Radiology

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Incidental Postnatal Diagnosis of Unilateral Right Multicystic Dysplastic Kidney in an Asymptomatic Neonate: A Case Report

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ABSTRACT

Background:
Multicystic dysplastic kidney (MCDK) is a common congenital anomaly of the kidney and urinary tract characterized by replacement of normal renal parenchyma with multiple non-communicating cysts due to abnormal embryologic development. The condition is usually detected during routine antenatal ultrasonography and is frequently asymptomatic after birth. Recognition of incidentally diagnosed unilateral MCDK is important because current management emphasizes conservative follow-up rather than surgical intervention in the absence of complications.

Case Report:
A full-term neonate presented with excessive crying since birth without fever, vomiting, poor feeding, urinary symptoms, or antenatal imaging records. Physical examination and laboratory investigations, including renal function tests and urinalysis, were unremarkable. Abdominal ultrasonography performed to exclude an intra-abdominal cause revealed an enlarged right kidney measuring 5.39 × 3.39 cm, almost completely replaced by multiple non-communicating cysts of varying sizes with marked absence of normal renal parenchyma and no identifiable pelvicalyceal system, consistent with multicystic dysplastic kidney. The left kidney demonstrated normal size, morphology, corticomedullary differentiation, and echogenicity without hydronephrosis or focal lesions. A diagnosis of isolated unilateral right MCDK was established. As renal function was preserved and the contralateral kidney was normal, conservative management with parental counseling, serial ultrasonographic surveillance, blood pressure monitoring, and periodic renal function assessment was recommended. At early follow-up, the infant remained asymptomatic with appropriate growth and no episodes of urinary tract infection.

Conclusion:
This case highlights the incidental postnatal diagnosis of unilateral multicystic dysplastic kidney during evaluation for an unrelated neonatal complaint. Ultrasonography remains the diagnostic modality of choice because of its characteristic imaging features and ability to assess the contralateral kidney. Recognition of isolated unilateral MCDK facilitates appropriate counseling, avoids unnecessary surgical intervention, and supports long-term conservative surveillance to preserve renal health.

Keywords: Congenital Abnormalities, Infant, Kidney Diseases, Neonate, Ultrasonography

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INTRODUCTION

Multicystic dysplastic kidney (MCDK) is one of the most common congenital anomalies of the kidney and urinary tract (CAKUT) and represents a severe developmental malformation characterized by the replacement of normal renal parenchyma with multiple non-communicating cysts of varying sizes separated by dysplastic connective tissue. The condition results from abnormal interaction between the ureteric bud and metanephric blastema during early embryogenesis, leading to failure of normal nephron formation and absence of functional renal tissue. The incidence of MCDK has been estimated to range from approximately 1 in 1,000 to 1 in 4,300 live births, with unilateral disease accounting for nearly 80–90% of cases. Bilateral involvement is uncommon and is generally incompatible with life because of severe renal insufficiency and associated pulmonary hypoplasia.[1]

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The widespread use of routine antenatal ultrasonography has significantly altered the epidemiology of MCDK diagnosis. Currently, the majority of cases are identified during the second-trimester anomaly scan, allowing appropriate prenatal counseling and postnatal follow-up planning. However, a small proportion of patients continue to present after birth either because prenatal imaging was unavailable, inadequate, or because the anomaly remained undetected. In such situations, the diagnosis is often incidental during imaging performed for unrelated clinical complaints.[2] Recognition of these incidental cases is important because MCDK itself is usually asymptomatic and does not require immediate surgical intervention.

Ultrasonography remains the primary imaging modality for diagnosing MCDK. The characteristic sonographic appearance includes an enlarged or irregular kidney replaced by multiple non-communicating cysts of varying sizes with absence of normal corticomedullary differentiation and lack of a recognizable renal pelvis. Demonstration of a normal contralateral kidney is equally important because long-term renal function depends almost entirely on the solitary functioning kidney. Differential diagnoses include severe hydronephrosis secondary to pelviureteric junction obstruction, multilocular cystic nephroma, autosomal recessive polycystic kidney disease, and cystic Wilms tumor, all of which require careful radiological distinction.[3]

The management of unilateral MCDK has evolved considerably over the past two decades. Earlier recommendations favored routine nephrectomy because of concerns regarding hypertension, recurrent urinary tract infections, and possible malignant transformation. However, contemporary evidence indicates that these complications are uncommon, and spontaneous involution of the dysplastic kidney occurs in a significant proportion of children. Consequently, conservative management with periodic ultrasonographic surveillance, blood pressure monitoring, and assessment of renal function has become the accepted standard of care for uncomplicated unilateral MCDK.[4]

Long-term prognosis is generally excellent when the contralateral kidney is structurally and functionally normal. Nevertheless, associated congenital anomalies involving the urinary tract, including vesicoureteric reflux, ureteropelvic junction obstruction, and contralateral renal dysplasia, may occur in a subset of patients, necessitating careful postnatal evaluation and follow-up. Early identification of these associated abnormalities is essential for preserving renal function and minimizing long-term complications.[5]

We report a neonate who underwent abdominal ultrasonography for evaluation of excessive crying, during which the right kidney was found to be enlarged and replaced by multiple non-communicating cysts of varying sizes, consistent with multicystic dysplastic kidney, while the left kidney was normal in morphology and echotexture. The case highlights the incidental detection of unilateral MCDK in an otherwise asymptomatic neonate and underscores the pivotal role of ultrasonography in diagnosing clinically silent congenital renal anomalies.

CASE REPORT

A full-term neonate was brought for ultrasonography with a history of excessive crying since birth. The infant was born by normal vaginal delivery following an uneventful pregnancy, with no history of birth asphyxia, neonatal intensive care unit admission, or antenatal complications. Antenatal ultrasonography records were unavailable. There was no history of fever, vomiting, poor feeding, abdominal distension, decreased urine output, hematuria, passage of abnormal urine, or respiratory distress. Family history was non-contributory, and there was no known history of congenital renal disease.

On examination, the neonate was alert, active, and hemodynamically stable. Vital parameters were within normal limits for age. The infant appeared well hydrated, and systemic examination was unremarkable. Abdominal examination revealed a soft, non-distended abdomen without palpable masses or organomegaly. No costovertebral angle tenderness or other abnormal clinical findings were noted. To exclude an intra-abdominal cause for the persistent excessive crying, ultrasonography of the abdomen and pelvis was performed using a high-frequency pediatric transducer.

Ultrasonography demonstrated an enlarged right kidney measuring 5.39 × 3.39 cm, which was almost completely replaced by multiple non-communicating anechoic cysts of varying sizes, with marked thinning and near-complete absence of identifiable normal renal parenchyma (Figure 1). No recognizable pelvicalyceal system was identified within the affected kidney, and there was no evidence of hydronephrosis or renal calculi. The sonographic appearance was characteristic of multicystic dysplastic kidney (MCDK).

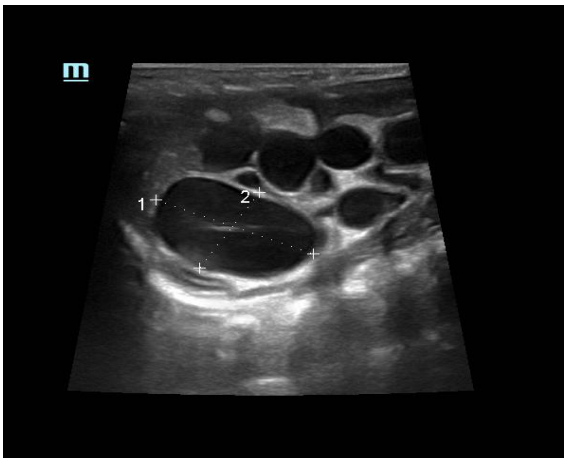

Figure 1:- Ultrasonography of the right kidney showing an enlarged kidney (5.39 × 3.39 cm) almost completely replaced by multiple non-communicating cysts of varying sizes with near-complete absence of normal renal parenchyma, consistent with multicystic dysplastic kidney

The left kidney was normal in size, shape, position, echogenicity, and corticomedullary differentiation, with no evidence of hydronephrosis, renal calculi, or focal renal lesions. The urinary bladder was adequately distended with normal wall thickness, and no other abdominal abnormalities were identified on ultrasonography.

Routine laboratory investigations, including complete blood count, serum creatinine, blood urea nitrogen, serum electrolytes, and urinalysis, were within normal neonatal reference ranges. There was no laboratory evidence of urinary tract infection or

Based on the characteristic ultrasonographic findings, a diagnosis of isolated unilateral right multicystic dysplastic kidney was established. As the contralateral kidney was structurally normal and the infant remained clinically stable with preserved renal function, conservative management was advised. The parents were counseled regarding the benign natural history of unilateral MCDK, the excellent prognosis associated with a normal contralateral kidney, and the importance of regular follow-up.

DISCUSSION

Multicystic dysplastic kidney represents the most severe end of the spectrum of renal dysplasia resulting from abnormal embryological interaction between the ureteric bud and metanephric mesenchyme. The malformed kidney lacks functional nephrons and consists of multiple non-communicating cysts separated by dysplastic connective tissue. Although unilateral MCDK is relatively common among congenital renal anomalies, most affected infants remain clinically asymptomatic because the contralateral kidney undergoes compensatory hypertrophy and maintains adequate renal function.[6]

In the present case, the neonate underwent ultrasonographic evaluation solely because of excessive crying, and the right kidney demonstrated multiple non-communicating cysts of varying sizes with virtual absence of normal renal parenchyma, whereas the left kidney was completely normal. Importantly, there was no evidence to suggest that the renal anomaly was responsible for the presenting complaint. This emphasizes an important clinical principle that incidental congenital anomalies should not automatically be considered the cause of nonspecific neonatal symptoms. Instead, they should prompt appropriate evaluation and long-term surveillance while clinicians continue searching for the actual etiology of the presenting complaint when necessary.

Ultrasonography remains the cornerstone for diagnosing MCDK because of its excellent sensitivity, lack of ionizing radiation, and ability to characterize cyst morphology. Typical findings include multiple variable-sized, non-communicating cysts replacing the renal parenchyma without a normal collecting system. These imaging features reliably differentiate MCDK from severe hydronephrosis, in which dilated calyces communicate with the renal pelvis, and from inherited polycystic kidney diseases, which usually demonstrate bilateral involvement with numerous microscopic cysts and enlarged echogenic kidneys.[7]

The presence of a structurally normal contralateral kidney significantly influences prognosis. Several longitudinal studies have demonstrated that children with isolated unilateral MCDK generally maintain normal renal function throughout childhood and adulthood owing to compensatory hypertrophy of the unaffected kidney. Nevertheless, approximately 20–40% of patients may have associated anomalies of the contralateral urinary tract, including vesicoureteric reflux or ureteropelvic junction obstruction, highlighting the importance of careful baseline evaluation and continued follow-up.[8]

Management strategies have changed substantially over the past three decades. Routine nephrectomy, previously advocated because of concerns regarding hypertension, infection, and malignant transformation, has largely been abandoned. Current guidelines recommend conservative management for asymptomatic unilateral MCDK with periodic ultrasonography, blood pressure monitoring, renal function assessment, and parental counseling regarding protection of the solitary functioning kidney. Surgical intervention is reserved for exceptional circumstances such as persistent abdominal mass, recurrent infection attributable to the dysplastic kidney, uncontrolled hypertension, or diagnostic uncertainty.[9]

The present case reinforces the excellent diagnostic capability of ultrasonography in detecting clinically silent congenital renal anomalies during evaluation for unrelated complaints. Recognition of the characteristic imaging appearance prevented unnecessary investigations and facilitated appropriate counseling of the family regarding prognosis and follow-up. Early identification of unilateral MCDK also allows timely monitoring of the contralateral kidney, which ultimately determines long-term renal outcome. Our case adds to the limited literature describing incidental postnatal diagnosis of unilateral MCDK in an otherwise healthy neonate and supports the current consensus favoring conservative management in the absence of complications.[10]

CONCLUSION

This case highlights the value of ultrasonography in the incidental detection of unilateral multicystic dysplastic kidney in an otherwise asymptomatic neonate. Recognition of its characteristic imaging features enables accurate diagnosis, appropriate parental counseling, and avoidance of unnecessary surgical intervention. A structurally normal contralateral kidney confers an excellent prognosis, while regular clinical and ultrasonographic follow-up remains essential to monitor renal growth, function, and associated urinary tract anomalies.

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