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Giant low-grade collecting duct renal carcinoma mimicking a hepatic hydatid cyst. A challenging diagnosis and therapy

Abstract:

BACKGROUND

A collecting duct carcinoma is a very rare, malignant, renal, epithelial tumor. Distant metastases are present in one third of the cases at the time of diagnosis. It is known as having a poor prognosis.

CASE SUMMARY

A 42-year-old male patient was sent to our surgery clinic with the presumptive diagnosis of hydatid cyst of the liver. The ultrasonography examination revealed a 119.2x108.3 mm encapsulated cystic mass, which was localized in the 8th segment of the right liver lobe. The CT scan confirmed the presence of Bosniak III-type cystic lesion, which affected the liver and convexity of the right kidney. Surgical intervention involved a right nephrectomy. The patient was mobilized on the first postoperative day and was discharged after seven days. The histological and immunohistochemical examination revealed a low-grade collecting duct renal carcinoma, which is a rare variant of papillary carcinoma, with low malignant potential. Without any chemotherapy and after 21 months of follow-up, a radiological examination and laboratory analyzes showed normal aspects. No relapse or other complications were reported.

CONCLUSION

To manage renal tumors properly, a correct histopathological diagnosis is crucial, as is early diagnosis and proper surgical treatment.

Key words: collecting duct renal carcinoma, hydatid cyst, immunohistochemistry

Core tip: In this paper we present a rare histological variant of renal carcinoma. There are at least three particularities. Firstly, during imagistic investigations, renal carcinoma

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mimics a hydatid cyst. Secondly, the differential diagnosis is difficult and is finally established by using immunohistochemical stains. Thirdly, although collecting duct carcinoma is known to have an aggressive behavior, the proper histological assessment indicates a low-grade carcinoma. The patient is still alive after 21 months of regular follow-up, without postoperative oncological therapy.

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Fülöp ZZ, Gurzu S, Jung I, Simu P, Banias L, Fulop E, Dragus E, Bara T Jr. Giant collecting duct renal carcinoma mimicking a hepatic hydatid cyst. A challenging diagnosis and therapy. *World J Gastrointest Surg* 2020; In press

INTRODUCTION

Collecting duct carcinoma (CDC), also known as carcinoma of the collecting ducts of Bellini, comprises fewer than 1% of malignant renal tumors[1,2]. It originates from the collecting duct epithelium, which is located in the renal medulla[3]. CDC has distinct clinical and pathological characteristics, like hematuria, weight loss, back or flank pain and local mass, but also fatigue and fever[2-6]. It mostly appears in men, who are in their middle age (male-to-female ratio = 2:1), with a right-sided laterality predominance (>2:1)[2,6,7,8]. At the time of diagnosis, approximately one third of patients present metastases in supraclavicular or cervical lymph nodes or distant metastases in the lungs, bones, liver or adrenal glands[2,4,6,7,9].

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The presumptive diagnosis is highlighted by the CT-characteristics. CDC is characteristically described as having medullary localization, with renal sinus involvement, heterogeneous enhancement, infiltrative growth, and preserved renal curve[7].

Microscopically, it presents tubular or tubulopapillary architecture[1,4,10]. The World Health Organization established some major criteria used for diagnosis of a CDC, which is a diagnosis of exclusion. They include location in the medullary pyramid, irregular

tubular architecture, without a component of urothelial carcinoma, with high nuclear grade, inflammatory desmoplastic stroma, which is accompanied by numerous neutrophils, together with immunohistochemical (IHC) reactivity to antibodies against high molecular weight cytokeratin (HMWCK) and Ulex europaeus I (UEA-I), respectively[4,7].

In this paper, we aim to present a case of large cystic low-grade CDC that mimics a liver hydatic cyst. After surgical excision, without postoperative oncological treatment but a strict postoperative follow-up, the patient is still alive, without complications, 21 months after surgery.

CASE PRESENTATION

Chief complaints

A 42-year-old male patient, with a body mass index of 28.75, was transferred from a regional hospital, to our University Surgery Clinic, for right hypochondria pain and suspicion of a hydatid cyst of the liver.

History of present illness

The patient confirmed a one-month history of right hypochondria pain, without any other significant symptoms.

History of past illness

The patient was known to have chronic cholecystitis and mild hepatic steatosis. He declared himself a social drinker.

Personal and family history

No significant diseases or other information were confirmed.

Physical examination upon admission

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During the physical examination a large abdominal mass was palpated in the right hypochondria and the inferior edge of the liver, located at 2.5 cm below the rib cage.

Laboratory examinations

The serum level of lymphocytes rate was 16.4%, with a neutrophil-to-lymphocyte ratio (NLR) of 4.42. The serum level of tumor-specific markers such as α-Fetoprotein (AFP), Carcinoembryonic Antigen (CEA), or human choriogonadotropin (HCG) were not checked.

Imaging examinations

The primary imaging investigation included ultrasonography, which described a non-homogeneous structure of a 119.2x108.3 mm-round mass, with increased echogenicity. The aforementioned encapsulated mass was located in the 8th segment of the right liver. Based on the patient's personal history, the presumptive diagnosis was a hydatid cyst, associated with hepatosplenomegaly and hepatic steatosis. A right renal malrotation, with the right kidney being localized in the epigastrium, was also suspected. The ureteral jet from the right side of the bladder was not visible.

A subsequent CT-scan was also carried out. It confirmed the hepatomegaly and presence of a well-defined 126x121x146 mm (AP/LL/CC) macronodular encapsulated cystic lesion. The wall thickness was estimated to be about 6 mm. The fluid content was estimated to be clear, having a density of 10 UH. The cystic mass was appreciated to involve the convex side of the right kidney, having the upper limit at the visceral face of the liver, the lateral limit at the abdominal wall and the inferior limit at the bifurcation of the abdominal aorta. It deployed the right kidney in the anterior and medial direction (Figures 1-3). Hydronephrosis or signs of disorders of the secretion or excretion function of the right kidney were not described, neither were modified lymph nodes. Free abdominal fluid was observed. As the cystic lesion was classified as Bosniak III-type, with a 50% potential of malignancy, surgical excision was decided upon.

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Treatment

After antibiotic prophylaxis, with second-generation cephalosporins, and thromboembolic prophylaxis with low molecular weight heparin, surgical intervention was carried out. The POSSUM predicted morbidity rate was estimated at 29.3%, with a POSSUM predicted mortality rate of 5.3%.

Exploratory laparoscopy was initiated, followed by conversion to open surgery. Intraoperatively, involvement of the right kidney was observed and a histological examination confirmed the malignant potential. Based on this fact, a right nephrectomy, with tumorectomy, was performed. Due to a diligent hemostasis, the surgical intervention lasted 150 minutes.

Postoperative histopathological assessment

Macroscopic examination confirmed the presence of the encapsulated cystic mass, which involved the renal specimen. On the cut section, a blackish-brown appearance was evident.

The microscopic findings revealed a specific presence of tubular and papillary-like structures. The nuclei predominantly showed Fuhrman grade 2; the stroma did not show obvious desmoplastic areas, although it was infiltrated with neutrophils (Figure 4). Based on histological findings, a papillary carcinoma was firstly diagnosed. As foamy macrophages were seen within the fibrovascular core, the variant of collecting duct carcinoma was taken into account, for differential diagnosis. The tumor extended into both the cortical and medullary area, exceeded the renal capsule and infiltrated the perirenal adipose tissue (pT3 stage). No lymph nodes were identified in the surgical specimen. No clear cells or sarcomatoid dedifferentiation was identified.

Immunohistochemical profile

Tumor cells show diffuse positivity for CD15 (clone: Carb-3, Dako) CTK AE1/AE3 (clone AE1/AE3, ImmunoLogic), alpha-methylacyl-CoA racemase (AMACR clone 13H4,

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Dako), and vimentin (clone V9, Leica Biosystems), focal positivity for CTK7 (clone OV-TL 12/30, A. Menarini Diagnostics) and CTK19 (clone RCK 108, Dako). No positivity was revealed for antibodies CD10 (clone Ab-2 56C6, Thermo Fisher Scientific), HER-2 (clone c-erbB-2, Dako), inhibin (clone Inhibin A, Leica), CD68 (clone KP1, ImmunoLogic; it marked the foamy macrophages within the fibrovascular core), Melan-A (clone A103, Cell Marque), and Calretinin (clone Dak-Calret 1, Dako). The Ki67 (clone Mib-1, Dako) index was below 5% (Figure 5).

Final diagnosis

Based on the histological aspect and immunoprofile of the tumor cells, the final diagnosis was established as pT3Nx-staged low-grade carcinoma of the collecting ducts of Bellini.

Outcome and follow-up

The patient was mobilized on the first postoperative day. Presenting favorable evolution, he was discharged after seven days following surgery. Postoperatively the patient's health conditions were assessed by phone after 3, 6 and 12 months.

He did not receive postoperative oncological treatment, but in the first year following the surgical intervention, he attended oncological control examinations once every three months. During the course of the first 12 months, two ultrasonographies and one CT-scan were performed, which described normal kidney function on the left side, without any suspicion of relapse on the right side. From the second postoperative year, control examinations were performed every six months. After 18 months the laboratory investigations presented normal values and the ultrasonography excluded any sign of relapse. The patient presents regularly at the nephrology clinic for evaluation of left-sided renal activity, which shows normal function. The patient states that he is in good general health, without any complaints 21 months following surgery.

DISCUSSION

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CDC is a rare but threatening genitourinary malignancy[9]. It usually presents as a locally advanced, high-grade carcinoma, with bone metastases[9]. In rare cases, these tumors can present large dimensions, with a cystic appearance, such as in this case[3,11].

Current literature is dominated mostly by case reports, respectively by small institutional cohort studies (Table 1). Due to its histological rarity, the optimal postoperative therapy is far to be elucidated. It should be based on a proper estimation of the malignancy grade. As the CDC is considered as having highly malignant behavior, identification of the low-grade cases, as an exclusion diagnosis, might be crucial for a thorough follow-up. Recent studies proposed using the inflammation-related parameters for estimation of the prognosis[12,13]. An NLR ≥ 4 is considered an indicator of poor prognosis[12,14-16]. In this case, although the value of the NLR was 4.42, the patient had a favorable prognosis, 21 months after diagnosis.

The reported survival rate is controversial, being mostly reported as a median survival of 13-22 months after diagnosis[5,9]. The overall survival rate at 1 and 3 years, for all stages, is reported at 69%, respectively 45%[2,5]. A survival benefit of 4-5 months only, is predicted with chemo-radiotherapy[9]. There is no standardized treatment to date for metastatic CDC[8]. In locally advanced cases, no chemotherapy is indicated after standard nephrectomy. It is recommended to follow the evolution of the patients and, if metastases appear, the histological examination and the immunoprofile of the metastasis are indispensable for an individualized therapy[2]. As HER-2 might be overexpressed[10], HER-2 /neu amplifications can be indicators of anti-HER-2 medications. In metastatic CDCs, tumor regression was reported after targeted therapy with sunitinib or sorafenib[2,8].

Although there is a tendency for a detailed imagistic diagnosis, in this particular case, a hydatid cyst was supposed at ultrasonography. CDC usually presents as a central medullar renal mass, showing minimal contrast capture; in rare cases, cortically situated satellite nodes are also described[2]. Cystic renal masses are easily diagnosable on CT-

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scans, if they belong to Bosniak type I or type IV. Bosniak type II and III cysts[3] may present a diagnostic challenge.

The diagnosis was, however, difficult, based on histological assessment, and supplementary IHC stains needed to be carried out. As CDC is an exclusion diagnosis, the differential diagnosis should include papillary carcinoma, renal medullary carcinoma, and gland-forming urothelial carcinoma[3]. Suspicion of CDC should be emphasized in Hematoxylin-Eosin and is confirmed by positivity for UEA I and a large spectrum of keratins, such CKHMW, CK AE1/AE3, CK7, and CK19, associated with positivity for CD15. CDC is negative for CD10, CK20 and villin and might display vimentin and HER-2 expression[1,3,5,6]. HER-2 positivity, which was not identified in this case, is considered an indicator of poor prognosis[10]. CDC also presents loss of heterozygosity and deletion of 1q32.1-32.2 and monosomy of chromosomes 1q, 6p, 8p, 14, 18, 22[1,2].

Multicenter studies and clinical trials, based on the genetic profile of the tumor cells, need to be conducted to establish an effective adjuvant therapy.

Conclusions: In patients with rare variants of renal carcinomas, such as CDC, estimation of the tumor grade is mandatory for a proper follow-up. LNR cannot be used as a prognostic parameter. In metastatic cases, the targeted therapy should focus on the genetic profile of tumor cells.

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