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Multicystic dysplastic kidney in adults: A case report of unilateral presentation in an adult sudanese female

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ABSTRACT

Multicystic dysplastic kidney is a congenital anomaly typically diagnosed in infancy, rare in adults, in our case of a 25-year-old Sudanese female presented with left flank pain. Imaging showed the left kidney replaced by cysts, consistent with MCDK, and ovarian cyst. She underwent a successful open simple nephrectomy; and histopathology confirmed MCDK. Our case highlights diagnostic and management challenges of MCDK in adults. Conservative management is increasing, especially for asymptomatic patients with normal contralateral kidney function. Healthcare barriers in Sudan, including limited awareness and political unrest, complicate timely diagnosis and treatment. Multidisciplinary care and improved healthcare access are essential.

1. Introduction

Multicystic dysplastic kidney (MCDK) is a congenital developmental anomaly characterized by the presence of multiple noncommunicating cysts affecting one or both kidneys. It arises from abnormal renal tissue development during embryogenesis, leading to the formation of cysts that lack normal renal parenchyma and function.[1] It occurs in approximately 1 in 4300 live births.[2]

While MCDK can be diagnosed incidentally in adults, the rarity of such cases in Sudan, combined with the significant healthcare challenges due to ongoing conflict, adds complexity to the diagnosis and management in this setting. In adults, unilateral MCDK typically presents asymptomatically, with the contralateral kidney often having normal renal function. However, symptoms such as flank pain, hematuria, or hypertension may occur in some cases, prompting further evaluation.[3]

Diagnostic imaging, including ultrasound, computed tomography (CT), or magnetic resonance imaging (MRI), plays a crucial role in confirming the diagnosis and assessing the extent of renal involvement.[4]

Management strategies for MCDK in adults vary depending on the clinical presentation, patient age, renal function, and associated comorbidities. Although nephrectomy has traditionally been the treatment of choice for symptomatic or complicated cases, conservative approaches are increasingly being considered, particularly in asymptomatic patients with preserved renal function.[5] Long-term follow-up is essential to monitor for potential complications and ensure optimal outcomes for affected individuals.[6]

Here, we present a case of MCDK in an adult Sudanese female who complained of left flank pain for one year.

2. Case presentation

A 25-year-old Sudanese female presented to the urology clinic with a one-year history of left flank pain. She denied any history of hematuria, dysuria, fever, or weight loss. Physical examination revealed no significant findings, and laboratory tests including complete blood count, renal function test, and urinalysis were normal. Abdominal and pelvic ultrasound revealed a normal right kidney and the absence of renal tissue in the left kidney, which was replaced by multiple cysts with no echogenicity suggestive of renal tissue. Computed tomography urography confirmed the presence of multiple cysts in the left kidney [Fig. 1], with a classical punch of grapes appearance consistent with MCDK [Fig. 2], CT urography also revealed a 4 cm left ovarian cyst. The cyst was asymptomatic and did not require concurrent treatment; it was scheduled for regular monitoring. Further investigations, such as micturatingcystourethrogram (MCUG), cystoscopy, and dynamic renal scintigraphy, were not available. The patient was counseled regarding conservative management versus nephrectomy, and she elected to

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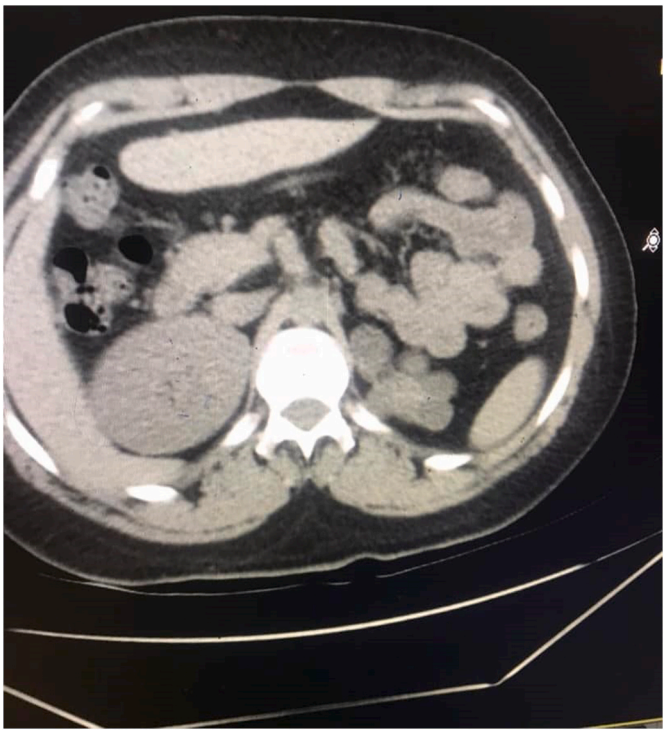

Fig. 1. Shows the left kidney enirly replaced by multiple cysts.

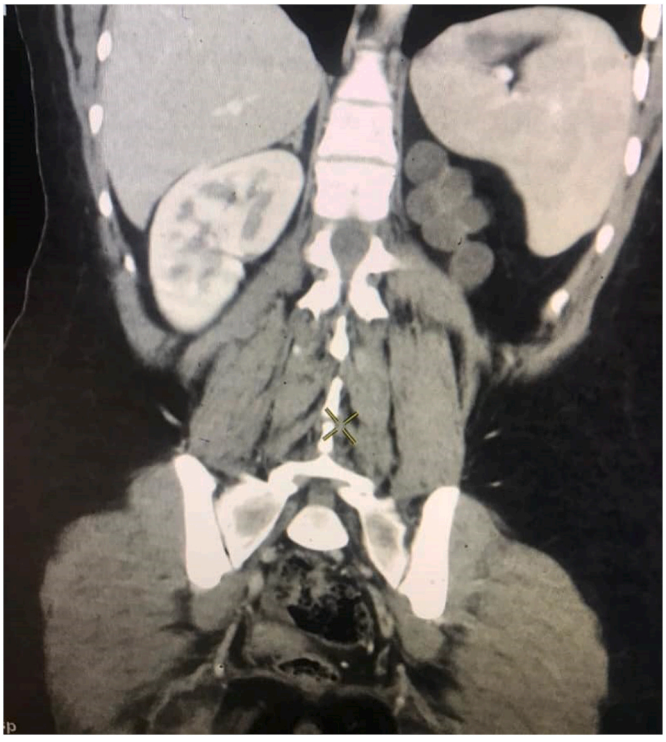

Fig. 2. Shows the classical punch of grapes appearance of MCDK.

undergo nephrectomy.

3. Procedure

After providing informed consent and completing all necessary preoperative preparations, a left transcostal approach was utilized for renal exploration in our patient. Intraoperatively, careful examination revealed that the left kidney was entirely replaced by multiple cysts, with a complete absence of normal renal tissue and no evidence of renal system dilatation. Additionally, intense fibrosis was observed around the kidney, indicative of chronic pathological changes associated with MCDK [Figs. 3 and 4]. Given the extent of renal involvement and absence of functional renal tissue, a decision was made to proceed with left open simple nephrectomy. The procedure was performed meticulously, and the kidney was excised without complications. Postoperative recovery was uneventful, with resolution of the patient's symptoms and no evidence of immediate surgical complications.

Histopathological examination of the excised kidney tissue confirmed the diagnosis of MCDK, demonstrating the characteristic findings of multiple cysts lined by flattened epithelium and the absence of normal renal architecture. The surrounding fibrous tissue exhibited chronic inflammatory changes consistent with long-standing disease.

4. Discussion

Multicystic dysplastic kidney represents a unique entity among congenital renal anomalies, and it does not seem to be a familial disorder,[7] However, the disease is usually isolated in almost 70 % of case, and associated anomalies of the genitourinary tract in the contralateral kidney could be present, including; urinary tract obstruction, vesicoureteral reflux and abnormalities of the genitalia.[8] The sonographic findings of MCDK include the presence of noncommunicating cysts with variable sizes that are usually located at the periphery of the kidney.[9]

In our patient, a 25-year-old Sudanese female presented with a one-year history of left flank pain, prompting evaluation for underlying renal pathology. Diagnostic imaging, including abdominal ultrasound and CT urography, revealed the characteristic findings of MCDK, with the left kidney entirely replaced by multiple cysts and the absence of normal renal tissue. This presentation is consistent with previously reported cases of unilateral MCDK in adults, which typically present asymptomatically and are incidentally detected during imaging studies.[10] The decision-making process regarding the management of MCDK in adults is multifaceted and requires careful consideration of various factors, including patient age, comorbidities, renal function, and patient

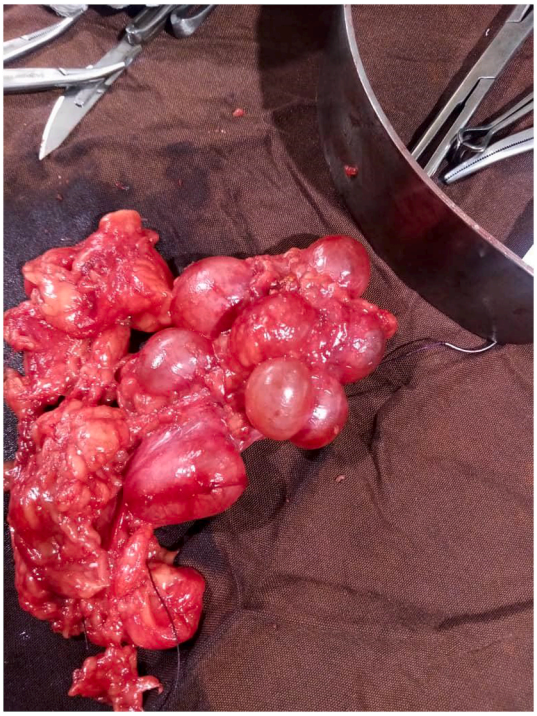

Fig. 3. Shows the left kidney that contains multiple and different sizes cysts.

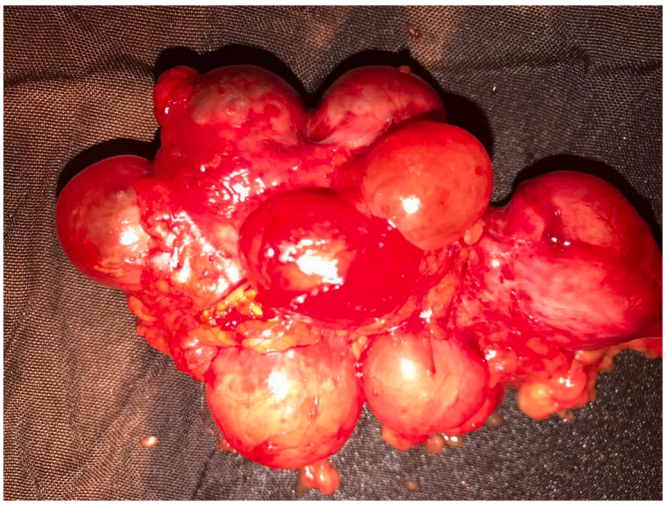

Fig. 4. Shows the left kidney that contains multiple and different sizes cysts.

preferences. Historically, nephrectomy has been the mainstay of treatment for MCDK, particularly in cases of symptomatic or complicated disease; however, conservative management approaches are increasingly being explored, especially in asymptomatic cases or when the contralateral kidney is functioning normally.[11] In our case, the patient was counseled regarding both conservative management and nephrectomy, with the final decision made based on the patient's preferences and individual circumstances. Open simple nephrectomy was performed successfully without complications, leading to resolution of the patient's symptoms and avoidance of potential long-term complications associated with MCDK. Isolated unilateral MCDK typically carries an excellent prognosis[12]; however, long-term follow-up with regular renal function tests and imaging studies are recommended to assess renal function and detect any changes in the contralateral kidney.

MCKD is rarely reported in the adult Sudanese population, the rarity in diagnosis and reporting of this disease is multifactorial. First, a lack of patient awareness is an important factor leading to patient negligence of the symptoms of MCDK which are usually rare or minimal. Second, the centralization of healthcare services means that advanced diagnostic and therapeutic facilities are largely confined to major cities like Khartoum. In our case, the patient's ability to access the necessary diagnostic imaging and surgical intervention was particularly challenging given these circumstances.

Furthermore, the ongoing conflict and political instability have severely disrupted the delivery of healthcare services. Since the escalation of violence in April 2023, many hospitals and clinics have been destroyed or rendered non-functional due to damage or the flight of healthcare workers. The scarcity of medical supplies, coupled with the economic downturn, has led to critical shortages of essential medications, diagnostic tools, and surgical equipment. This situation has forced many healthcare providers to adopt "warfare medicine" practices—delivering care under extreme conditions with limited resources.

The mass displacement of both healthcare professionals and patients has also contributed to the crisis. Many skilled healthcare workers have fled the country or been internally displaced, leading to a severe shortage of trained personnel. The internal displacement of patients further complicates their ability to receive timely and appropriate care. In many cases, patients are unable to reach healthcare facilities due to active conflict, and those who do manage to reach these centers often face overcrowded conditions and long waiting times.

In the context of our patient, these challenges played a critical role in both the delay of diagnosis and the decision-making process for treatment. The lack of available advanced diagnostic modalities such as MRI or dynamic renal scintigraphy, which are standard in more resource-rich settings, meant that our clinical team had to rely on more basic imaging techniques. Additionally, the patient's decision to undergo nephrectomy was influenced not only by the clinical indications but also by the understanding that future access to healthcare might be severely limited, making conservative management less viable in this context.

5. Conclusion

In conclusion, our case underscores the importance of a multidisciplinary approach to the diagnosis and management of MCDK in adults, with emphasis on individualized treatment strategies tailored to the patient's unique clinical circumstances and preferences. Further research and collaboration are warranted to enhance our understanding of MCDK and optimize outcomes for affected individuals.

Furthermore, the rarity of MCDK in the adult Sudanese population highlights the need for increased awareness and early detection of this condition. However, challenges in healthcare access and delivery, compounded by ongoing political unrest and conflict in the country, pose significant barriers to timely diagnosis and management of MCDK in resource-limited settings.

Ethical approval and consent to participate

Written consent was obtained for the surgery itself and for the use of the excised kidney for researches and teaching purposes, unfortunately, due to the ongoing war and patient displacement other related documents have been lost including the, CT, ultrasounds and histopathology reports. The four images included in our manuscript are the only remaining images available. We hope that these images combined with the accompanying clinical details will be sufficient and provide enough information for the purpose of the study.

Availability of data and materials

Not applicable.

Declaration of competing interest

The authors declare that they have no competing interests.

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Authors contributions

1-Dr. Amer Abbo supervised and performed the surgery and wrote the case presentation and procedure sections.

2- Dr. Basil Hassan assisted in the surgical procedure and wrote the introduction and conclusion sections.

3- Dr. Amel Ibrahim observed the surgery and wrote the discussion section.

All authors read and approved the final manuscript.

Patient documents and challenges

In our case, and due to the ongoing war, the histopathology report and imaging reports (CT and Ultrasound) were initially available but subsequently lost due to patient displacement and instability. Despite these challenges, the diagnosis of MCDK was confirmed through imaging studies and the histopathology of the excised kidney, supporting our case findings.

CRediT authorship contribution statement

Amer Abbo Hassan Abbo: Writing – original draft, Supervision. **Basil Amer Abbo Hassan:** Resources. **Amel Abdelrahman Omer**

Ibrahim: Writing – review & editing.

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