patients with well-differentiated tumour have a 90% 5-year disease-specific survival following surgery. Signet-ring cell adenocarcinomas are associated with poor prognosis [14-16]. Metastasis is frequent in UC at presentation and seen in the pelvic lymph nodes, lung, brain, liver and bone. The overall prognosis is generally poor; because the tumour is often detected late in an advanced stage [11]. Signet ring cell adenocarcinoma and metastases to pelvic nodes in our case indicate a poor prognosis. In a retrospective study by Ashley *et al*., there was no difference in survival between patients who underwent partial cystectomy and those who underwent radical cystectomy [16]. However, performance of complete urachectomy and umbilectomy was a significant predictor of survival. Other factors like incomplete resection of urachal ligament, bladder dome, umbilicus, positive margins and occult lymph node involvement, substantially increase the risk of relapse [3,11]. Local recurrence is often seen within 2 years of surgery. Rarely genitourinary cutaneous metastasis can occur. Overall 5- and 10-year cancer-specific survival rates are 55.9% and 43.4%, respectively [17].



[Table/Fig-3]: Tumour cells are immunonegative with CK7 (a, 200x), CK20 (b, 200x) and β-catenin (c, 200x)

The median cancer-specific survival time of patients with urachal adenocarcinoma was 45 months, which was significantly longer than that of bladder urothelial carcinoma with similar stage of disease. Though current chemotherapy and radiotherapy have no significant role on survival, study on effect of combined chemotherapy regimen including gemcitabine, fluorouracil, leucovorin and cisplatin (GemFLP) for metastatic or unresectable adenocarcinoma is under phase II clinical trial [3,18].

CONCLUSION

UC should be distinguished from primary urothelial carcinoma because of its different treatment and prognosis. Though biopsy is essential for the decision of the treatment modality of bladder cancer, FNAC can be a reliable diagnostic tool if radiographic features are characteristic for UC.

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