



Ureterocele in a Newborn with Bilateral Vesicoureteral Reflux and Poor Renal Function

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Description

Ureterocele is a rare congenital anomaly characterized by cystic dilatation of the distal ureter as it enters the bladder. In newborns, it can present a particularly challenging clinical scenario when associated with bilateral Vesicoureteral Reflux (VUR) and compromised renal function. This triad represents a complex interplay of developmental anomalies, urinary tract obstruction, and renal parenchymal injury, which can have significant implications for long-term renal health. Understanding the pathophysiology, diagnosis, and management of such cases is crucial for pediatric urologists and nephrologists seeking to optimize outcomes and preserve renal function.

The embryologic origin of ureterocele involves abnormal development of the distal ureteral bud, which may fail to canalize properly during early gestation. The resulting cystic dilatation protrudes into the bladder lumen, and in some instances extends beyond the bladder neck into the urethra. Ureteroceles are classified based on their location and the presence of duplex

systems. Orthotopic ureteroceles arise at the normal site of the ureteral orifice, whereas ectopic ureteroceles are displaced from the trigone, often associated with a duplicated collecting system. In the context of a newborn with bilateral VUR and poor renal function, the ureterocele may be bilateral or involve one side with compensatory reflux on the contralateral kidney. The presence of obstruction, impaired drainage, and retrograde flow creates a milieu for progressive renal damage if not identified and managed promptly.

Bilateral vesicoureteral reflux further complicates the clinical picture. VUR occurs when urine flows retrograde from the bladder into the ureters and renal collecting systems. It may result from congenital incompetence of the ureterovesical junction or be secondary to obstruction, as in the case of an ureterocele. Reflux exposes the renal parenchyma to recurrent high-pressure urine flow and increases susceptibility to infections. In neonates, even a single episode of infection can precipitate parenchymal scarring due to the immaturity of the immune response and renal tissue. When bilateral VUR accompanies an ureterocele, both kidneys are at risk, which may explain the observation of poor renal function in affected newborns. The functional impairment may be present at birth or may develop rapidly during the neonatal period due to ongoing obstruction and infection.

The clinical presentation in newborns is often subtle but may include palpable abdominal masses, urinary tract infections, hematuria, failure to thrive, or oliguria. Antenatal ultrasonography increasingly identifies hydronephrosis, dilated ureters, or cystic masses suggestive of an ureterocele, allowing early postnatal evaluation. Postnatal ultrasonography remains the first-

line imaging modality, demonstrating cystic intravesical lesions with associated hydroureteronephrosis. The ureterocele appears as a thin-walled, round or ovoid cystic structure within the bladder, often at the site of the ureteral orifice. Hydronephrosis may be more pronounced on the affected side, but bilateral involvement can be seen in severe cases.

Further functional assessment is critical, particularly in the setting of suspected renal compromise. Radionuclide renal scintigraphy, such as with Dimercaptosuccinic Acid (DMSA), evaluates differential renal function and identifies cortical scarring. In newborns with ureterocele and bilateral VUR, this study often reveals asymmetric or globally reduced function. Additionally, a diuretic renogram using Mercaptoacetyltriglycine (MAG3) or Diethylenetriaminepentaacetic Acid (DTPA) assesses drainage from the renal pelvis into the ureter and bladder. These studies are instrumental in quantifying obstruction and determining the urgency of surgical intervention. Voiding Cystourethrography (VCUG) is the gold standard for evaluating VUR, demonstrating the presence, grade, and bilateral nature of reflux. High-grade reflux in combination with ureterocele-associated obstruction represents a significant risk factor for progressive renal injury.

The prognosis in newborns with ureterocele, bilateral VUR, and poor renal function depends largely on the severity of obstruction and the degree of initial renal

impairment. Early recognition and intervention improve outcomes, allowing preservation of functional nephrons and minimizing the risk of long-term complications. Advances in prenatal imaging have facilitated early diagnosis, while minimally invasive surgical techniques have reduced morbidity and improved postoperative recovery. Nevertheless, lifelong surveillance is recommended, as residual or recurrent reflux, infection, or renal insufficiency may emerge later in childhood or adolescence.

Conclusion

Ureterocele in a newborn associated with bilateral vesicoureteral reflux and poor renal function is a rare but clinically significant constellation. It combines obstructive and refluxive pathology, creating a high-risk environment for renal injury. Timely diagnosis through a combination of ultrasonography, VCUG, and renal scintigraphy is essential, while management typically involves a combination of surgical intervention, infection prophylaxis, and careful follow-up. Preservation of renal function remains the primary goal, with individualized treatment strategies dictated by the degree of obstruction, severity of reflux, and residual renal capacity. With modern diagnostic and therapeutic approaches, favorable outcomes can be achieved, though lifelong monitoring remains imperative to address potential late complications and ensure optimal renal health.