



# Neonatal Urinoma Associated with Ascites in a Newborn with a Solitary Kidney

Emil Dorosiev<sup>1</sup>, Gabriela Minova<sup>1</sup>, Boris Mladenov<sup>1</sup>, Teofil Pelov<sup>1</sup>, Stoyan Peev<sup>1</sup>

<sup>1</sup> Clinic of Urology, NI Pirogov UMHATEM, Sofia, Bulgaria

**Corresponding author:** Boris Mladenov, Clinic of Urology, NI Pirogov UMHATEM, 21 Totleben Blvd., Sofia 1000, Bulgaria; Email: boris\_mladenov@abv.bg; Tel.: +359 884 551 093

**Received:** 6 June 2021 ♦ **Accepted:** 20 Sep 2021 ♦ **Published:** 31 Dec 2022

**Citation:** Dorosiev E, Minova G, Mladenov B, Pelov T, Peev S. Neonatal urinoma associated with ascites in a newborn with a solitary kidney. *Folia Med (Plovdiv)* 2022;64(6):998-1002. doi: 10.3897/folmed.64.e69787.

## Abstract

Fetal urinomas are often diagnosed in prenatal ultrasonography. The etiology is usually an obstructive uropathy leading to hydronephrosis and increased intrarenal pressure putting future kidney function at risk. Rupture of pyelocaliceal system in such cases may lead to retroperitoneal urinoma or urinary ascites, sepsis, uraemia, and acute renal failure. On the other hand, this may serve as “pop-off valve” mechanism decreasing intrarenal pressure and protecting from definitive kidney function loss. We present a case of a newborn girl with a retroperitoneal urinoma, ascites, uraemia, and obstruction of a solitary right kidney, which was successfully treated minimally invasively through peritoneal and retroperitoneal drainage and intubation of the right ureter with a DJ stent shortly after birth.

## Keywords

calyceal rupture, fetal urinoma, obstructive uropathy, percutaneous drainage, ureteral stenting

## INTRODUCTION

Fetal urinoma persisting after birth is rare and is usually an encapsulated or poorly demarcated collection caused by extravasation of urine into the perirenal space. Predisposing factors are dysplasia of the renal parenchyma, obstruction of the urinary tract and breach of the integrity of the collecting system.<sup>[1-3]</sup>

Fetal urinomas are associated with obstructive uropathy as a secondary phenomenon in cases of newborns with posterior urethral valves or pyeloureteral obstructions. Urinomas are identified in 3-17% of newborns with posterior urethral valves. Lower urinary tract obstruction (LUTO) includes proximal urethral obstruction, enlarged fetal urinary bladder, varying degrees of hydronephrosis, and calyceal dilatation. Fetal urinomas have also been documented as a result of traumatic amniocentesis.<sup>[4]</sup>

The condition is often diagnosed during prenatal ultrasound examination. Amniotic fluid can range from com-

plete anhydramnios to a relatively normal amount of amniotic fluid.

The extravasation of urine into the paranephric space in the event of increased pressure in the upper urinary tract acts as a ‘pop-off valve’ – a protective mechanism preserving the renal parenchyma and renal function. Other authors define the formation of urinoma as secondary to the damage to renal parenchyma.<sup>[5,6]</sup>

Neonatal perirenal urinomas are associated with significantly decreased or absent function in the affected kidney.<sup>[7,8]</sup> Meta-analyses show a probability of a non-functioning ipsilateral kidney in up to 80% of cases; however, these data remains debatable.<sup>[9]</sup>

The probability of preservation of renal function is higher in urinomas associated with lower urinary tract obstruction compared to those in the upper tract.<sup>[10]</sup> Additional prognostic factors are age at onset and concomitant pathology.

Early prenatal and postpartum diagnosis through ultrasound, MRI or CAT and rapid drainage by percutaneous nephrostomy or ureteral catheterization prevent further

damage to the renal parenchyma and reduce the necessity for extensive surgery.

## CASE REPORT

We present a case of a 12-day-old female newborn weighing 1900 g at the time of transfer to our clinic.

The history was taken from medical records. In the twenty-first week of gestation, a fetal morphology examination revealed a female fetus with no visible structural defects corresponding to biometric indicators of gestational age. No ultrasound markers were found to indicate an increased risk of chromosomal abnormalities, utero-placental blood flow was normal.

Pregnancy proceeded normally from the third to the thirty-second week of gestation when a massive ascites of the fetus was found with an unclear cause – bladder not visualized, decreased amount of amniotic fluid, subcutaneous edema. Termination of pregnancy was recommended.

At the thirty-third week of gestation, the mother was referred for corticosteroid therapy and delivery.

The child was born by an emergency caesarean section with an Apgar score of 3 and severe general condition – acrocyanosis, and muscular hypotension. The baby was intubated at 3 minutes and placed on mechanical ventilation in SIPPV mode, and inotropic therapy and surfactant were administered. Due to progressive ascites, increasing values of serum urea and creatinine and lack of diuresis, a peritoneal drainage was placed. After evacuation of the urine ascites, peritoneal dialysis was performed and the newborn was transferred to a pediatric urological department due to the continuous lack of diuresis.

Due to inactive abdominal drainage and high serum urea and creatinine values, CAT urography followed by dialyses was performed revealing a liquid collection in the retroperitoneum around the right kidney and a kidney-like hypoplastic structure on the left, without contrast perfusion (Fig. 1).

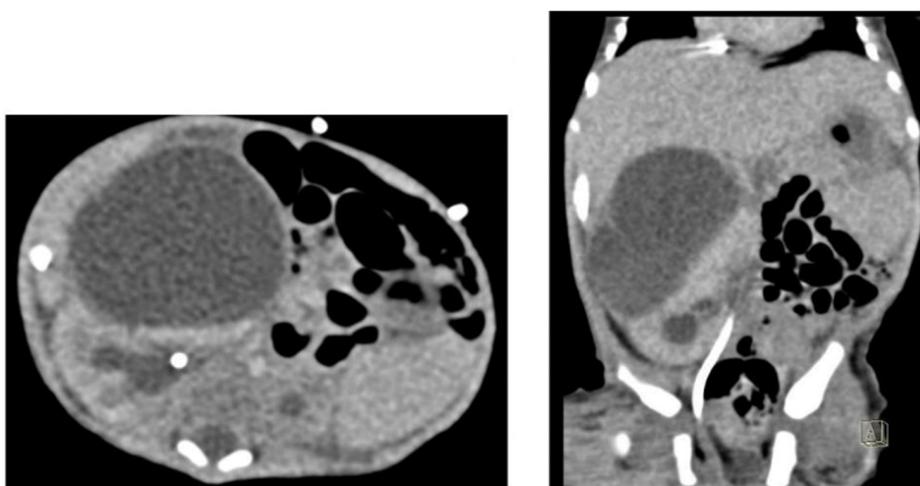
CAT urography was followed by cystoscopy under general anesthesia – the two ureteral orifices were identified on their normal anatomical places. A 3CH prosthesis was inserted into the right ureter and a rupture of the upper calyx was verified through retrograde pyelography (Fig. 2).

The right ureter was intubated by a 5CH DJ stent. The perirenal urinoma was drained by percutaneous nephrostomy 8CH, where about 70 ml of thick foul-smelling liquid was evacuated (Fig. 3). A permanent urethral catheter was inserted into the urinary bladder. The peritoneal drain was removed at 2 days. After a few days, there was an improvement in the general condition and normalization of laboratory values was registered. Antibiotic and anti-inflammatory therapy was applied. On the fifth postoperative day, due to lack of activity, the paranephric drain was removed. The catheter was removed on the tenth postoperative day. The child was discharged from hospital with normal values of urea, creatinine, and electrolytes and adequate diuresis. The DJ stent was extracted after one month.

Ultrasound control at the discharge revealed a right kidney with preserved size, increased echogenicity of the parenchyma, dilated pyelo-calyx system – hydronephrosis 1<sup>st</sup> degree. The left kidney was not visualized. The patient was referred for a follow-up with CAT urography and dynamic renal scintigraphy with <sup>99m</sup>Tc-MAG3 (Fig. 4).

## DISCUSSION

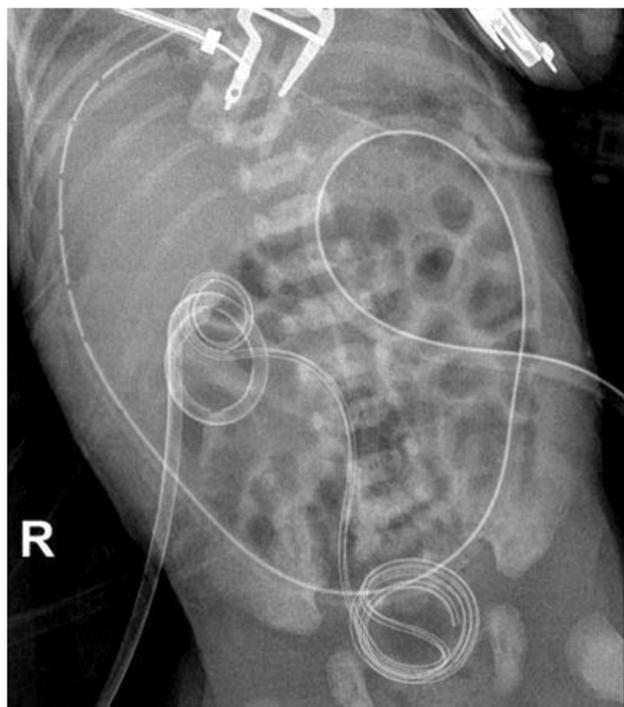
When intrauterine obstructive uropathy is present, the upper urinary tract is exposed to high pressure. This can lead to varying degrees of cystic renal dysplasia. There are mechanisms that could prevent irreversible kidney damage, such as vesicoureteral reflux, formation of bladder diverticulum, and urine extravasation.<sup>[11]</sup> Extravasation at the level of a calyceal fornix leads to formation of urinoma around the kidneys, engaging the relevant retroperitoneal half or freely communicating with the peritoneal cavity, causing urinary ascites.



**Figure 1.** The collection in the right kidney is located ventrally 53×35×56 mm in size and an approximate volume of 104 cm<sup>3</sup> resulting from a lesion of the upper group calyx; left – transversal, right – coronal view.



**Figure 2.** Retrograde pyelography on the right – contrast extravasation at the level of the upper calyx.



**Figure 3.** DJ stent in the right ureter, percutaneous drainage of the infected urinoma on the right and peritoneal drainage.



**Figure 4.** CAT after discharge from the hospital.

In our case, the rupture of the level of renal upper calyx resulted in perirenal urinoma and secondary to urinary ascites, but thanks to it, the pressure in the solitary kidney decreased and the renal function was preserved.

Such findings require active treatment in order to decompress the urinary tract by placing an abdominal drain, drainage of the urinary tract in accordance with the level of rupture or open surgery. An indication for abdominal centesis is fetal distress syndrome.

In case of continuing urine extravasation, a percutaneous nephrostomy tube or ureteral stent may be placed in an attempt to spontaneously close the lesion.<sup>[12,13]</sup> In the most severe cases and when conservative drainage methods fail, open surgery is applied. Elevated serum creatinine and urea levels may be due to congenital renal failure as well as a consequence of creatinine resorption from urinary ascites.

In the presented clinical case, an abdominal drain was placed in the first hours of the newborn's life and because of the acute renal failure peritoneal dialysis was performed. Due to deteriorating general condition, persistence of ascites, and increase in the urinoma's size to the degree of involvement of the right retroperitoneal half and evidence for increasing inflammatory activity, sequential drainage of the infected urinoma and drainage of the pyelocaliceal system were performed – through percutaneous drainage and ureteral DJ sent.

Considering the rapid recovery of renal function in the presence of dysplastic, non-accumulating contrast structure on the place of the left kidney, we believe that the rupture occurred early in utero, resulting in a sufficiently preserved renal parenchyma to maintain normal nephron function.

Neonatal urinary ascites is a life-threatening condition because the peritoneal membrane ‘autodialyzes’ the urine leading to a progressive increase in blood urea and serum electrolyte abnormalities.

## CONCLUSIONS

In newborns with obstructive uropathy, ruptures of the pyelocaliceal system occurring early during intrauterine development may be a preserving mechanism for sufficiently healthy renal parenchyma after birth. Diagnostic tools are CT urography and retrograde pyelography. Active treatment after delivery is required – draining the urinary tract, placing percutaneous drainage of the retroperitoneal urinoma and the peritoneal cavity, when urinary ascites is present.

## Acknowledgements

The authors have no support to report.

## Funding

The authors have no funding to report.

## Competing Interests

The authors have declared that no competing interests exist.

## REFERENCES

1. Oktar T, Salabas E, Kalelioglu I, et al. Fetal urinoma and prenatal hydronephrosis: How is renal function affected? *Turk Urol Derg* 2013; 39(2):96–100.
2. Razzaboni GI. Ricerche sperimentali sulla pseudo-idronefrosi [Experimental research on pseudo-hydronephrosis]. *Arch Ital Chir* 1922; 6:365–72 [Italian].
3. Aizenstein R, Owens C, Sabnis S, et al. The perinephric space and renal fascia: review of normal anatomy, pathology, and pathways of disease spread. *Crit Rev Diagn Imaging* 1997; 38:325–67.
4. Miller M, Korzets Z, Blumenfeld Y, et al. Fetal urinoma as a sign of a dysplastic kidney. *Pediatr Nephrol* 2003; 18:65–7.
5. Yitta S, Saadai P, Filly R. The fetal urinoma revisited. *J Ultrasound Med* 2014; 33:161–6.
6. Gorincour G, Rypens F, Toivianen-Salo S, et al. Fetal urinoma: Two new cases and a review of the literature. *Ultrasound Obstet Gynecol* 2006; 28(6):848–52.
7. Connor JP, Hensle TW, Berdon W, et al. Contained neonatal urinoma: management and functional results. *J Urol* 1988; 140:1319–21.
8. Miller M, Korzets Z, Blumenfeld Y. Fetal urinoma as a sign of dysplastic kidney. *Pediatr Nephrol* 2003; 18:65–7.
9. Stathopoulos L, Merrot T, Chaumoitre K, et al. Prenatal urinoma related to ureteropelvic junction obstruction: poor prognosis of the affected kidney. *Urology* 2010; 76:190–4.
10. Kleppe S, Schmitt J, Geipel A. Impact of prenatal urinomas in patients with posterior urethral valves and postnatal renal function. *J Perinat Med* 2006; 34:425–8.
11. Rittenberg MH, Hulbert WC, Snyder HM, et al. Protective factors in posterior urethral valves. *J Urol* 1988; 140(5):993–6.
12. Lang EK, Glorioso 3rd L. Management of urinomas by percutaneous drainage procedures. *Radiol Clin North Am* 1986; 24(4):551–9.
13. Matthews LA, Smith EM, Spirnak JP. Nonoperative treatment of major blunt renal lacerations with urinary extravasation. *J Urol* 1997; 157(6):2056–8.

# Неонатальная уринома, связанная с асцитом у новорожденного с единственной почкой

Емил Доросиев<sup>1</sup>, Габриела Минова<sup>1</sup>, Борис Младенов<sup>1</sup>, Теофил Пелов<sup>1</sup>, Стоян Пеев<sup>1</sup>

<sup>1</sup> Клиника урологии, УМБАЛСМ „Н. И. Пирогов“, София, Болгария

**Адрес для корреспонденции:** Борис Младенов, Клиника урологии, УМБАЛСМ „Н. И. Пирогов“, бул. „Тотлебен“, София 1000, Болгария;  
E-mail: boris\_mladenov@abv.bg; Тел.: +359 884 551 093

---

**Дата получения:** 6 июня 2021 ♦ **Дата приемки:** 20 сентября 2021 ♦ **Дата публикации:** 31 декабря 2022

---

**Образец цитирования:** Dorosiev E, Minova G, Mladenov B, Pelov T, Peev S. Neonatal urinoma associated with ascites in a newborn with a solitary kidney. Folia Med (Plovdiv) 2022;64(6):998-1002. doi: 10.3897/folmed.64.e69787.

---

## Резюме

Уриномы плода часто диагностируются при пренатальном УЗИ. Этиология обычно представляет собой обструктивную уропатию, ведущую к гидронефрозу и повышению внутрипочечного давления, что ставит под угрозу функцию почек в будущем. Разрыв чашечно-лоханочной системы в таких случаях может привести к забрюшинной уриноме или мочевому асциту, сепсису, уремии и острой почечной недостаточности. С другой стороны, это может служить механизмом «открывающегося клапана», снижающего внутрипочечное давление и защищающего от окончательной потери функции почек. Представлен случай новорожденной девочки с забрюшинной уриномой, асцитом, уреемией и обструкцией единственной правой почки, успешно пролеченной малоинвазивно путём перитонеального и забрюшинного дренирования и интубации правого мочеточника стентом Double J вскоре после рождения.

---

## Ключевые слова

разрыв чашечки, уринома плода, обструктивная уропатия, чрескожное дренирование, стентирование мочеточника

---