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Case report

Chromophobe renal cell carcinoma in an 18-year-old female[☆]



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KEYWORDS

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Abstract

Renal cell carcinoma (RCC) in young adults is uncommon. Whether they have different clinicopathologic characteristics and outcomes from those in older patients is still a conflicting matter. In this article we present an uncommon subtype of RCC which is chromophobe RCC (chRCC) in a female aged less than 20 years.

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Introduction

Renal cell carcinoma (RCC) is the most common neoplasm of the kidney representing on average over 90% of all renal malignancies that occur in adults in both sexes [1,2]. It is rare in the pediatric population and only 2% of RCC occur in patients younger than 20

years old [3]. RCC is a heterogeneous disease comprised of different histological variants including clear cell, papillary, chromophobe, collecting duct, medullary, MiT translocation renal cell carcinoma (TRCC), mucinous tubular spindle cell and unclassified, according to the World Health Organization (WHO) classification. It is known that the most common subtype in adulthood is clear cell followed by papillary then chromophobe RCC (chRCC). But in the pediatric population, TRCC comprises the majority of RCC [4,5]. The frequency of the remaining non-translocation associated RCCs in this age group is still a matter of controversy. In this paper we present a case of a chRCC occurring in an 18-year-old female.

Case report

An 18-year-old female, with no medical history, presented with abdominal pain and distention evolving for 2 months. Clinical

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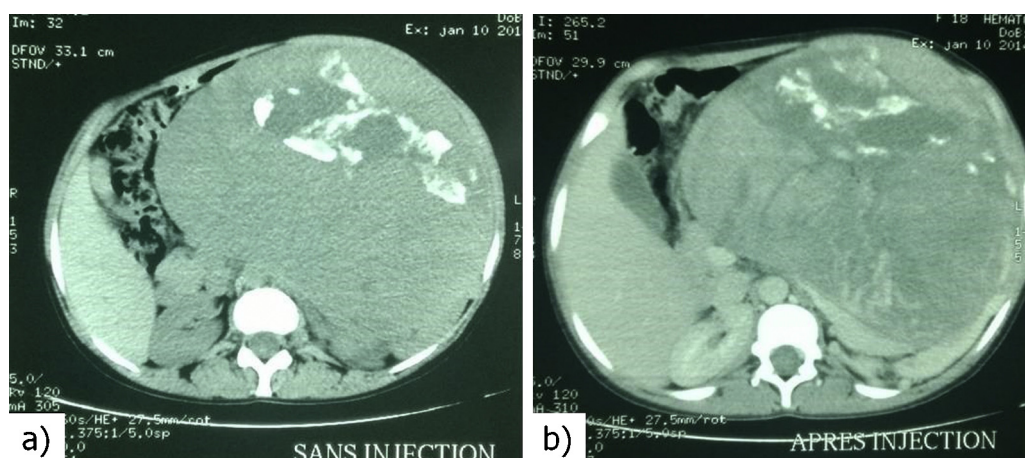


Fig. 1 Renal CT scan. (a) Renal mass with central calcifications and large foci of necrosis. (b) Post contrast images showing homogeneous enhancement.



Fig. 2 Well-delimited kidney tumor with gray-yellowish cut surface. Presence of foci of necrosis and hemorrhage.

examination revealed a large painless mass in the left abdomen. Laboratory studies showed anemia with elevated levels of Lactate dehydrogenase (LDH = 748 UI/l). Ultrasonography confirmed the presence of the bulky mass in the left hypochondrium. On further evaluation, the thoraco-abdomino-pelvic computed tomography (CT) showed a hypervascular large mass (26 cm × 21 cm × 17 cm) arising from the left kidney with central calcifications and necrosis (Fig. 1). There were no secondary lesions. The patient underwent a left nephrectomy. Gross examination revealed an encapsulated, well delimited tumor measuring 23 cm × 21 cm, occupying almost the entire kidney. The cut surface of the tumor was gray-yellowish in color presenting areas of necrosis and hemorrhage (Fig. 2). The hilar vessels and the ureter were not involved. Histological analysis of this tumor showed a lobulated carcinomatous proliferation comprised of groups of polygonal cells with accentuated cell borders, an irregular nuclei and a perinuclear halo. These cells were sometimes binucleated or even multinucleated. Their cytoplasm was either abundant and transparent or granular and eosinophilic. Areas

of necrosis, fibrosis and calcification were also seen in this tumor (Fig. 3). There was no invasion of the peri-renal fat or the renal vein. Hale's colloidal iron stain showed a cytoplasmic positivity (Fig. 4). Immunohistochemical stain CK7, EMA and CD117 were positive while vimentin and CD10 were negative (Fig. 5). Based on these morphological and immunohistochemical features, the diagnosis of chromophobe renal cell carcinoma was made. This tumor was classified as pT2b cN0 cM0 according to the TNM system. After surgery, the patient made an uneventful recovery. At 23 months of follow up, there were no sign of disease recurrence or metastasis.

Discussion

The chRCC represents the third most common variant of RCC. It is an uncommon variant accounting for 5–10% of all cases of RCCs [1]. The mean age of incidence is in the sixth decade with a range of 27–86 years [2]. Many series of chRCC were reported [6–10]. In those series, all patients were aged more than 20 years. Yet, some cases of chRCC in patients aged less than 20 years have been reported. In a series of 16 cases of chRCC reported by Nakaigawa et al., the mean age and range of ages of patients were 50.9 years and 16–74 years, respectively [11]. Din et al. reported 45 cases of chRCC and found that age ranged from 18 to 90 years with an average age of 48.5 years [12]. Eggenner et al. reviewed 119 renal tumors in patients aged from 17 to 45 years old; they found that 91 (76.5%) of them are RCCs. The incidence of chRCC was relatively increased (12.1%) in this population [13]. Other authors reported comparative studies of RCC between young patients (younger than 40 years) and their older counterparts. Suh et al. [14], Thompson et al. [15], and Gillett et al. [16] found a higher incidence of chRCC in young patients compared with the older patients group. Lee et al. [17], as well as Taecoen et al. [18] reported a high proportion of non-clear cell carcinomas in young adults but the most common variant was papillary carcinoma. Goetzl et al. [19] did not find any difference in the frequency of histological subtypes of RCC between young and old adults. In our case, the patient's age was 18 years when she was diagnosed with chRCC.

There are no specific clinical features of chRCC but the most common symptoms are hematuria, flank mass and pain [1,20].

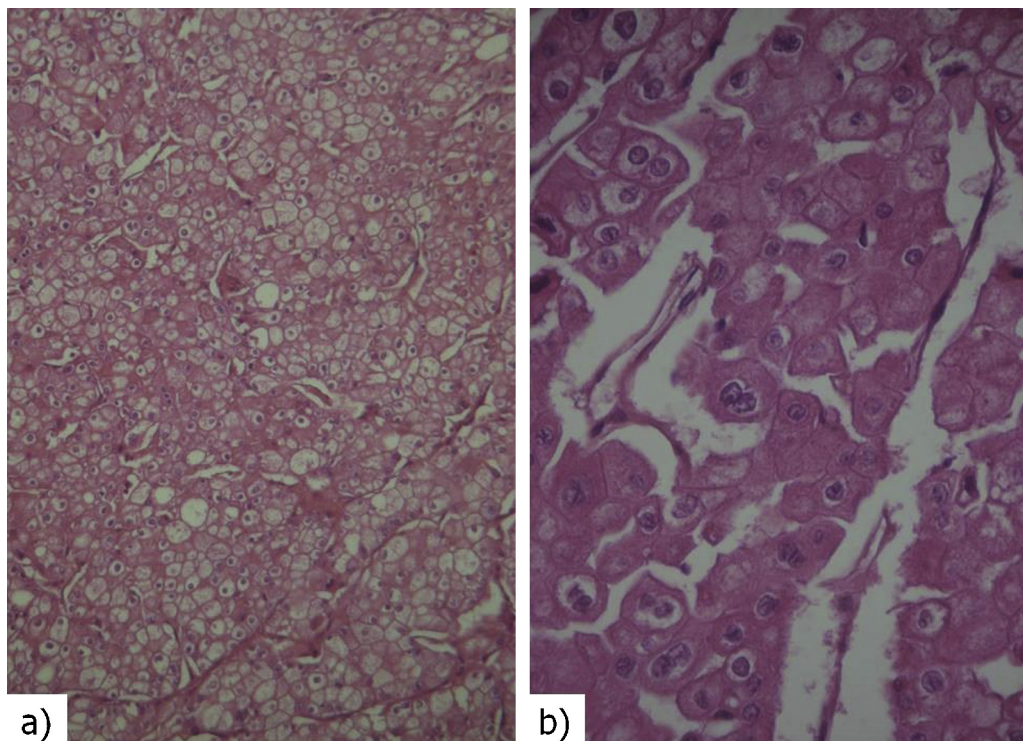


Fig. 3 (a) Proliferation of various-sized tumor cells arranged in large sheets separated by fibrovascular septa (HE 100 \times). (b) The cell border is thick and prominent. The cytoplasm is eosinophilic and granular. The nuclei are generally wrinkled. Presence of binucleated cells and perinuclear halos (HE 400 \times).

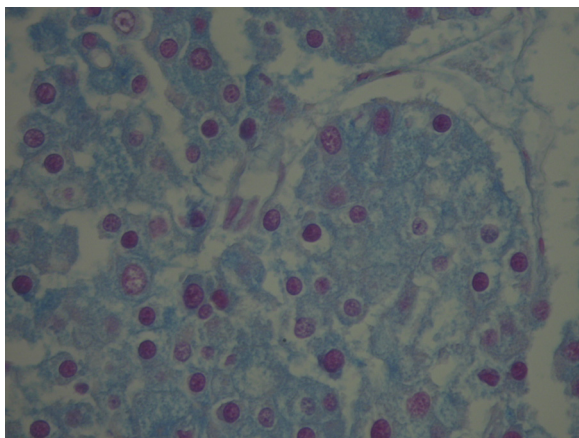


Fig. 4 Hale's colloidal iron stain positivity in the cytoplasm (400 \times)

CT findings in chRCC show a hypodense mass with a homogeneous enhancement. Calcifications may be seen in 38% of the cases [1].

On gross examination, chRCC are solid, well circumscribed tumors with a lobulated surface that appears grey-beige in color [1,2]. Foci of necrosis and hemorrhage may also be seen [20]. The mean size of this tumor is 6 cm [1,21]. In a series of 104 cases of chRCC reported by Cindolo et al., the tumor size ranged from 1.2 cm to 18 cm [6]. Zhang et al. reported 42 cases of chRCC ranging in size from 2 cm to 19 cm [7]. Among the 53 cases of chRCC reviewed by Zhao et al., the largest tumor size was 20 cm [8]. The tumor size in our case was 23 cm in greatest dimension.

Microscopically, this neoplasm grows typically in a solid pattern, with fibrotic septa and thick-walled blood vessels, and sometimes in glandular or tubulocystic patterns. It is made of two types of tumor cells in varying proportions. Some are polygonal with abundant and clear cytoplasm. Others are small with an eosinophilic and granular cytoplasm. Both cells have in common sharply defined borders, an irregular, wrinkled nuclei and perinuclear halos. Some cells are binucleated. Hale's colloidal iron stain shows a diffuse and strong cytoplasmic reticular positivity due to the presence of numerous cytoplasmic vesicles. Immunohistochemical analysis shows a strong and diffusely positive immunostaining for cytokeratin 7 and epithelial membrane antigen (EMA) with a negative reaction for CD10 and vimentin [1,2,20]. Our patient presented the typical histological and immunohistochemical features of chRCC.

The Fuhrman grading system is useless in chRCC since irregular nuclei, prominent nucleoli and nuclear pleomorphism are inherently present in this tumor. Moreover, Paner et al. proposed a novel 3-tiered grading system based on the analysis of geographic nuclear crowding and anaplasia. Paner et al. also concluded the superior prognostic value of this novel grading system compared to Fuhrman grade [22,23].

Although chRCC is known to have a favorable outcome, the prognosis of RCC occurring in young adults remains a matter of controversy. In fact, some authors reported a favorable long-term survival in young adults with RCC in comparison with a group of old adults [14,18]. Others found no difference in cancer specific survival between the age groups [15,19]. Lee et al. concluded that survival outcomes were poorer in young adults [17].

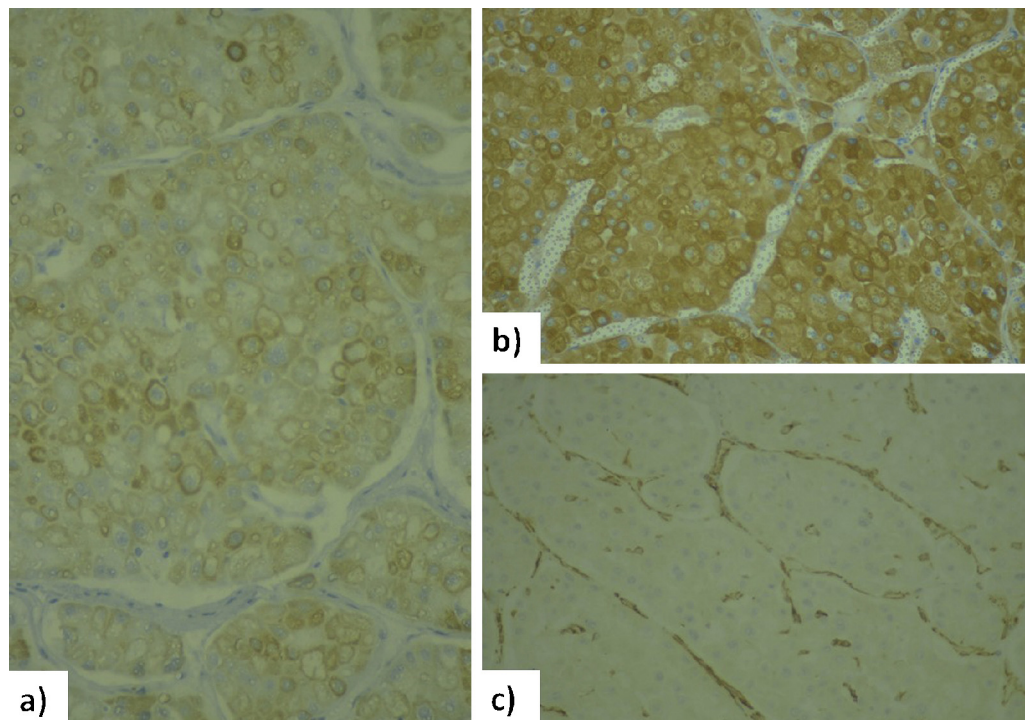


Fig. 5 Immunohistochemistry study. (a) Positivity of tumor cells with Cytokeratin 7 (200 \times). (b) Positivity of tumor cells with EMA (200 \times). (c) Tumor cells are negative for Vimentin (200 \times).

Conclusion

In this paper we report a large ChrCC in an 18-year-old female. The occurrence of this subtype of RCC in young adults is uncommon. In this particular age group, the incidence of RCCs in general is rising and its prognosis compared to older patients is still a conflicting matter.

Conflict of interest

The authors have no conflict of interest to declare.

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